INTRODUCTION

University of California San Diego
Division of Rheumatology/Allergy-Immunology

Rheumatology Fellowship Curriculum and Training Manual, and Specific Expectations of Fellows at Each Level of Training

Our goals are to train Rheumatology specialists who will provide expert medical care for patients with rheumatic disorders and can serve as consultants, educators, and physician scientists in rheumatic disorders and diseases.

To accomplish these goals, the Rheumatology training program will provide trainees an academic environment that fosters the development of excellence in the practice of the field, encompassing the full spectrum of clinical and basic rheumatology including professional conduct and ethics. The Rheumatology faculty will provide an environment of inquiry and scholarship as well as clinical discussions, rounds, journal clubs, and research conferences to support residents’ participation in scholarly activities.

The fellowship program consists of two structured clinical years, but all trainees may not progress through training at the same pace. Opportunities for enrichment and/or remedial work are offered when and where the need applies.

You are embarking on a training program that will enable you to practice an exciting, clinically oriented subspecialty. Rheumatologists are experts in diagnosing and treating inflammatory and degenerative diseases of connective tissue. We pride ourselves on making diagnoses largely based on the traditional internal medicine skills of history and physical examination. We provide a unique bridge between internal medicine, radiology, orthopedic surgery, and rehabilitation medicine.

In the next two years, you will receive comprehensive and rigorous, high-caliber training in rheumatology and related clinical fields. In order to succeed in medicine, you need to understand basic and applied science. This is especially true in immunology. This program will help you to understand the pathogenesis of your patients’ immune-mediated diseases; it will also prepare you to undertake treatment with advanced immunosuppressive drugs and biological agents that are currently under development for therapy of rheumatic diseases. This preparation will involve educating fellows in the fast-moving fields of basic immunology, immunogenetics, control of the immune response, and autoimmunity.

Rheumatologists are uniquely equipped to succeed in internal medicine. Our subspecialty is based upon attention to the entire patient and maintenance of the classical skills of medicine. Therefore, most rheumatology practitioners can serve as generalists and primary care providers and if the situation requires it, they are able to practice general internal medicine. In many areas of the country, however, rheumatologists are in great demand and they are able to devote most of their professional time to the practice of rheumatology.
UCSD has a long tradition of training rheumatologists and rheumatology physician-scientists in particular. As part of this tradition, we recognize that patient care always has precedence over other duties, and patient welfare comes first. They are in academic and clinical practice in locations all over the world.

Overall UCSD Rheumatology Educational Plan for Fellows

General:
Each fellow is required to complete a minimum of 12 months of direct patient care activities in the subspecialty of Rheumatology, that includes 24 months of weekly continuity clinic, with a minimum of 2 half-day continuity clinics per week on average, and typically 3.5 to 5 per week averaged over 2 years. This minimum requirement is often exceeded due to our perceived demands for optimum clinical training, in particular for those planning to enter clinical practice or a career in clinical research after graduation. The timing of the clinical rotations is individualized for each fellow, but generally fellows complete a minimum of 12 months of clinical rotations, including at least 6-8 months of consult service activity over 2 years of fellowship. The first and second years of fellowship contain research and clinical elective time, with continuing clinical rotations.

Goals:
To master the basic pathophysiologic principles of Rheumatology, be clinically competent in the care of patients with arthritic disorders, be competent in the procedural and technical skills required for evaluation and care of these patients, and to acquire skills necessary for the critical evaluation and interpretation of basic and/or clinical research in the field.

Objectives:
A. Pathophysiologic Principles
As per learning objectives described below.

B. Clinical and Diagnostic Skills.
As per learning objectives described below.

C. Interpersonal and Communication Skills
Fellows must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, the families of patients, and professional associates.

Fellows are expected to:
1. Create and sustain a therapeutic and ethically sound relationship with patients
2. Use effective listening skills and elicit and provide information using verbal and
writing skills
3. Work effectively with others as a member or leader of a health care team or other professional group.

D. Humanistic Behaviors
Fellows must demonstrate the following behaviors:
1. Availability and accessibility to other providers
2. Cooperation with nursing and other health care professionals
3. Provision of care and comfort in addition to other treatments, including appropriate spiritual and social support
4. Communication with patient and other health care providers.
5. Striving for personal development

E. Medical Ethics
Promote patient autonomy in decision making
Preserve confidentiality of information
Help patients consider/select advance directives
Principles of informed consent
Malpractice and other grievance procedures
Facilitate appropriate termination of doctor-patient relationship and transfer of care
Reproductive issues as they pertain to the management of patients with rheumatologic disorders and the side effects of therapies
Demonstrate skill in delivery of prognostic information, as well as understand the principles of medical futility

F. Technical, Procedural, and Other Skills
Develop competence or expertise in the performance and, where applicable, interpretation of procedures described in the training manual:

G. Practice-Based Learning and Improvement
Fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Fellows are expected to:
Analyze practice experience and perform practice-based improvement activities using a systematic methodology, with the specific goal of increasing patient accrual to clinical trials, and to development of novel treatment strategies.
Locate, appraise, and assimilate evidence from scientific studies related to their patients’ health problems.
Obtain and use information about their own population of patients and the larger
population from which their patients are drawn. Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness. Use information technology to manage information, access on-line medical information, and support personal education. Facilitate the education of students and other health care professionals.

H. Professionalism
Fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.

Specifically, Fellows are expected to:
1. Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development.
2. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices.
3. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender and disabilities.

I. Systems-Based Practice
Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

Specifically, Fellows are expected to:
Understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice.

Know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources. Practice cost-effective health care and resource allocation that does not compromise quality of care. Advocate for quality patient care and assist patients in dealing with system complexities. Know how to partner with health care managers and health care providers to assess, coordinate, and improve health care and know how these activities can affect system performance.
J. Quality Assessment
Understand principles and objectives of quality assessment of procedures and clinical care. Demonstrate knowledge of the process of quality assessment and use of outcome data to improve quality assessment and to improve quality of delivered care.
Expectations of fellows at each level of training

It is expected that each fellow’s ability to function independently will increase throughout the training period, and intensity of supervision will be altered as appropriate. Generally, in year 1 fellows will be supervised closely and instructed in performing a rheumatologic examination, interpreting roentgenograms, aspirating and injecting joints, examining synovial fluid by microscopy, and planning rehabilitative and therapeutic programs for patients. Fellows in year 2 will generally be able to perform a rheumatologic history and examination, aspirate and inject joints, demonstrate advanced ability to interpret imaging studies, and examine synovial fluid with the attending physician nearby and available on an immediate basis if questions arise.

Global and detailed expectations for fellows in each year of training related to core competencies: Please note, for each duty outlined curriculum aspect, these expectations detailed here are again briefly summarized in the text of the curriculum. Please refer back to this section or contact the Program Director if there any questions remaining about expectations for fellows at each level of training.

UCSD Rheumatology residents are provided with graduated responsibilities consistent with their level of training. Implicit in the evaluations of fellows by faculty are the faculty expectations, appropriate for year of training of the fellow, of the performance by fellows of their responsibilities in the 6 core competencies, as follows.

First Year Fellows will be responsible for:
A. Conducting independent interviews and examinations of all patients for whom rheumatologic consultation is requested
B. Conducting independent interviews and examinations of all patients referred for admission to the inpatient rheumatology service
C. Formulating an evaluation and treatment plan appropriate to the level of complexity of the case, and writing a clear, thoughtful and thorough note based on their obtained history and physical examination, and containing both assessment and recommendations, which will be reviewed and finalized by the attending faculty. Consultation and/or admission notes should also include references to the literature, where appropriate, to support diagnostic and/or therapeutic decision-making
D. Communicating clearly and regularly with the consult attending, as well as the Local Site Director
E. Coordinating care with the nurse practitioner, other subspecialty services and other departments in complex cases
F. Recommending and ordering appropriate rheumatologic specialty diagnostic tests and interpreting them and looking for system flaws such as incorrect synovial fluid analysis by lab technicians
G. Independently reviewing the rheumatology consultation service patients daily or as needed, and formulating changes in treatment recommendations in conjunction with a
supervising attending.

H. Writing follow-up notes on their consultation patients daily or as appropriate to the level of activity of the case; active patients should have rheumatologic care documented at least six times weekly.

I. Performing necessary rheumatologic procedures (joint, bursal and/or soft tissue aspirations/injections; polarized microscopy examination for crystals) under the direct supervision of certified senior physicians, or independently once the first year fellow competency in the procedures has been certified

J. Once certified, instructing and supervising house officers in injection/aspiration of knees as well as straightforward soft tissue injections.

K. Serving as educators to the residents and others on the teams for which consultations are rendered.

L. Supervising residents and medical students in the UCSD and VA arthritis continuity clinics.

M. Creating a sign out for their covering rheumatology fellows and directly communicating the sign out issues to covering fellow.

N. Ordering cyclophosphamide and biologics, and coordinating cyclophosphamide and biologic administration in rheumatologic patients for whom this therapy is indicated, in direct consultation with the attending rheumatology faculty.

O. Presenting cases regularly at UCSD rheumatology conferences.

Second Year Fellows, in addition to the above-described responsibilities, are responsible for higher level performance in the core competencies via:

P. Writing clinic and consult notes that are thoughtful and generally more sophisticated than in the first year. It is anticipated that second year fellow consultation notes and discussions of cases with faculty will generally include a didactic component.

Q. Taking a lead role in designing performance improvement projects.

R. Taking lead initiative in decisions about starting and changing regimens of biologics in rheumatologic patients for whom this type of therapy is indicated, while remaining in direct consultation with the attending rheumatology faculty.

S. Driving case collection for radiology and pathology case conferences, as discussed above.

T. In the absence of an attending rheumatologist, instructing and supervising first year fellows in all rheumatologic procedures (joint, bursal and soft tissue aspiration/injection) in which the first year fellow has not achieved certified competency (this presumes that all fellows will have achieved competency in all procedures by the time of entry to the second year). Note that while second year fellows can supervise first year fellows in these procedures, they cannot validate their own or the first year fellow's procedure log to document competency in this circumstance.

U. Taking a lead role in identifying system flaws such as in appointment scheduling or lab errors.

According to Core Competencies, graded expectations are
First Year:
1. Patient Care: A, B, C, F, G, I, N
2. Medical Knowledge: B, F, K, O
3. Practice-Based Learning and Improvement: C, F, G, I, O
5. Professionalism: C, D, E, G, H, J, L, M, O
6. Systems-Based Practice: E, F, L, M

Second Year
1. Patient Care: P, R
2. Medical Knowledge: P, R
3. Practice-Based Learning and Improvement: P, Q
4. Interpersonal and Communication Skills: P, Q, S, T, U
5. Professionalism: P, Q, S, T, U
6. Systems-Based Practice: Q, U
Detailed Description of Major Features of the 3 Available Training Tracks in this Fellowship:

   • A 2 year training track for rheumatologists committed to a career in clinical practice (or as an academic clinician scholar) following a standard ACGME 2 year training program for board eligibility in Rheumatology

Rheumatology Clinical Teaching Faculty:
Robert Terkeltaub (Program Director)
Maripat Corr (Associate Program Director)

Other Professors: Gary Firestein, Arthur Kavanaugh, Ken Kalunian, Mark Ginsberg, Harry Bluestein, Gregg Middleton

Assistant and Associate Professors: Susan Lee, Susan Sweeney, Nunzio Bottini, Arnoldas Ceponis, Monica Guma

Community Faculty (including from the Scripps, Kaiser, and Sharp Health Care systems): Bonnie Hepburn, Adrian Jaffer, Alan Cohen, John Scavulli, Katherine Nguyen, Jeannie Chao, Brian Anderson, Zuhre Tutuncu, Peter Weis

Featured Clinical Activities:
*Clinics:
   • UCSD General Rheumatology Continuity Clinic
   • VA Medical Center General Rheumatology Continuity Clinic
   • UCSD SLE/Systemic Immune-Mediated Disease Focused Continuity Clinic
   • UCSD Ultrasound Clinic
   • Pediatric Rheumatology Clinic (Rady Children's Hospital)
   • UCSD Ortho/Sports Medicine Elective Clinic

*Rheumatology Inpatient Consult Service (UCSD and VA)

*Teaching Conferences:
Rheumatology Grand Rounds
Rheumatology Case Conferences
Rheumatology San Diego City-Wide Teaching Conference (with Scripps program and the San Diego Rheumatology Community)
Combined Rheumatology and Allergy Clinical Grand Rounds
Rheumatology Formal Ultrasound Curriculum Conferences
Core Curriculum Conferences
Rheumatology-Radiology Teaching Rounds
Rheumatology-Immunology Research Conference
Inter-Disciplinary Conferences (With UCSD Orthopedics, Ophthalmology, Pathology, Renal, and Dermatology Faculty)
Rheumatology Journal Club

*Rheumatology Research Elective Time (1 Year Total)
  • Clinical and translational research testing novel therapies at the Center for Innovative Therapy (http://health.ucsd.edu/specialties/cit/Pages/default.aspx), including biologics and other forms of immune modulation, or at the VA and other sites offering training in HSR&D, outcomes research, and tele-medicine.

2. Clinical-Translational Rheumatology Research Track
  • Board eligibility after 2 years of training employing most of the same array of clinical training activities in the clinical track
  • Designed as a 3 Year T32-supported Training Track
  • NIH-funded CREST K30 Courses in Clinical Research Methodology:
    As a component of the CREST program, trainees have the opportunity to obtain either a Masters of Advanced Studies (MAS) or a Masters of Public Health (MPH) degree in conjunction with San Diego State University School of Public Health.
  • Full Integration with UCSD NIH CTSA program
  • Specialized Rheumatology Clinical Research Journal Club for This Track
  • Clinical and translational research testing novel therapies at the Center for Innovative Therapy (http://health.ucsd.edu/specialties/cit/Pages/default.aspx), including biologics and other forms of immune modulation, or at other sites offering training in HSR&D and outcomes research.

Training opportunities include work with these mentors:
Clinical Research, Clinical Epidemiology, Outcomes, HSR&D:

Arthur Kavanaugh http://raidivision.ucsd.edu/Faculty/Pages/arthur-kavanaugh.aspx

(Director Center for Innovative Therapy; Rheumatic disease translational research in biologics, outcomes, diagnostic tools, clinical trials methodology)

Ken Kalunian http://raidivision.ucsd.edu/Faculty/Pages/kenneth-kalunian.aspx

(SLE and Osteoarthritis clinical research, including biologics development, and inception cohort studies)

Susan Lee http://raidivision.ucsd.edu/Faculty/Pages/susan-lee.aspx

(HSR&D, tele-rheumatology, outcomes)

Robert Terkeltaub http://raidivision.ucsd.edu/Faculty/Pages/robert-terkeltaub.aspx

(Clinical Research in Gout)
Bruce Zuraw and Marc Riedl (Clinical-Translational Research in Angioedema and Drug Hypersensitivity, Based in the US HEAE Association Angioedema Center)
http://www.haea.org/angioedema-center/
http://raidivision.ucsd.edu/Faculty/Pages/bruce-zuraw.aspx
http://raidivision.ucsd.edu/Faculty/Pages/marc-riedl.aspx

-Other research mentors collaborating with the Division include:
Christina Chambers, Andrea Lacroix, Deb Kado (in Family and Preventative Medicine and Epidemiology)

Stephanie Strathdee http://globalhealth.ucsd.edu/Pages/default.aspx (Lab)
http://gph.ucsd.edu/Pages/default.aspx (Personal)
Biomarkers:
Gary Firestein http://raidivision.ucsd.edu/research/firestein-lab/Pages/default.aspx (CTSA PI)
David Boyle http://raidivision.ucsd.edu/Faculty/Pages/david-boyle.aspx
   (Director, CTSA Biomarker Core)
Biomarkers Core and Other Resources of NIH CTSA-funded UCSD Clinical Translational Research Institute (CTRI) http://ctri.ucsd.edu/Pages/default.aspx

Novel Rheumatologic Applications of Ultrasound and Advanced Imaging:

Arnoldas Ceponis http://raidivision.ucsd.edu/Faculty/Pages/arnold-ceponis.aspx
   (eg, Ultrasound for Hemophilic Arthropathy)

Arthur Kavanaugh http://raidivision.ucsd.edu/Faculty/Pages/arthur-kavanaugh.aspx
   (eg, Ultrasound for Enthesopathy, Sjogren’s Syndrome)

Ken Kalunian http://raidivision.ucsd.edu/Faculty/Pages/kenneth-kalunian.aspx
   (Ultrasound in OA)

Donald Resnick http://radiology.ucsd.edu/?q=about-us/people/faculty/donald-resnick
   (Radiology: Advanced Imaging Approaches)

Christine Chung http://radiology.ucsd.edu/?q=about-us/people/faculty/christine-chung
   (Radiology: Functional MRI)
Computational translational biology, including informatics, genomics, proteomics:
Trey Ideker http://chianti.ucsd.edu/idekerlab/ (Lab)
http://chianti.ucsd.edu/idekerlab/pages/ideker.html (Systems Biology, Genetics)

Lucilla Ohno-Machado (Bioinformatics)
http://dbmi.ucsd.edu/display/DBMI/Lucila+Ohno-Machado%2C+MD%2C+PhD
http://dbmi.ucsd.edu/

Kelly Frazer http://igm.ucsd.edu/faculty/profiles/frazer.shtml
(Genomics, Deep Sequencing)

Richard Scheuermann http://www.jcvi.org/cms/about/bios/rscheuermann/
(at J Craig Venter Institute http://www.jcvi.org/cms/about/overview/) (Informatics)

3. Basic-Translational Rheumatology Research Track
• Board eligibility after 2 years of training employing most of the same array of clinical training activities in the clinical track
• Designed as 3 Year T32-supported training track
• Additionally integrated with the UCSD Physician Scientist Training Pathway (PSTP, directed by Mark Ginsberg)
• Specialized Rheumatology Research Journal Club
• Specialized Research Training Courses in Ethics and Grantsmanship for This Track

Training opportunities include work with these mentors:

Innate Immunity, Inflammation, Connective Tissue Biology:
Gary Firestein http://raidivision.ucsd.edu/research/firestein-lab/Pages/default.aspx
(RA Synovial Biology, Kinase Signaling, Epigenetics)
Michael Karin http://pharmacology.ucsd.edu/faculty/karin.html
(Inflammation Transcriptional Signaling)
Mark Ginsberg http://raidivision.ucsd.edu/research/ginsberg-lab/Pages/default.aspx
(Inflammation Biology and Signaling, Leukocyte Adhesion and Trafficking,
Angiogenesis and Vascular Biology in Rheumatic Disease)
Dennis Carson http://raidivision.ucsd.edu/Faculty/Pages/dennis-carson.aspx
http://stemcells.ucsd.edu/faculty/index.html
(Member: Institute of Medicine, National Academy of Sciences; TLR Innate Immunity
in

Translational Immune Modulation, Purine Metabolism in Immunology, Nanotechnology

Jack E Dixon http://biomedsci.ucsd.edu/faculty/faculty_descrip.aspx?id=32
(Member: National Academy of Sciences; Fam20 Secreted Protein Kinases in Arthritis, Mitochondrial Biology in Connective Tissue Disease)

Hal Hoffman http://raidivision.ucsd.edu/research/hoffman-lab/Pages/default.aspx
(Inflammasome Biology and Pediatric Autoinflammatory Diseases)

Robert Terkeltaub http://raidivision.ucsd.edu/research/terkeltaub-lab/Pages/default.aspx
(Interfaces between Inflammation and Connective Tissue Biology, Crystal Arthropathies)

Eyal Raz http://raidivision.ucsd.edu/Faculty/Pages/eyal-raz.aspx
(Mucosal Immunity, Innate Immunity, Translational Immune Tolerization for SLE and RA)

Maripat Corr http://raidivision.ucsd.edu/Faculty/Pages/maripat-corr.aspx
http://raidivision.ucsd.edu/research/corr-lab/Pages/default.aspx
(Innate Immunity in Arthritis, Wnt Signaling in Rheumatic Disease)

Paul Insel http://pharmacology.ucsd.edu/faculty/insel.html (Mechanisms of Fibrosis)

Monica Guma http://raidivision.ucsd.edu/Faculty/Pages/monica-guma.aspx
(Inflammation Signal Transduction, Stem Cell Biology, Angiogenesis)

Ru Liu-Bryan http://raidivision.ucsd.edu/Faculty/Pages/ru-bryan.aspx
(Inflammation Modulation and Metabolic Regulation of Inflammation in Cartilage Disease)

Alex Gingras http://raidivision.ucsd.edu/Faculty/Pages/alexandre-gingras.aspx
(Structural biology of Complement and of Leukocyte Activation)

Bob Sah http://cte.ucsd.edu (Lab) http://cte.ucsd.edu (Personal)
(Biomechanics in Cartilage Biology)

Adaptive Immunity:

Dennis Carson http://raidivision.ucsd.edu/Faculty/Pages/dennis-carson.aspx
http://stemcells.ucsd.edu/faculty/index.html
(B cell biology, and life and death mechanisms, Immune tolerance, immunization and adjuvanticity)

Nunzio Bottini http://raidivision.ucsd.edu/Faculty/Pages/nunzio-bottini.aspx
(T cell signaling, T cell Phosphatases, Nanotechnology)

Maripat Corr http://raidivision.ucsd.edu/Faculty/Pages/maripat-corr.aspx
http://raidivision.ucsd.edu/research/corr-lab/Pages/default.aspx
(Adaptive Immunity in RA, SLE, and Spondyloarthritis)

Mark Ginsberg http://raidivision.ucsd.edu/research/ginsberg-lab/Pages/default.aspx
(B and T cell trafficking and activation)
Susan Sweeney  [http://raidivision.ucsd.edu/Faculty/Pages/susan-sweeney.aspx](http://raidivision.ucsd.edu/Faculty/Pages/susan-sweeney.aspx)
(Innate antiviral IRF defenses in autoimmune disease)
Joseph Cantor  [http://raidivision.ucsd.edu/Faculty/Pages/joseph-cantor.aspx](http://raidivision.ucsd.edu/Faculty/Pages/joseph-cantor.aspx)
(B Cell Signaling, CD96)
Anthony Horner  [http://raidivision.ucsd.edu/Faculty/Pages/anthony-horner.aspx](http://raidivision.ucsd.edu/Faculty/Pages/anthony-horner.aspx)
(Immune Tolerance)

-Mentors based nearby in the La Jolla research community, including:

Mitch Kronenberg (Director, LIAI)  [http://www.liai.org/pages/faculty-kronenberg](http://www.liai.org/pages/faculty-kronenberg)
(Antigen Presentation, NK and iNKT cells)

Mick Croft (LIAI)  [http://www.liai.org/pages/faculty-croft](http://www.liai.org/pages/faculty-croft)
(T cell biology, Translational Immune Tolerance)

Klaus Ley (LIAI)  [http://www.liai.org/pages/faculty-ley](http://www.liai.org/pages/faculty-ley)
(T cell Immunity in Atherosclerosis)
Carl Ware (Sanford-Burnham)  [http://www.sanfordburnham.org/talent/Pages/CarlWare.aspx](http://www.sanfordburnham.org/talent/Pages/CarlWare.aspx) (TNF superfamily, Autoimmunity, Viral Immune Evasion in Rheumatic Diseases)

Allergic inflammation:
David Broide  [http://raidivision.ucsd.edu/research/broide-lab/Pages/default.aspx](http://raidivision.ucsd.edu/research/broide-lab/Pages/default.aspx)
(Lung inflammation and tissue remodeling, Mast Cells)
Bruce Zuraw  [http://raidivision.ucsd.edu/research/zuraw-lab/Pages/default.aspx](http://raidivision.ucsd.edu/research/zuraw-lab/Pages/default.aspx)
(Kinins, Angioedema)
Seema Aceves  [http://raidivision.ucsd.edu/research/aceves-lab/Pages/default.aspx](http://raidivision.ucsd.edu/research/aceves-lab/Pages/default.aspx)
(Eosinophilic Inflammation)
Taylor Doherty  [http://raidivision.ucsd.edu/Faculty/Pages/taylor-doherty.aspx](http://raidivision.ucsd.edu/Faculty/Pages/taylor-doherty.aspx)
(TNF superfamily in lung inflammation)
Basic Mechanisms and Translation in Pediatric and Autoinflammatory Rheumatic Diseases:
Hal Hoffman  http://raidivision.ucsd.edu/research/hoffman-lab/Pages/default.aspx
  (Inflammasome Biology and Pediatric Autoinflammatory Diseases)

Jane Burns  http://nizetlab.ucsd.edu/iii/investigators/burns.html

  (Kawasaki’s Disease Pathophysiology and Immune Modulation Based Therapy)
Lori Broderick (Autoinflammatory Diseases)
Other:

**Stem Cell Biology in Rheumatic Diseases:**

Training and Collaboration Opportunities at the UCSD/Sanford Consortium California Institute for Regenerative Medicine [http://www.sanfordconsortium.org/resources-faq.htm](http://www.sanfordconsortium.org/resources-faq.htm)

**Molecular Medicinal Chemistry in Immunology:**

Training and Collaboration Opportunities at the Scripps Research Institute, including in the Scripps T32 program in Immunology [http://www.scripps.edu/](http://www.scripps.edu/)
GUIDELINES FOR RHEUMATOLOGY FACULTY AND FELLOWS

Attachment A - UCSD Rheumatology
Expectations of faculty
   Details Regarding Specific Expectations of fellows
Prerequisites
Duration of program
Punctuality and courtesy
Clinical responsibilities, vacation requests, attendance at national meetings, call schedule
Lines of authority
Clinical rotations
Research projects
Division teaching conferences
Procedures, faculty supervision of procedures
Suggested textbook, membership in the American College of Rheumatology, subscription to Arthritis and Rheumatism
Location and availability of fellows
Attendance at Department of Internal Medicine teaching conferences
Responsibilities to the Department of Internal Medicine
Increasing clinical responsibilities with increasing level of training
Evaluation of fellows and faculty

Appendix A-H:
Clinical research elective curriculum;
Compulsory Radiology Training
Elective in Medical Orthopedics
Assigned Medical and Research Ethics Reading List
Rheumatology Teaching Rounds and Case Conference Topics and Guidelines
Inservice exams as components of training evaluation
   Interpretation of Clinical Trials in Rheumatology

Attachments:
Program Policy on Moonlighting
Guidance on Fellow "Portfolios"
Performance Improvement
Identifying and Preventing Adverse Patient Events (System Errors) and the Role of Chief's Rounds with the Division Director
Etiquette-Based Medicine
Final Words: Aphorisms on Becoming a Medical Subspecialist
Curriculum for Ultrasound Training for Rheumatology Fellows
VA Tele-Rheumatology Elective Curriculum

CEX exam sample evaluation sheet
Fatigue Policy of the Fellowship
ACR website materials available:
Rheumatology Coding Manual (Rheumatology-specific Information to help code with confidence)
ACR The Business Side of Rheumatology Practice

FELLOWSHIP CURRICULUM FOR RHEUMATOLOGY

1. I. Overall Mission Statement for the Training Program

II. Overall Goals for the Training Program

A. Clinical competence
B. Work with a variety of medical professionals
C. Life-long learning

III. Overall Objectives for the Training Program

A. Clinical competence in a variety of settings
B. Continuing learning and development of proficiency

IV. Methodology for Teaching Rheumatology

A. Patient care experience
1. General Internal Medicine
2. Subspecialty Medicine — Ambulatory experience
   a. Educational purpose/rationale/value
   b. Goals
   c. Objectives
   d. Defined method of teaching
Educational content
   (1.) Diseases
   (2.) Patient characteristics and types of clinical encounters
   (3.) Procedures and services
   (4.) Principal and ancillary educational materials
   (a.) Reading/audiovisual/computerized
   (b.) Pathological material
   e. Evaluation
      (1.) Evaluation of fellows
      (2.) Evaluation of program performance
      (3.) Strengths and limitations specific to resources
f. Explicit descriptions of supervisory guidelines for care of patients
g. Experience with other clinical specialties

B. Consultation experience

1. Educational purpose/rationale/value
2. Goals
3. Objectives
4. Defined method of teaching
5. Educational content
   a. Diseases
   b. Patient characteristics and types of clinical encounters
   c. Procedures and services
   d. Principal and ancillary educational materials
      (1) Reading/audiovisual/computerized
      (2) Pathological materials
6. Evaluation
   a. Evaluation of fellows
   b. Evaluation of program performance
   c. Strengths and limitations specific to resources
7. Explicit descriptions of supervisory guidelines for care of patients
8. Expectations of fellows at each level of training

C. Teaching experience for fellows

D. Conferences

Educational purpose/rationale/value

1. Rheumatology Rounds
   a. Description (director, time, scheduled occurrence, conference content, who attends)
   b. Goals
   c. Objectives
   d. Defined method of teaching
   e. Educational content
      (1) Diseases
      (2) Patient content and types of clinical encounters
      (3) Topics covered
      (4) Expectations of fellows at each level of training
      (5) Principal and ancillary educational materials
         (a) Reading
         (b) Pathological materials
   f. Evaluation
      (1) Evaluation of faculty
   20
(2.) Evaluation of fellows

2. Radiology Conference
   a. Description (director, time, scheduled occurrence, conference content, who attends)
   b. Goals
   c. Objectives
   d. Defined method of teaching
   e. Educational content
      (1.) Diseases
      (2.) Patient content and types of clinical encounters
      (3.) Topics covered
      (4.) Expectations of fellows at each level of training
      (5.) Principal and ancillary educational materials
         (a.) Reading
         (b.) Pathological Materials
   f. Evaluation
      (1.) Evaluation of faculty
      (2.) Evaluation of fellows

3. Pathology teaching
   a. Description (director, time, scheduled occurrence, conference content, who attends)
   b. Goals
   c. Objectives
   d. Defined method of teaching
   e. Educational content
      (1.) Diseases
      (2.) Patient content and types of clinical encounters
      (3.) Topics covered
      (4.) Expectations of fellows at each level of training
      (5.) Principal and ancillary educational materials
         (a.) Reading
         (b.) Pathological materials
   f. Evaluation
      (1.) Evaluation of faculty
      (2.) Evaluation of fellows

4. Case Conferences
   a. Description (director, time, scheduled occurrence, conference content, who attends)
   b. Goals
   c. Objectives
   d. Defined method of teaching
   e. Educational content

21
1. Diseases
2. Patient content and types of clinical encounters
3. Topics covered
4. Expectations of fellows at each level of training
5. Principal and ancillary educational materials
   a. Reading
   b. Pathological materials
f. Evaluation
   (1.) Evaluation of faculty
   (2.) Evaluation of fellows

5. Rheumatology-Orthopedic Surgery-Rehabilitation Conference
   a. Description (director, time, scheduled occurrence, conference content, who attends)
   b. Goals
   c. Objectives
   d. Defined method of teaching
   e. Educational content
   (1.) Diseases
   (2.) Patient content and types of clinical encounters
   (3.) Topics covered
   (4.) Expectations of fellows at each level of training
   (5.) Principal and ancillary educational materials
   a. Reading
   b. Pathological materials
   f. Evaluation
   (1.) Evaluation of faculty
   (2.) Evaluation of fellows

6. Basic Science/Research Conference/JOURNAL CLUB
   a. Description (director, time, scheduled occurrence, conference content, who attends)
   b. Goals
   c. Objectives
   d. Defined method of teaching
   e. Educational content
   (1.) Diseases
   (2.) Patient content and types of clinical encounters
   (3.) Topics covered
   (4.) Expectations of fellows at each level of training
   (5.) Principal and ancillary educational materials
   a. Reading
   b. Pathological materials
f. Evaluation
22
(1.) Evaluation of faculty
(2.) Evaluation of fellows

*Journal Club
a. Description (director, time, scheduled occurrence, conference content, who attends)
b. Goals
c. Objectives
d. Defined method of teaching
e. Educational content
(1.) Diseases
(2.) Patient content and types of clinical encounters
(3.) Topics covered
(4.) Expectations of fellows at each level of training
(5.) Principal and ancillary educational materials
(a.) Reading
(b.) Pathological materials
f. Evaluation
(1.) Evaluation of faculty
(2.) Evaluation of fellows

E. Procedures

F. Occupational Safety and Health Administration (OSHA) Guidelines
1. OSHA Regulations and Universal Precautions for Protection of Health Care Workers
2. Immunization Policy
3. Research Involving Hazardous Materials
4. Research Involving Animals
5. Research Involving Radioactivity

G. Critical Assessment and Decision Services

H. Continuous Quality Improvement

I. Psychosocial, Economic, and Ethical Issues

J. Educational and Counseling Skills

K. Research Experience

1. Educational Purpose/Rationale/Value
2. Goals
3. Objectives
4. Defined method of teaching
5. Educational content  
   (a.) Diseases  
   (b.) Patient characteristics and types of clinical encounters  
   (c.) Procedures and services  
   (d.) Principal and ancillary educational materials  
   (e.) Research involving hazardous materials  
   (f.) Research involving animals  
   (g.) Research involving radioactivity  
   (h.) Evaluation  
   (1.) Evaluation of fellows  
   (2.) Evaluation of program performance  
   (3.) Strengths and limitations specific to resources  
   (i.) Expectations of fellows at each level of training  

L. Other scholarly activities  
   (a) Rheumatology Coding Manual  
   (b) The Business Side of Rheumatology Practice  

22. Evaluation  

23. Evaluation  

A. Formative Evaluation of Fellows  
B. Summative Evaluation of Fellows  
C. Advancement of Fellow to Position of Higher Responsibility  
D. Unsatisfactory Evaluation of Fellow and Grievance Procedure  
E. Evaluation of Faculty and Program
DETAILED FELLOWSHIP CURRICULUM FOR RHEUMATOLOGY

I. Overall Mission Statement for Training Program

The mission of this rheumatology fellowship training program is to produce physicians who:

A. Are clinically competent in the field of rheumatology and can serve as knowledgeable consultants in this subspecialty

B. Are capable of working in a variety of settings

C. Possess habits of life-long learning to build knowledge, skills and professionalism.

II. Overall Goals for Training Program

The specific goals of our training program are derived from the Mission Statement and include:

A. Clinical competence

B. Ability to work with a variety of medical professionals in a variety of settings, including multidisciplinary teams

C. Adopting the habits of being a life-long learner.

These specific goals are amplified as follows:

5. Clinical competence is essential for all physicians and for a rheumatologist is defined as:

a. As a subspecialist, the rheumatologist must possess a basic core of knowledge of clinical manifestations, clinical presentations, pathophysiology and management of rheumatologic diseases or systemic diseases with rheumatic manifestations. This knowledge base includes an appropriate content of anatomy, genetics, biochemistry, immunology, physiology, pharmacology, epidemiology, statistics, ethics, and human behavior relative to the practice of rheumatology. The subspecialist must also have knowledge and competency in the skills of Internal Medicine.
Fellows will learn to diagnose and manage inpatients and outpatients with rheumatic diseases and other illnesses with rheumatologic manifestations:

1. Diffuse connective tissue diseases
2. Rheumatoid arthritis
3. Systemic lupus erythematosus (SLE)
4. Scleroderma
5. Polymyositis and dermatomyositis
6. Spondyloarthopathies
7. Vasculitis
8. Crystal-induced synovitis
9. Osteoarthritis
10. Nonarticular rheumatic diseases, including fibromyalgia
11. Nonsurgical, exercise-related (sports) injuries
12. Systemic diseases with rheumatic manifestations
13. Metabolic diseases of bone (including osteoporosis)
14. Infections of joints
15. Joint surgery
16. Rheumatologic problems requiring rehabilitation therapy

Fellows are also expected to learn:

1. The use of nonsteroidal anti-inflammatory drugs, disease-modifying drugs, biologic response modifiers, glucocorticoids, cytotoxic drugs, antihyperuricemic drugs, and antibiotic therapy for septic joints
2. Musculoskeletal examination of patients
3. Construction of differential diagnosis for rheumatologic diseases
4. Diagnostic aspiration and analysis of synovial fluid, including examination under compensated, polarized light microscopy
5. Therapeutic injection of diarthrodial joints, bursae, tenosynovial structures, and entheses
6. Interpretation of biopsies of tissues relevant to diagnosis of rheumatic diseases
7. Interpretation of imaging studies and bone density measurements
8. Nailfold capillary microscopy
9. Administration of controlled clinical trials
10. Understanding of indications for arthroscopy
11. Understanding of electromyograms and nerve conduction studies (A 90 minute demonstration session with fellows is held once during the 2-year training period).

NOTE: The ACGME Program Requirements for Residency Education in Rheumatology and the Core Curriculum Content for Subspecialty Fellows in Rheumatology that was developed by the American College of Rheumatology contain detailed descriptions of curriculum material covered during the 2-year
period of fellowship training. The requirements and core curriculum content are contained in this syllabus, and to supplement the more concise description herein, at the end of this curriculum document and appendices, are appended the detailed ACR core curriculum and core competency expectations.

b. The clinical skill of data collection including history-taking, physical examination and the appropriate request and interpretation of laboratory and imaging studies.

Fellows will learn to examine the musculoskeletal system, and to construct differential diagnoses for complexes of symptoms and signs related to rheumatologic diseases.

Fellows will learn diagnostic aspiration and analysis by light and polarized light microscopy of synovial fluid from diarthrodial joints.

Fellows will gain skill in interpreting biopsies of tissues relevant to the diagnosis of rheumatic diseases, bone and joint imaging techniques, bone density measurements, nailfold capillary microscopy, administration of clinical trials, indications for arthroscopy, and electromyogram and nerve conduction studies.

c. The ability to formulate appropriate differential diagnoses and therapeutic plans based on an ability to critically analyze the clinical data, and to integrate this analysis with a basic fund of medical knowledge.

d. The ability to perform as a consultant and as a health care team leader.

e. Knowledge to treat the common and uncommon diseases found in the practice of the subspecialty of rheumatology.

Fellows will learn skill in the use of nonsteroidal anti-inflammatory drugs, disease-modifying drugs, biologic response modifiers, glucocorticoids, cytotoxic drugs, antihyperuricemic drugs, and antibiotic therapy for septic joints.

Fellows will learn therapeutic injection of diarthrodial joints, bursae, tenosynovial structures, and entheses.

Fellows will develop understanding of the principles, indications, contraindications, risks, cost and expected outcome of the various treatments. Fellows will recognize the need for appropriate consultation and reasonable expectations from a consultant.

f. The performance and/or interpretation of diagnostic and therapeutic procedures common in the practice of rheumatology. This set of skills
includes an understanding of the principles, indications, contraindications, risks, cost and expected outcome of these procedures.

g. The further development of appropriate communication skills with patients, peers and other medical personnel.

h. The further development of qualities of professionalism and humanistic skills including integrity, compassion, and respect for patients, peers and paramedical personnel.

i. Clinically competent rheumatologists must possess a level of skill and expertise in research. All fellows must be capable of demonstrating competence in the understanding of the design, implementation and interpretation of research studies. These skills specifically include research methodology, critical interpretation of data, critical interpretation of published research, and the responsible use of informed consent.

2. The ability to work in a variety of settings is essential for a rheumatologist. Trainees at the fellowship level will be able to demonstrate clinical competence in the following settings:

a. Primary health care provider in the acute inpatient setting, the ambulatory clinic, the emergency department, and the intensive care setting.

b. Consultant to other internists or non-internists in the acute inpatient setting, the ambulatory clinic, the emergency department, and the intensive care setting.

c. Leader of a multidisciplinary health care team for rehabilitation of patients, establishment of home health care, etc.

3. Life-long learning is an essential component for clinically competent physicians and is required for the acquisition, critical analysis, synthesis and reassessment of knowledge, skills and professionalism. All fellows will be capable of demonstrating their abilities to be life-long learners by these means:

a. Independent study habits in the acquisition of clinical and research knowledge and skills.

b. Attendance, presentation and participation in the organization of local educational conferences of the Department of Internal Medicine and the
Division of Rheumatology.

c. Attendance and presentation at regional and national professional scientific conferences.

III. Specific Objectives

A. Clinical competence in a variety of settings:

6. 1. All fellows should have mastered those specific clinical objectives for the majority of diseases seen in the practice of rheumatology, including the uncommon and complicated diseases.

2. Demonstrate proficiency as a consultant and/or leader of a multidisciplinary health care team.

3. Possess communication skills that will allow the fellow to perform as the health care team leader with peers and professionals.

4. Demonstrate clinical proficiency at a level where the fellow not only demonstrates his or her proficiency, but is capable of teaching clinical skills to trainees at junior levels.

5. Demonstrate qualities of professionalism and humanistic skills at a level which serves as a model for trainees at a junior level.

6. All fellows should have mastered those specific research objectives outlined for the fellowship program and have produced sufficient research work to enable them to submit their work for peer reviewed presentation, scientific meetings, manuscript submissions, or grant applications for research funding.

B. Continuing learning and development of proficiency:

11. 1. Fellows will demonstrate proficiency at attending and participating in conferences, and coordinating conferences, conference topics, and conference schedules.

2. Fellows will demonstrate mastery of teaching skills in their interactions with junior-level fellows, residents in internal medicine and medical students.
CURRICULUM - METHOD FOR TEACHING RHEUMATOLOGY
R. Terkeltaub MD, Program Director

A. PATIENT CARE EXPERIENCE

In order to achieve the goals and objectives for the fellowship program the following experiences have been established for the purpose of teaching fellows in Rheumatology to maintain Internal Medicine skills and to develop subspecialty skills in Rheumatology.

1. GENERAL INTERNAL MEDICINE

Internal medicine skills are maintained by daily application of the diagnostic and therapeutic principles of the specialty to inpatients and outpatients. At UCSDMC and the SDVAHCS, approximately 1,000 patients with rheumatoid arthritis, psoriatic arthritis, ankylosing spondylitis, systemic lupus erythematosus, and inflammatory muscle disease are followed regularly by members of the Rheumatology Section.

Fellows also maintain their primary internal medicine skills by attending Internal Medicine Teaching Conferences.

The following section describes detailed methods of developing subspecialty skills in Rheumatology.

2. SUBSPECIALTY MEDICINE — AMBULATORY EXPERIENCE

a. Educational purpose/rationale/value

(1.) Develop clinical skills of data collection and the appropriate ordering and interpretation of laboratory and imaging studies in the outpatient setting

(2.) Develop ability to formulate appropriate differential diagnoses and therapeutic plans based upon critical analysis of data and integration of this analysis with a basic fund of medical knowledge

(3.) Perform as a consultant to outpatients and recognize the reasonable expectations of a consultant

(4.) Develop understanding of principles, indications, contraindications, risks, cost, and expected outcome of treatment in the outpatient setting

(5.) Learn to document findings and recommendations on the outpatient chart;
learn to communicate effectively with referring physicians verbally and through communications

(6.) Develop abilities to teach physicians who submit consultations for outpatients, and to teach residents and medical students in the outpatient clinic, and to teach the patients

b. Goals of the Ambulatory Experience

(1.) Maintain skills in Internal Medicine

(2.) Develop clinical competence in evaluating and treating rheumatic diseases and other illnesses with rheumatologic manifestations in the outpatient setting

(3.) Develop understanding of the natural history of rheumatologic conditions over an extended period of time

(4.) Perform as consultant for outpatients

(5.) Develop clinical skills in data collection

(6.) Formulate appropriate differential diagnoses for rheumatic diseases and other illnesses with rheumatologic manifestations

(7.) Develop skills in outpatient therapy

(8.) Perform and interpret diagnostic and therapeutic procedures, and interpret results of diagnostic procedures common in the practice of rheumatology. These procedures include EMG and office-based joint ultrasound.

(9.) Develop appropriate communication skills

(10.) Develop qualities of professionalism and humanistic skills

c. Objectives of the Ambulatory Experience

(1.) Fellows will apply general Internal Medicine skills in evaluating and following outpatients in their continuity clinics at UCSDMC and the SDVAHCS
and St. Vincent de Paul.

(2.) All fellows will maintain the equivalent of at least **THREE half-day clinics** for patients with rheumatic diseases over 2 years. Each clinic will contain not more than **ONE TO THREE** new patients and **THREE TO EIGHT** follow up patient visits at each clinic session. Each fellow will be in two half-day UCSDMC-Affiliated Rheumatology Clinics per week. At least one of these clinics is a continuity clinic. These clinics, plus the half-day continuity and new patient clinic at the Veterans’ Hospital, are supplemented by 1-2 ultrasound and procedure clinics at UCSDMC ACC Hillcrest per month. In addition, in year 2, the fellow is able to participate on an elective basis in one half day Pediatric Rheumatology Clinic San Diego Children’s Hospital as an observer.

Outpatient experiences will continue with progressive responsibility throughout the fellowship. Each clinic is appropriately supervised by dedicated attending faculty members.

(3.) Subspecialty skills that will be developed on the Ambulatory rotation include assessment of the outpatient with a rheumatologic complaint and developing clinical evaluation skills.

**Immunology & Rheumatology fellows will learn:**
(a.) Taking and recording a high-quality medical history.
(b.) Performing a relevant musculoskeletal examination
(c.) Writing letters and dictating useful consultations to the referring physician
(d.) Formulating an appropriate differential diagnosis
(e.) Ordering appropriate tests and radiographs
(f.) Ordering appropriate outpatient consultations, and making appropriate referrals to physical therapists, occupational therapists, and psychologists
(g.) Interpreting laboratory test results and imaging studies
(h.) Planning for follow up visits at proper intervals

d. Defined method of teaching

This experience is not an isolated rotation; rather, it provides opportunities to provide outpatient consultations and to follow outpatients longitudinally.
Appropriate learning experiences are ensured for fellows in the outpatient setting by the following means:

1. Constant presence of a dedicated attending rheumatologist who is assigned to each clinic. The attending rheumatologist will examine and supervise care of each new patient/consultation patient in the clinic, and will ensure that appropriate contact and written consultation communications are provided for each referring physician. The attending physicians are consistently in the same clinic, and are therefore known to the fellows. Each patient who is seen by a fellow is presented to and reviewed by the attending physician.

2. Radiographs of new patients are reviewed by fellows and attending physicians

3. Selected outpatients are chosen for presentation and in-depth discussion at Rheumatology, Radiology and Rheumatology-Orthopedic Surgery-Rehab Conferences.

4. Fellows are expected to place patient welfare first, by showing compassion, and unselfishness, and by promptly attending to patient calls and physician pages.

5. Fellows are expected to continue self-study activities in the clinic setting. They will perform literature research on topics appropriate to cases seen as outpatients.

6. Fellows will continue to develop as teachers and to actively and effectively teach patients, medical students, and residents in the outpatient setting.

7. Fellows will use the outpatient setting, interactions with the clinic attending physician, and self-study to develop their knowledge of rheumatic diseases. They will continue to develop understanding of the indications, contraindications, techniques, and complications of arthrocentesis as well as means of interpreting results from this procedure.

8. The PRINCIPAL TEACHING METHODS of the division will continue to be applied in the ambulatory setting. These methods include:
   a. Clinical experience, with direct supervision and review of the fellow’s skills in data collection by the outpatient clinic attending physician
   b. Review of the fellow’s skills in interpreting imaging studies and laboratory test results by the outpatient clinic attending physician
   c. Literature review by the fellow and discussion of findings with the attending physician
d. Presentation of selected outpatients at Rheumatology conferences. Fellows will learn through their intensive review of the case, a mandatory review of pertinent literature, and discussion of the patient by a full panel of other fellows and attending physicians.

e. Self study of recommended textbooks and journal articles, videotapes, and rheumatology journals including *Arthritis and Rheumatism*.

f. Educational content

1. Diseases

It is anticipated that 90% of the patients seen in consultation in the outpatient clinic will have one of these diagnoses: rheumatoid arthritis, systemic lupus erythematosus, scleroderma, polymyositis, dermatomyositis, mixed connective tissue disease, overlay syndromes, spondyloarthropathy, vasculitis, crystal-induced synovitis, osteoarthritis, fibromyalgia, sports injury, systemic disease with rheumatic manifestations, metabolic disease of bone, or a joint infection.

2. Patient characteristics and types of clinical encounters

Patients who are evaluated as new patients and followed as follow-up patients in the outpatient clinics are a typical cross section of individuals of both sexes with ages ranging from birth to over 100 years. Adequate numbers of adolescent and geriatric age groups, and of both sexes are available to ensure adequate inpatient and outpatient experience for each follow. A broad range of incomes, socioeconomic classes, and types of medical payment support is included. The demographic characteristics of this patient population are typical of those of the southwestern United States. A suitable variety of rheumatic diseases is available to provide appropriate examples of illnesses for education of the fellows.

3. Procedures and services

Education in the outpatient department continues the educational mission of the division that includes discussion between fellow and attending physician of the basic core of knowledge, data collection, formulation of differential diagnoses, outpatient consultation, treatment recommendation, interpretation of diagnostic procedures, recommendation of diagnostic and therapeutic procedures, development of communication skills, development of professionalism and humanistic skills, recommendation of physical therapy and occupational therapy, performance of arthrocentesis and interpret synovial fluid findings, and therapeutic injections of joints and other musculoskeletal structures.

4. Principal and ancillary educational materials

(a.) Reading/audiovisual/computerized materials


3. American College of Rheumatology RSAP program (includes case studies and examples of radiographs and pathological materials)

4. Suggested Reading List for Rheumatology Fellows. Provided by the Fellowship Training Subcommittee, American College of Rheumatology.

(b.) Pathological materials

Pathological material pertinent to Rheumatology, for example muscle, kidney biopsies, skin biopsies, from outpatients are reviewed at regularly scheduled Pathology Conferences. In addition, biopsies from selected outpatients are reviewed with the rheumatology attending and with the appropriate pathologist as necessary during the course of the rotation.

e. Evaluation

(1.) Evaluation of fellows
The fellows’ performance in outpatient clinics is evaluated q 6 months in writing by the chief attending physician in that clinic, who is responsible for supervising the fellow for the two-year training period. These evaluations are made during the course of the regularly scheduled every 6 months meetings of the Division of Rheumatology Clinical Evaluations Committee, and results are discussed with the fellows at the times of their meeting with the program director, and incorporated into the written summaries of the fellows’ quarterly FORMATIVE evaluation reviews with the Program Director and in the summary evaluations that are prepared at the end of each year of the training period.

All fellows keep an online procedures log throughout the entire training period, identifying the procedure, date, indication, outcome, any complications, and the name of the supervising physician. A copy of the online log is provided to the Program Director on an every 6 months basis for the program director’s review, and for placement in the fellow’s permanent file.

All attending physicians in the clinics are members of the Division of Rheumatology Clinical Evaluation Committee. Minutes of ad hoc meetings of this committee, the record of the semiannual fellows’ evaluation sessions with the Program Director and the summative evaluations will reflect fellows’ performance
in the outpatient clinic. Records of the ad hoc meetings of the Clinical Evaluation Committee, the semiannual fellows’ evaluation sessions with the Program Director, and the summative evaluation are placed in each fellow’s permanent folder, and these are available for the fellow to inspect.

Fellows will receive feedback on their performance in ambulatory rheumatology at the time of the semiannual meeting with the Program Director. This session will also provide a way for the fellows to make suggestions about changes that should be made in the clinic schedule or procedures. It is the responsibility of the Program Director to see that these suggestions are conveyed to the Division Director. In addition, one fellow will attend meetings of the faculty at the time that the entire program is reviewed. In this way, fellows will be able to give substantial input into the critique of and plans for improvement of the program.

All fellows keep logs of the patients they see in consultation, as well as a procedures log that identifies both inpatient and outpatient procedures, along with the date, indication, outcome, complications, and the name of the supervising physician. Both logs are provided to the Program Director on an every 6 months basis for review and for placement in the fellow’s permanent file.

1.1. Objective evaluation methods:

CEX: At months 6 and 18 in the 2 year program accredited training cycle, a CEX exam is conducted to evaluate the core competencies in an objective manner in a patient care setting. The exam is performed in an ambulatory care clinic venue in the training program, with one of the permanent of affiliated community faculty serving as the examiner. The exam lasts 30-40 minutes and is conducted by having the faculty directly observe the trainee doing a history and physical exam on one patient, and presenting the history, physical, lab results, and assessment to the faculty. The CEX exam form is presented as an attachment at the end of the training manual. The expectations are graded for each year of training and according to core competencies, based on the detailed format presented in bold at the beginning of this training manual.

Objective evaluation of procedure skills: Beginning at the onset of the training program, the objective evaluation of procedure skills is conducted by faculty for joint aspiration and synovial fluid analysis. The evaluations by faculty are logged into New Innovations, and assessments are presented in the form attached at the end of the training curriculum. The satisfactory, objectively evaluated performance of 10 such procedures constitutes adequate evidence that fellows can independently perform the procedure without the presence of rheumatology faculty (such as in the ER setting).

(2.) Evaluation of program performance
Fellows *anonymously* evaluate faculty members AT THE END OF EACH CONSULTATION ROTATION. THEY EVALUATE the instructional program TWICE A YEAR, using a mechanism that includes critique of the clinic attending physicians and allows written feedback to go directly to every faculty member. *The Division Administrator distributes and collects the evaluation forms, and collates the responses so that they are returned to the faculty members in a system that does not allow the faculty members to be able to identify the fellows who wrote the critiques.*

These critiques are also discussed at faculty meetings and are used by the Training Program Director and the Division Director to make needed changes in the outpatient teaching experience.

(3.) **Strengths and limitations specific to resources**

Every effort is made to keep fellows’ outpatient experiences compatible with good teaching, so that they are seeing a variety of acute and chronic problems as needed for educational purposes. However, they are not to be overloaded with new patients and follow up visits. They do have continuity of experience in managing patients, with graded levels of responsibility in all settings. The fellows have access to acceptable numbers of patients in every age range, including children and adolescents, with an acceptable balance between groups having health maintenance organization, Medicare, Medicaid, insurance, and no coverage.

**f. Supervisory guidelines for care of patients**

The attending physician in charge of a clinic is responsible for the care of patients who are followed by fellows in the clinic. All outpatients are seen under the direct supervision of a qualified rheumatology faculty member. At the UCSDMC the attending physician performs the mandated history and physical examination and participates in key decision making functions, and records these activities on the patient’s record. At the VA Medical Center, Drs. Terkeltaub, Kavanaugh, Corr and Lee attend the clinic. **THESE ATTENDING PHYSICIANS ADHERE TO THE SAME RULES AS USED AT THE UCSDMC FOR CONFIRMATION OF ATTENDING INPUT INTO THE CARE OF NEW OUTPATIENTS, AND ALL INPATIENT CONSULTATION PATIENTS.**

Private outpatients at Thornton Hospital of UCSDMC are generally seen by the attending physician who is responsible for that patient. In an emergency, when the attending physician is not immediately available, the fellow on call may be asked to initially see and assess the private patient. This would be followed by a supervisory visit and assessment and decision-making, by the primary rheumatology attending or by the attending physician who is covering for the primary rheumatology attending physician.
g. Experience with other clinical specialities

Fellows who request rotations with other specialties in advance may have access to rotations with other disciplines whose expertise is required in the care of patients with rheumatic diseases. These disciplines include: 1) outpatient orthopedic surgery/Sports medicine, 2) rehabilitative medicine, and 3) Osteoporosis 4) Pain Clinic. The goal of these experiences is for the fellow to appreciate the approach to the specific conditions that relate to rheumatic disorders within these specialties. This interdisciplinary interaction can be arranged to include a clinical rotation, attendance at weekly clinics, and/or multidisciplinary conferences. Clinical experiences are under the direction of attending physicians in the respective subspecialty who participate fully in the educational goals of the rotation.

B. CONSULTATION EXPERIENCE

1. Educational purpose/rationale/value

a. Development of clinical skills of data collection and the appropriate ordering and interpretation of laboratory and imaging studies in the inpatient setting

b. Development of ability to formulate appropriate differential diagnoses and therapeutic plans based upon critical analysis of data and integration of this analysis with a basic fund of medical knowledge

c. Development of ability to perform as a consultant to inpatients and recognition of reasonable expectations for an inpatient consultant

d. Development of understanding of principles, indications, contraindications, risks, cost, and expected outcome of treatments

e. Development of appropriate communications skills, especially those dealing with accurate recording of data and communicating recommendations in the consultation format

f. Development of the fellow’s abilities to teach physicians who submit consultations, and to teach residents and medical students in the consultation/inpatient team

2. Goals of the consultation experience

a. Maintain skills in Internal Medicine

b. Develop clinical competence in evaluating and treating rheumatic diseases and other illnesses with rheumatologic manifestations in the inpatient setting
c. Learn to perform as consultant for inpatients and develop clinical skills in data collection

d. Perform diagnostic and therapeutic procedures and interpret results of diagnostic procedures common in the practice of rheumatology

e. Develop communication, professionalism and humanistic skills

3. Objectives of the consultation experience

a. Fellows will continue to apply skills in general Internal Medicine in evaluating and recommending treatment for consultation patients. The “Rheumatology” patients will be followed by Rheumatology fellows when they are admitted to the hospital at UCSDMV and the VASDHCS.

b. Subspecialty skills that will be developed include development and refinement of clinical evaluation skills with regards to diagnosis and care of inpatients with rheumatic diseases:

(1.) Medical history

(2.) Musculoskeletal examination

(3.) Formulation of an appropriate differential diagnosis

(4.) Assessment of need for hospitalization vs. outpatient care

(5.) Develop strategies for diagnostic tests

(6.) Interpret laboratory test results

(7.) Interpret imaging studies

(8.) Refine clinical judgment, such as developing individualized treatment programs and weighing one treatment strategy against another with regard to cost and risks
(9.) Understand the roles of physical therapy, occupational therapy, and psychological well being in the treatment program

(10.) Regular follow up of inpatients; integration of changing clinical status or development of drug toxicity into the knowledge base; appropriate modification of chronic therapy

4. Defined method of teaching in the consultation experience

Essential in this rotation will be developing skills in providing inpatient consultation services. The fellow will learn and develop knowledge in the subspecialty, and learn effective oral communication with the patient, and oral and written communication with referring physicians. It is also important for the fellow to communicate, when appropriate, with families of patients and other health professionals such as nurses and social workers. Fellows are also expected to understand community support services so that they can effectively arrange for continuing care of patients’ rheumatic conditions.

6. Fellows will learn these skills by attending daily teaching rounds with the consultation attending physician and the Internal Medicine residents and medical students who are assigned to this service. Fellows will supervise the medical history-taking and physical examinations performed by the residents and students. Work rounds, in which patients are evaluated by attending physicians, fellows, residents, and medical students, will be distinct from teaching rounds, in which the attending physician meets at a defined time with fellows, residents, and medical students to review specific clinical topics. Both activities will be performed regularly as part of the consultation service experience.

a. Fellows will also take histories and perform physical examinations of inpatients who are seen in consultation and present these patients to the attending physician who is assigned to the service. The cases will be examined by the attending physician with the fellow present, and the fellow’s assessment and recommendations will be discussed with the attending physician. The fellow will also examine and interpret radiographs and other imaging studies that are appropriate to the case, and present his/her interpretation to the attending physician. The fellow will write consultations and review them with the attending physician. Each of these opportunities will allow opportunities for teaching.

b. Fellows are also expected to understand community support services so that they can effectively advise others and arrange for continuing care of patients' rheumatic conditions.

c. Fellows will place patient welfare first. This principle will be demonstrated
by prompt attention to patient calls and complaints and prompt rendering of consultations, including calls and requests that are received by on-call fellows on nights and weekends and holidays.

7.  d. Fellows will be called upon to perform literature research on topics appropriate to cases seen in consultation and as inpatients. They are expected to communicate the results of the search with the attending physician, as well as Internal Medicine residents and medical students who are assigned to the consultation/inpatient team and residents and medical students involved in the care of the patient who is the subject of the consultation.

e. Fellows will develop their teaching skills by participating actively in the teaching activities of the consultation team. They are expected to teach the Internal Medicine residents and medical students assigned to the consultation/inpatient team and the residents and medical students who are involved in care of the patient who is the subject of the consultation.

f. Fellows will develop a comprehensive understanding of the indications, contraindications, techniques, and complications of arthrocentesis as well as the interpretation of results from this procedure.

g. Fellows will acquire knowledge of and skill in educating patients about their illnesses when this is appropriate. They will also educate patients about arthrocentesis and the meaning of informed consent. Faculty supervision is required in developing these skills.

1.  h. The PRINCIPAL TEACHING METHODS of the division will continue to be applied in the inpatient consultation setting. These methods include:

(1.) Clinical experience, with direct supervision and review of the fellow’s skills in data collection by the attending physician

(2.) Review of the fellow’s skills in interpreting imaging studies and laboratory test results by the attending physician

(3.) Literature review by the fellow and discussion of findings with the attending physician

(4.) Presentation of selected patients at Rheumatology Grand Rounds. Fellows will learn through their intensive review of the case, a mandatory review of pertinent literature, and discussion of the patient by a full panel of other fellows and attending physicians.
(5.) Self study of recommended textbooks and journal articles, rheumatology journals including "Arthritis and Rheumatology."

5. Educational Content

a. Diseases

It is anticipated that 90% of the patients seen in inpatient consultation and followed as inpatients will have one of these diagnoses: rheumatoid arthritis, systemic lupus erythematosus, scleroderma, polymyositis, dermatomyositis, diffuse connective tissue diseases, spondyloarthritis, vasculitis, crystal-induced synovitis, osteoarthritis, fibromyalgia, systemic illness with rheumatic manifestations, metabolic disease of bone, septic arthritis, post joint surgery.

b. Patient characteristics and types of clinical encounters

Inpatients seen in consultation compose an acceptable cross section of individuals of both sexes with ages ranging from birth to over 100 years, with racial and demographic characteristics that mirror the mix in most communities in the southwestern part of the United States. The diseases represented in 90% of these patients are listed in the preceding paragraph.

Clinical encounters are those of the traditional consultation in which the fellow takes a history, performs a physical examination, formulates a differential diagnosis and treatment plan, and presents the patient to the attending physician for review and teaching.

c. Procedures and services

The fellow will gain experience in data collection and formulation of differential diagnoses. Under supervision, he/she will also perform as a consultant, recommend treatment, interpret diagnostic procedures, recommend therapy, recommend therapeutic procedures, develop communication skills, develop professionalism and humanistic skills, and recommend care by ancillary personnel.

Arthrocentesis and injection of steroid preparations are the procedures that are most commonly performed by rheumatologists. In addition, rheumatologists inject tendon areas, entheses, and various tender points, and interpret microscopic characteristics of synovial fluid. Fellows will learn the anatomy, precautions, and potential sequella of and demonstrate competency in aspiration and therapeutic injection of diarthrodial joints, bursae, tenosynovial structures, and entheses.

Fellows are expected to acquire knowledge and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-
specific informed consent. Faculty supervision of fellows in their performance is required, and each fellow’s experience in such procedures is noted in procedure logs kept by the Program Director.

Direct examination of wet preparations of synovial fluid is learned using microscope equipped with polarizing lenses and a first-order red plate compensator. The microscope is available at all times to fellows.

d. Principal and ancillary educational materials

(1.) Reading/audiovisual/computerized materials (N.B. Fellows are expected to use a major textbook (recent edition) of rheumatology for self-study, such as the TOR or Rheumatology.

1. Rheumatology self-assessment program (CARE) of the ACR

2. Rheumatology Secrets. Sterling west, editor


13. Radiographs, computerized tomography scans, and magnetic resonance images pertinent to Rheumatology are reviewed with a musculoskeletal radiologist as appropriate. Also, materials for teaching on radiology are accessible at http://medicine.ucsd.edu/bonepit.com.

(2.) Pathological materials

Pathological materials pertinent to Rheumatology such as renal biopsies, skin biopsies, and muscle biopsies from consultation patients are reviewed at Pathology Conferences. Biopsies from selected consultation patients are also reviewed with the rheumatology attending physician and with the appropriate pathologist as necessary during the course of the rotation.

6. Evaluation

a. Evaluation of fellows

During their training, fellows will be given graded responsibilities within the exposure to clinical practice, and will be expected to pursue self-directed study. All fellows, with respect to their level of training, are expected to demonstrate the skills, knowledge, and attitudes to sufficiently meet the requirements of the following Core Competencies:
1. Patient Care
2. Medical Knowledge
3. Practice-Based Learning and Improvement
4. Interpersonal and Communication Skills
5. Professionalism
6. Systems-Based Practice

Fellows are also required to engage in original research during their training years, and demonstrate competency in the following areas:
1) Literature review
2) Design of research protocols
3) Data interpretation
4) Research presentation

Principles Regarding the Assessment of Scholarly Activity: In addition to participating in a core curriculum in scholarly activities, all fellows will be expected to engage in projects in which they develop hypotheses or in projects of substantive scholarly exploration and analysis that require critical thinking. Areas in which scholarly activity may be pursued include, but are not limited to: basic, clinical, or translational biomedicine; health services; quality improvement; bioethics; education; and public policy.

In addition to biomedical research, examples of acceptable activities might include a critical meta-analysis of the literature, a systematic review of clinical practice, a critical analysis of the literature, a systematic review of clinical practice, a critical analysis of public policy, or a curriculum development project with an assessment component. Involvement in scholarly activities must result in the generation of a specific written “work product.” Examples include, but are not limited to:

- A peer-reviewed publication in which a fellow played a substantial role
- An in-depth manuscript describing a completed project
- A thesis or dissertation written in connection with the pursuit of an advanced degree
- An extramural grant application that has either been accepted or favorably reviewed
- A progress report for projects of exceptional complexity, such as a multi-year clinical trial

Review of scholarly activity and the written work product will occur at the local level with each fellow having a scholarship Oversight Committee responsible for overseeing and assessing the progress of each fellow and verifying to the ABP that the requirement has been met.

Formative evaluations occur at the completion of each inpatient/consultation rotation. For each clinical rotation, a Milestones evaluation form is completed by the supervising faculty member. The attending physician for that rotation completes evaluation forms for the fellow and reviews the evaluations directly with the fellow. The evaluation form is the milestones form adapted from American
Board of Internal Medicine.

The completed evaluation form is returned to the Program Director for review, and the CLINICAL COMPETENCY COMMITTEE (Drs. Terkeltaub, Lee, Kavanaugh, Sweeney) reviews the evaluations and provides feedback in a meeting with the Program Director.

**Means for dealing with Unsatisfactory ratings.** Completed evaluation forms submitted to the Program Director are immediately reviewed upon their receipt. Any forms that contain a rating less than satisfactory in any category require an immediate conference between the fellow and the Program Director to identify causes for the poor performance and to identify means for improving the deficiency.

**Procedures log.** All fellows keep an online procedures log on New Innovations that identifies the procedure, date, indication, outcome, any complications, and the name of the supervising physician. A copy of this log is provided to the Program Director for placement in the fellow’s permanent file.

**Portfolio.** Fellows also keep a portfolio of all skills that is turned in to the Program Director every 3 months and it is kept in the fellow’s permanent file.

**Twice per year evaluation meeting with Program Director.** Semiannually, fellows confer individually with the Program Director to review their formative evaluations, and summary of the CLINICAL COMPETENCY COMMITTEE, and to go through the fellows’ files. This meeting is to provide feedback to the fellow on his/her performance and to enhance professional development of the fellow. A written summary of this review of formative evaluations/counseling/feedback session is signed by the Program Director and the fellow, and the summary is placed in the fellow’s permanent file.

**Observation of Clinical Skills.** A structured clinical exam on selected patients asked to serve as test cases is currently under development by the Program, using the ACR framework. Here, the faculty member would perform a complete assessment of the fellow’s clinical skills through observation and discussion. This assessment includes direct observation of a fellow doing a consultation with history and physical examination, presentation and discussion of the case by the fellow, and evaluation of the consultation letter or progress note that the fellow has dictated or written.

The Rheumatology-specific competencies that may relate to systems-based practice include the requirements to:

- Demonstrate competency manifested by actions that show an awareness of and responsiveness to the larger context and system of health care and
the ability to effectively call on system resources to provide care that is of optimal value to the patient.

• Coordinate the care of patients, including the use of consultation.

Goals and objectives for fellows:

1) Fellow exhibits awareness of and is responsive to systems of health care
   a) For example, demonstrates knowledge of HMO structure, Medicare/Medicaid, community resources

2) Advocates for patient within health care system
   a) For example, helping connect with appropriate resources; obtaining waiver for out-of-formulary prescription

3) Provides cost-effective medical care
   a) For example, knows relative costs of various prescriptions and considers as a factor when all else equal.

Assessment of competency:

Knowledge of practice and delivery systems. Possess basic economic and business knowledge to function effectively in one’s own practice system. Competency will be assessed by reviewing the fellow’s patient logs, faculty evaluations and portfolio every 6 months for evidence that they are successfully caring for patients in multiple practice and delivery systems.

Practice cost-effective care. Know the relative costs of various medications used to treat arthritis; ask patients how they pay for medications. Faculty observed patient encounters will be scheduled on an unannounced basis.

Advocate for patients within the health care system. Work to assure access to subspecialty consultations for patients with moderate to severe arthritis. Patient satisfaction "360 questionnaires" will be handed out to all patients by clinic staff at the end of the patient visit for 1 week every 6 months. Patients will be asked to complete the questionnaire on the spot.

b. Evaluation of program performance

Fellows evaluate faculty and the division’s fellowship program at least once per year. A form is used that assures anonymity of the fellow and allows written feedback to be
sent directly to every faculty member. THE PROGRAM IS REVIEWED BY THE FACULTY REGULARLY, AND FELLOWS ON THE CURRICULUM REVIEW COMMITTEE, TO PROVIDE FEEDBACK INTO THE CRITICISMS AND TO ASSIST WITH FORMULATIONS OF PROCEDURES TO CORRECT PROBLEMS IN THE PROGRAM.

c. Strengths and limitations specific to resources

The UCSDMC and the VAHCS contain adequate resources, including advance imaging computerized tomography and magnetic resonance imaging technology, to provide a superior training experience for fellows in Rheumatology. The training program is especially strong with regard to the new, state-of-the-art rehabilitation hospital and outpatient facilities, a strong association with orthopedic surgery and radiology, and varied opportunities for clinical and bench research.

Consultations in the affiliated hospitals have a broad range of patients, including infants, prenatal and postpartum women, children, adolescents, mid-aged adults, and the geriatric population.

7. Supervisory guidelines for care of patients

The Attending Physician for the month has authority over the fellows who are rotating through the service with regard to evaluation/recommendations on consultation patients and procedures. All rheumatology consultations are rendered under the direct supervision of the attending physician, who personally reviews the medical history, examines the patient, participates in key decision-making, and writes impressions on and signs the consultation form.

All procedures are also performed under the supervision of the attending physician, who approves the need for the procedure.

In some instances, an inpatient with a rheumatologic disease will be the private patient of a rheumatology attending physician at the UCSDMC including Thornton Hospital. The patient is cared for by an Internal Medicine ward team and the private rheumatology attending physician, who rounds on this patient and makes decisions. The teaching rheumatology attending physician is often asked to render a “courtesy consultation”. This allows the consultation fellows and team to see the patient for educational purposes.

8. Expectations of fellows at each level of training

It is expected that each fellow’s ability to function independently will increase throughout the training period, and intensity of supervision will be altered as appropriate. Generally, in year 1 fellows will be supervised closely and instructed in performing an accurate rheumatologic examination, interpreting roentgenograms,
aspirating and injecting joints, examining synovial fluid by microscopy, and planning rehabilitative and therapeutic programs for patients. Fellows in year 2 will be able to perform a thorough and completely rheumatologic history and examination with attention to fine detail and subtle historical and physical exam findings, aspirate and inject joints, and examine synovial fluid with >95% accuracy, with the attending physician nearby and available on an immediate basis if questions arise.

C. Teaching experience for fellows

The program provides an environment for the fellow which fosters and highly regards the activities of teaching. This includes the education of not only medical students, physicians, and other allied health personnel but also the education of the patients. The curriculum for the Consultation/inpatient experience, the Ambulatory experience, and the Didactic conferences provide ample opportunities for fellows to learn to teach.

Development of teaching skills requires the fellow to receive instruction and feedback in counseling and communication techniques. This latter training includes cultural, social, behavioral and economic issues such as confidentiality of information and indications for life support systems. These topics are covered in a number of ways. Regularly scheduled Core Conferences of the Department of Internal Medicine allow fellows to receive didactic instruction in important *psychosocial, economic, and ethical issues*.

D. CONFERENCES

1. Educational purpose/Rationale/Value of conferences

a. The didactic conferences of the Division of Rheumatology afford opportunities for the fellows to learn about specific topics within the subspecialty through didactic teaching. These conferences provide a group setting in which a variety of opinions can be expressed, and fellows continue to learn to develop appropriate differential diagnoses and therapeutic plans.

b. It is important for fellows to learn to teach in a group conference setting.

c. Fellows work with Rheumatology faculty and experts in Radiology and Pathology to interpret radiographs, computerized tomography images, magnetic resonance images, pathological specimens and tissue slides relevant to the rheumatic diseases.

d. As part of their goal to continue life-long learning, fellows must learn to critically interpret the clinical and research literature relevant to Rheumatology.

e. Conferences provide an ideal setting for fellows to give lectures, present
patients, and participate in open discussions, thereby developing communication skills.

2. Rheumatology Grand Rounds/Case Conferences

a. Description
Director: Dr. Terkeltaub
CSB 247 - 8:00 - 9:00 am, 3 Fridays per month
Fellows choose, prepare, present, and discuss most cases.
Clinical case presentation and literature discussion by fellow, 3 conferences
Attendance is mandatory - faculty, fellows, residents, students
Attendance at all conferences is required unless the fellow is on scheduled vacation, is sick and has notified the Division Administrator of such, or is taking care of a critically ill patient.

b. Goals
(1.) Learn from didactic teaching in the subspecialty of Rheumatology, and learn to convey information through didactic teaching
(2.) Self study in the subspecialty of Rheumatology, emphasizing critical review of the literature
(3.) Develop clinical competence in evaluating and treating diseases included in the list of rheumatic diseases and other illnesses with rheumatologic manifestations
(4.) Review differential diagnoses, therapeutic plans, and therapy skills in a forum with experienced faculty rheumatologists and peers
(5.) Interpret diagnostic procedures common to the practice of rheumatology
(6.) Apply results of literature review to patient evaluation and treatment
(7.) Develop communication skills
(8.) Interdisciplinary experience: Discuss cases, examine and interpret imaging studies, examine pathological material, and learn approach to musculoskeletal medicine with respect to input from orthopedic surgeons, musculoskeletal radiologists, physical medicine and rehabilitation physicians, PHYSICAL THERAPISTS, AND OCCUPATIONAL THERAPISTS

8. Objectives
(1.) Hold conference on regularly scheduled basis
(2.) Present case/literature reviews with pertinent roentgenograms and pathology slides. The fellow also discusses important teaching points from this case, basing this discussion on a relevant article which is distributed to attendees at the conference. The attending physician for the month oversees this conference and helps direct the discussion.
(3.) The attending physician works with the fellows preceding the conference, to be sure that appropriate cases are selected, and to review fellow presentations when necessary.

c. Defined method of teaching
The teaching methods employed in Rheumatology Grand Rounds include open
discussion, debate, use of original teaching slides and slides provided by the
American College of Rheumatology, interpretation of radiographs, computerized
tomography images, magnetic resonance images and histological slides, and self
study and literature review.

These methods are used by faculty of the division. These methods are also employed
by fellows, who are responsible for organizing most of the conferences in which
clinical presentations are made. Fellows also learn to use the teaching methods listed
above.

Development of communications skills is stressed, and fellows are called upon to
communicate results of their literature reviews in a conference setting. These
exercises also enable fellows to learn to teach and lead a group.

9. 4. Educational content
(1.) Diseases

The conferences provide opportunities to present and discuss cases that cover the
spectrum of those that must be recognized and understood by rheumatologists.
These cases invariably include patients whose diagnoses are diffuse connective tissue
diseases, rheumatoid arthritis, scleroderma, polymyositis, dermatomyositis,
spondyloarthropathy, vasculitis, crystal-induced arthritis, osteoarthritis,
nonarticular rheumatic diseases including fibromyalgia, sports injuries, systemic
diseases with rheumatic manifestations, metabolic diseases of bone including
osteoporosis, infections of joints, joint surgery, and rheumatologic problems
requiring rehabilitation therapy.

(2.) Patient content and types of clinical encounters

Clinical conferences include discussions of inpatients and outpatients who are
hospitalized or followed as outpatients. They are a cross section of individuals of both
sexes with ages ranging from birth to over 100 years. The racial and demographic
characteristics of these patients mirror those found in most communities in the west.

(3.) Topics covered

Diagnosis and treatment of diseases encountered by rheumatologists, interpretation
of radiographs and pathology tissue relevant to the cases, contributions of allied
health personnel such as psychologists and physical therapists, literature search and
review.

(4.) Expectations of fellows at each level of training
Year 1 - Participate in evaluating and selecting patients for presentation, write case description, choose key article for review, bring patient to conference, present and discuss case, present and discuss relevant radiographs and pathology slides

Year 2 - The responsibilities of the second year fellow will be the same as those of the first year fellow in Rheumatology Grand Round/Case Conferences. In addition, the advanced fellow will guide and advise the first year fellow and will be responsible for a more detailed and scholarly discussion of the case.

(5.) Principal and ancillary educational materials

(a.) Reading

(1.) RSAP of ACR

(2.) American College of Rheumatology teaching slides (includes physical findings, radiographs, pathology material)


(4.) Radiographs, computerized tomography scans and magnetic resonance images pertinent to rheumatology

(5.) Articles from scientific journals that are pertinent to the case under discussion. These articles, as well as articles used in journal clubs, are recommended by attending rheumatologists or selected by fellows or attending physicians using computerized review of the relevant literature.

D. Evaluation

14. 15. 1. Evaluation of faculty

Faculty members are evaluated as above. The director reviews the forms periodically and uses this information to make specific teaching assignments and provide counseling for member of the faculty.

16. 2. Evaluation of fellows.

Fellows are evaluated as described above.

Performance of fellows in Rheumatology Grand Rounds/Case conferences is one of the topics of discussion at meetings of the Clinical Competency Committee.
Fellows will receive feedback on their performance and participation in conferences at the time of their meetings with the Program Director. These sessions provide a means for fellows to make suggestions about changes in the conference schedule and content. It is the responsibility of the Program Director to convey these suggestions to the Division Director. IN ADDITION, FELLOWS PARTICIPATE IN THE REGULAR REVIEWS OF THE DIVISION INSTRUCTIONAL PROGRAM FOR FELLOWS.

E3. Radiology/Imaging Conferences

a. Description
Director: Dr. Karen Chen, and Dr. R. Terkeltaub
Tuesdays 5:15 - 6:30 pm, 4 conferences per year at the VA
Presentation of selected imaging studies by faculty, discussion and interpretation with Dr. Chen (Radiology)
Attendance is mandatory – core faculty, fellows, residents, students
Attendance at all conferences is required unless the fellow is on scheduled vacation, is sick and has notified the Division Administrator of such, or is taking care of a critically ill patient.

b. Goals
(1.) Interpret imaging studies common to the practice of rheumatology, and ultrasound
(2.) Develop communication skills
(3.) Interdisciplinary experience: Discuss cases, examine and interpret imaging studies and learn approach to musculoskeletal medicine with musculoskeletal radiologist

c. Objectives
(1.) Hold conference on regularly scheduled basis
(2.) Understand cases with radiographs, MRI, CT, or ultrasound and brief clinical context
(3.) Cases are discussed by faculty members and fellows.

F. Defined method of teaching

The teaching methods employed in these conferences include interpretation of radiographs, computerized tomography images, ultrasound, and magnetic resonance images, self study and literature review, discussion, and open discussion and criticism. These methods are used by faculty of the division and faculty from other specialties that are relevant to Rheumatology. In addition, these methods are employed by fellows, who are responsible for organizing most of these conferences.

Development of communications skills is stressed, and fellows are called upon to communicate information about their cases in a conference setting.
These interdisciplinary conferences allow fellows to review cases and learn from faculty in other specialties relevant to Rheumatology. The content of these conferences includes members from the Department of Radiology who have specific interests in the field of rheumatic disease.

G. Educational content

(1.) Diseases

Radiology conferences provide opportunities to present and discuss cases that cover the spectrum of those that must be recognized and understood by rheumatologists. The cases include patients whose diagnoses are diffuse connective tissue disease, rheumatoid arthritis, scleroderma, spondyloarthropathy, vasculitis, crystal-induced arthritis, osteoarthritis, sports injuries, systemic diseases with rheumatic manifestations, metabolic diseases of bone including osteoporosis, infections of joints, and joints following surgery.

(2.) Patient content and types of clinical encounters

Clinical conferences include discussions of inpatients and outpatients who are hospitalized or followed as outpatients. They are a cross section of individuals of both sexes with ages ranging from birth to over 100 years. The discussions include adequate numbers of patients from the adolescent and geriatric age groups, and people of both sexes. All income classes and socioeconomic classes are included. The racial and demographic characteristics of these patients mirror those found in most communities in the west.

(3.) Topics covered

Interpretation of radiographs, computerized tomography, and magnetic resonance imaging relevant to diseases encountered by rheumatologists, especially systemic lupus erythematosus, diffuse connective tissue disease, rheumatoid arthritis, scleroderma, spondyloarthropathy, vasculitis, crystal-induced arthritis, osteoarthritis, sports injuries, systemic diseases with rheumatic manifestations, metabolic diseases of bone including osteoporosis, infections of joints, and joints following surgery.

(4.) Expectations of fellows at each level of training

Year 1 - Be able to interpret imaging studies of patients with uncomplicated rheumatoid arthritis, osteoarthritis, ankylosing spondylitis, gout, pseudogout, and the other diseases listed in the curriculum.

Year 2 - The responsibilities of the second year fellow will be the same as those of the first year fellow, and in addition, the second year fellow will also be expected to guide and advise the first year fellows and participate in teaching and guiding the residents.
and students on the service. Second year fellows are expected to have more proficiency in interpreting imaging findings of complicated rheumatoid arthritis, gout, pseudogout, and the other diseases listed in the curriculum. They are expected to be familiar with computerized tomography and magnetic resonance imaging studies of the spine, shoulder, and knee.

(5.) Principal and ancillary educational materials

Radiographs, computerized tomography scans and magnetic resonance images pertinent to rheumatology.

10. H. Evaluation
(1.) Evaluation of faculty

Faculty members are evaluated as above. The director reviews forms periodically and uses this information to make specific teaching assignments and provide counseling for member of the faculty.

(2.) Evaluation of fellows

Performance of fellows in Radiology is one of the elements of evaluation of clinical performance and fund of knowledge.

I. Pathology Conference

11. Description
Director: Dr. Terkeltaub
CSB247 - 8:00 - 9:00 am Friday, 2-4 conferences a year
Fellows choose and present most cases and assist in planning the conference. Presentation by faculty and fellows of selected biopsies relevant to rheumatology, with interpretation and discussion by Dr. Powell, or Tak.
Attendance is mandatory - faculty, fellows, residents, students
Attendance at all conferences is required unless the fellow is on scheduled vacation, is sick and has notified the timekeeper and Division Administrator of such, or is taking care of a critically ill patient.

2. Goals
(1.) Interpret pathological slides of tissues from patients with diseases common to rheumatology. Includes synovial and muscle biopsies and renal and skin biopsies.
(2.) Develop communication skills
(3.) Interdisciplinary experience: Discuss cases, examine and interpret histology slides of pathology tissue with pathologist

12. Objectives
(1.) Hold conference on regularly scheduled basis
Present 4-6 cases and discuss prepared tissue slides or projected transparencies of the lesions with a qualified pathologist.

Cases are presented by faculty members and fellows.

**13. Defined method of teaching**

The teaching methods employed in these conferences include interpretation of pathology slides from synovial biopsies, renal biopsies, muscle biopsies, and other tissues from patients with diseases relevant to rheumatology, self study and literature review, discussion, and open discussion and criticism. These methods are used by faculty of the division and faculty from other specialties that are relevant to rheumatology. In addition, these methods are employed by fellows, who are responsible for organizing most of these conferences. Development of communications skills is stressed, and fellows are called upon to communicate information about their cases in a conference setting. These interdisciplinary conferences allow fellows to review cases and learn from faculty in other specialties relevant to rheumatology. The content of these conferences includes members from the Department of Pathology who have specific interests in the field of rheumatic disease.

**14. Educational content**

(1.) Diseases

The Pathology Conference provides opportunities to present and discuss tissue and relevant biopsies from cases that must be recognized and understood by rheumatologists. These cases include patients whose diagnoses are diffuse connective tissue diseases, rheumatoid arthritis, scleroderma, polymyositis, dermatomyositis, vasculitis, crystal-induced arthritis, and osteoarthritis.

(2.) Patient content and types of clinical encounters

Pathology Conference includes discussions of inpatients and outpatients who are hospitalized or followed as outpatients. They are a cross section of individuals of both sexes with ages ranging from birth to over 100 years. The racial and demographic characteristics of these patients mirror those found in most communities in the west.

(3.) Topics covered

The Pathology Conference will cover indications for biopsy, limitations and interpretation of light microscopy, and appropriate use and interpretation of electron microscopy and direct immunofluorescence of tissue from cases that must be recognized and understood by rheumatologists. These cases include patients whose diagnoses are diffuse connective tissue disease, rheumatoid arthritis, scleroderma,
polymyositis, dermatomyositis, vasculitis, crystal-induced arthritis, and osteoarthritis.

(4.)  Expectations of fellows at each level of training

Year 1 - Participate in evaluating and selecting patients for presentation, present the case and discuss the indications for, and the result of the biopsy. Understand how tissue interpretation will influence diagnostic thinking and plans for therapy and imaging studies.

Year 2 - The responsibilities of the second year fellow will be the same as those of the first year fellow in respect to Pathology Conference. The advanced fellow will also be expected to guide and advise the first year fellows and participate in teaching and guiding the residents and students on the service. Second year fellows are expected to have more proficiency in interpreting histopathology of rheumatoid arthritis, inflammatory muscle disease, systemic lupus erythematosus, and vasculitis.

(5.)  Principal and ancillary educational materials

Pathology material presented through photomicrographs, provided by the attending pathologist. These will show representative tissues from patients with rheumatoid arthritis, systemic lupus erythematosus, vasculitis, and other diseases pertinent to the subspecialty of rheumatology. It is also expected that the fellows will review literature pertinent to the cases that are presented.

15.  Evaluation
   (1.)  Evaluation of faculty

   As above.

(2.)  Evaluation of fellows

   As above.

16.
17.
18.
19.
20.
21.
22.  Case Conferences (see Appendix on Rheumatology Clinical Conferences
23.  Below and discussion of Grand Rounds above)
24.  In addition, Rheumatologists (affiliated faculty) from the community (Naval, Kaiser, Sharp, and Scripps Health Hospitals) present their own cases.

Discussion of community cases with an experienced clinician constitutes the major
method of teaching, and broadens and enriches the clinical experience of fellows.

25. Educational content

(1.) Diseases

Diffuse connective tissue diseases, rheumatoid arthritis, scleroderma, polymyositis, dermatomyositis, inclusion body myositis, spondyloarthropathies, vasculitis, crystal-induced arthritis, osteoarthritis, nonarticular rheumatic diseases including fibromyalgia, sports injuries, low back pain, systemic diseases with rheumatic manifestations, metabolic diseases of bone including osteoporosis, infections of joints, joint surgery, and rheumatologic problems requiring rehabilitation therapy.

(2.) Patient content and types of clinical encounters

Clinical encounters are not part of Case Conference. However, the topics that are covered deal with diseases that involve both sexes and people of all ages. People of all races and incomes, and with different types of health care coverage, are expected to have the diseases that are discussed in this conference.

(3.) Topics covered

Diffuse connective tissue diseases, rheumatoid arthritis, scleroderma, polymyositis, dermatomyositis, inclusion body myositis, spondyloarthropathies, vasculitis, crystal-induced arthritis, osteoarthritis, nonarticular rheumatic diseases including fibromyalgia, sports injuries, low back pain, systemic diseases with rheumatic manifestations, metabolic diseases of bone including osteoporosis, infections of joints, joint surgery, and rheumatologic problems requiring rehabilitation therapy.

(4.) Expectations of fellows at each level of training

Year 1 - First-year fellows are expected to discuss the cases and to participate in discussion with the faculty mentor and the other fellows concerning the diagnosis, pathogenesis, and treatment of the cases.

Year 2 – Discuss case, discuss material with faculty and other fellows, show advanced understanding of the topics, with ability to discuss the material with greater expertise compared to first year fellows, participate in teaching the first year fellows.

(5.) Principal and ancillary educational materials

(a.) Reading
(b.) Pathological materials

Pathology topics are included in the cases and are discussed as appropriate to the case under study.

26. Evaluation
   (1.) Evaluation of faculty

As above.

(2.) Evaluation of fellows

As above.

Rheumatology-Orthopedic Surgery-rehab Conferences

27. Description
Director: Dr. Robert Terkeltaub
CSB, Friday 8-9 AM, 4-6 times per year
Fellows choose and present cases of interest to rheumatologists/orthopedic surgeon/physiatrist.
Attendance is mandatory for core faculty, fellows, residents in Internal Medicine, and students.
Attendance at this conference is required unless the fellow is on scheduled vacation, is sick and has notified the Division Administrator of such, is in a regularly scheduled clinic, or is taking care of a critically ill patient.

2. Goals
   (1.) Learn practical aspects of office orthopedics and physical medicine and rehabilitation
   (2.) Understand principles of selecting patients for surgical procedures on joints
   (3.) Learn postoperative care principles. Learn principles of rehabilitation and physical therapy as applied to rheumatologic diseases
   (4.) Gain additional experience in interpreting skeletal and joint radiographs
   (5.) Interdisciplinary experience: Discuss cases, examine and interpret imaging studies, and learn approach to musculoskeletal medicine with orthopedic surgeon and musculoskeletal radiologist.

3. Objectives
   (1.) Meet on a regularly scheduled basis 4-6 times per year.
   (2.) Rheumatology, orthopedic surgery and podiatry faculty and rheumatology
fellows choose and present selected inpatient and outpatient cases for discussion.

28. Defined method of teaching

The teaching methods employed in these conferences include interpretation of radiographs, computerized tomography images, and magnetic resonance images, self-study and literature review, and open discussion and criticism.

These methods are used by faculty of the division and faculty from other specialties that are relevant to Rheumatology.

In addition, these methods are employed by fellows, who are responsible for organizing most of the Rheumatology-Orthopedic Surgery-Radiology Conferences. Fellows also learn to use the teaching methods listed above.

Development of communications skills is stressed, and fellows are called upon to communicate results of their literature reviews in this conference setting. These exercises also enable fellows to learn to teach and lead a group.

This interdisciplinary conference allows fellows to review cases and learn from faculty in other specialties relevant to Rheumatology.

29. Educational content

(1.) Diseases

Rheumatoid arthritis, scleroderma, spondyloarthropathies, crystal-induced arthritis, osteoarthritis, sports injuries, low back pain, systemic diseases with rheumatic manifestations, metabolic diseases of bone including osteoporosis and Paget’s disease, infections of bone, primary bone tumors, metastases to bone, infections of joints, and joint surgery.

(2.) Patient content and types of clinical encounters

Clinical encounters are not generally part of this conference. However, the topics that are covered deal with diseases that involve both sexes and people of all ages, races and incomes, and with different types of health care coverage, are discussed in this conference.

(3.) Topics covered

Rheumatoid arthritis, scleroderma, spondyloarthropathies, crystal-induced arthritis, osteoarthritis, sports injuries, low back pain, systemic diseases with rheumatic manifestations, metabolic diseases of bone including osteoporosis and Paget’s disease, infections of bone, primary bone tumors, metastases to bone, infections of joints, and joint surgery.

(4.) Expectations of fellows at each level of training

*Year 1* - First-year fellows are expected to choose cases and bring the relevant
radiographs for discussion. They are expected to read literature pertinent to their cases, and to participate in discussion with the faculty mentor and the other fellows concerning the diagnosis, pathogenesis, and treatment of the cases.

**Year 2** - Read about cases, discuss material with faculty mentor and other fellows at the conference, show advanced understanding of the topics, discuss the material with greater expertise compared to first year fellows, participate in teaching the first year fellows and residents and students at the conference.

(5.) Principal and ancillary educational materials
   As above.

30. Evaluation
   (1.) Evaluation of faculty
       As above.
   (2.) Evaluation of fellows
       As above.

17. Basic Science Conferences and Research Conferences with Journal Club
   a. Description
      Directors: Drs. R Terkeltaub and H. Tighe
      *MTF274 each Tuesday 8:00-9:00am, and one Friday AM per month at 8-9:30 AM in CSB 247.*
      Each month, this series of conferences includes a Basic Science Conference, a Journal Club, and a Research Conference. The Journal Club is described below (item 11.)

      Faculty and fellows discuss basic sciences relevant to the rheumatic diseases and prepare and present research topics, usually a report of ongoing research. Rheumatology fellows and the residents in Internal Medicine and medical students who are rotating in Immunology & Rheumatology are expected to attend. Attendance of fellows at all conferences is required unless the fellow is on scheduled vacation, is sick and has notified the Division Administrator, or is taking care of a critically ill patient.

   b. Goals
      (1.) Learn basic science aspects of Rheumatology
      (2.) Develop ability to collect and analyze research data
      (3.) Refine communications skills and teaching skills by providing a forum in which the fellow learns to prepare a talk and present research findings to a group
      (4.) Develop ability to critically review and analyze research and basic science literature
      (5.) Promote scholarship
31. Objectives
   (1.) Hold conferences on a regularly scheduled basis with attendance required of faculty and fellows
   (2.) Present research background, methods, and results of fellow’s research project
   (3.) Prepare research talk and appropriate visual aids

32. Defined method of Teaching

Review of investigative articles, presentations that give the background for a research topic such as “Cytokines”, and faculty member and fellow presentations that focus on an ongoing research project. Some presentations are given by guest speakers from closely affiliated disciplines, such as Immunology-Allergy. Teaching is by lecture and by debate and discussion.

33. Educational content
   (1.) Diseases

Research topics covered in the *Basic Science/Research Conference* for the Division of Immunology & Rheumatology include these diseases: rheumatoid arthritis, osteoarthritis, systemic lupus erythematosus, mixed connective tissue disease, scleroderma, experimental granulomatous disease, and fibromyalgia.

   (2.) Patient content and types of clinical encounters

Patients and clinical encounters are not part of *Basic Science/Research Conference*. However, these diseases are covered in the research topics: rheumatoid arthritis, osteoarthritis, systemic lupus erythematosus, mixed connective tissue disease, scleroderma, experimental granulomatous disease, and fibromyalgia.

   (3.) Topics covered

Immunogenetics, control of the immune response, hormonal modulation of autoimmune disease, pathogenesis of systemic lupus erythematosus, definition of new autoantibody systems, pain control in rheumatoid arthritis, effects of exercise on rheumatoid arthritis, osteoarthritis, and bone mineral density.
(4.) Expectations of fellows at each level of training

Year 1 - First year fellows are expected to make at least one presentation giving literature background for the research project chosen by that fellow. Depending upon the fellow’s progress, the methods can be presented.

Year 2 - Second year fellows are expected to have planned, researched, and started their projects. They will be presenting results of work in progress. Near the end of the second year, material for abstract presentations and manuscripts will be presented.

(5.) Principal and ancillary educational materials

(a.) Reading


22. US Department of Health and Human Services. Application for Public Health Service Grant

23. Endocrine Society: Introduction to molecular and cellular research

24. Bailar JC and Mosteller F. Medical uses of statistics.


26. Fellows are expected to continue the tradition of self study in order to prepare for Basic Science/Research Conference presentations. They are expected to review books, articles, and other reference materials from the library. Fellows are expected to be aware of the rapid advances in the field and the necessity for life-long learning.
(b.) Pathological materials

Pathological materials are utilized as needed to explain results of an experiment. These are usually materials from experimental animals, and the materials that are used are photomicrographs of light microscopy studies that are relevant to the research report.

34. Evaluation
   (1.) Evaluation of faculty
       As above.
   (2.) Evaluation of fellows
       As above.

Journal Club
Journal articles are selected, presented, and discussed by fellows. The journal club alternates clinical and research topics. Rheumatology fellows are expected to attend. The residents in Internal Medicine and medical students who are rotating in Immunology & Rheumatology are expected to attend. Attendance at all conferences is required unless the fellow is on scheduled vacation, is sick and has notified the Division Administrator of such, or is taking care of a critically ill patient.

Goals
(1.) Learn basic science aspects of rheumatology
(2.) Develop ability to critically read the literature of rheumatology
(3.) Refine communications skills, by learning to present clinical and basic science articles to a group
(4.) Develop ability analyze research and basic science literature

35. Objectives
(1.) Hold regularly scheduled conferences
(2.) Presentation and discussion of scientific articles, with clinical or research (basic science) topics, chosen and presented by rheumatology fellows
(3.) Critical review of literature
(4.) Open debate and discussion

36. Defined methods of teaching
The teaching methods employed in these conferences include self study and literature review and open discussion and criticism.

In addition, these methods are employed by fellows, who are responsible for organizing the journal clubs and choosing the articles they will review. Fellows also
learn to use the teaching methods listed above. Development of communications skills is stressed, and fellows are called upon to communicate results of their literature reviews in a conference setting. These exercises enable fellows to learn to teach and lead a group.

37.
38.
39.
40.
41. Educational content
42.

(1.) Diseases
Clinical journal club articles cover these subjects during a 2-year cycle: diffuse connective tissue diseases, rheumatoid arthritis, scleroderma, polymyositis, dermatomyositis, inclusion body myositis, spondyloarthropathies, reactive arthritis, vasculitis, crystal-induced arthritis, osteoarthritis, nonarticular rheumatic diseases including fibromyalgia sports injuries, low back pain, systemic diseases with rheumatic manifestations, metabolic diseases of bone including osteoporosis, infections of joints, joint surgery, and rheumatologic problems requiring rehabilitation therapy.

Research journal club articles cover immunology, immunogenetics, control of the immune response, autoantibody formation, and identification and characterization of new autoantibodies.

(2.) Patient content and types of clinical encounters

Direct patient encounters and contact are not part of Journal Club.

(3.) Topics covered

Clinical Journal Club topics - Evolving a hypothesis, planning an experiment, statistical analysis, ethics of investigation, animal husbandry, experimental procedures, data analysis, scientific writing.

Basic Science Journal Club topics - Basic science topics center around immunology, immunogenetics, control of the immune response, the nature of autoimmunity, and identification of unique antibody systems.

(4.) Expectations of fellows at each level of training

Year 1 - Fellows are expected to choose important articles and present them and discuss them at their assigned journal club sessions.

Year 2 - Fellows choose important articles and present them in more depth compared to first year fellows. They are also more able to analyze and understand
the significance of the material they present in *Journal Club*. Second year fellows should be able to teach residents and students who attend the conference.

(5.) Principal and ancillary educational materials
(a.) Reading
Current articles from sources including *Journal of Immunology, Journal of Clinical Investigation, Arthritis and Rheumatism, Journal of Rheumatology, Annals of Rheumatic Disease*
(b.) Pathological materials
Pathological materials are discussed if they are part of an article that is being presented in *Journal Club*.

43. Evaluation

(1.) Evaluation of faculty
   As above.

(2.) Evaluation of fellows
   As above.

PROCEDURES

Arthrocentesis and injection of steroid preparations are the procedures that are learned in the fellowship. In addition, fellows learn to inject tendon areas, entheses, and various soft tissue tender points, all under the supervision of faculty rheumatologists.

Fellows learn the anatomy, precautions, and potential sequelae of and demonstrate competence in aspiration and therapeutic injections of diarthrodial joints, bursae, tenosynovial structures, and entheses.

Fellows acquire knowledge and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of fellows in performance of 20 injections of joints, and 15 injections of tendons, etc. is required for documentation of competence.

Each fellow’s experience in procedures is noted in procedure logs that are kept in the fellow’s permanent file. Procedure logs are kept for the entire duration of the fellowship, and list invasive procedures, date, indication, outcome, complication, and name of supervising physician. The supervising faculty attending physician initials each procedure to indicate that it was done under appropriate supervision.

Direct examination of wet preparations of synovial fluid is learned using a microscope equipped with polarizing lenses and a first-order red plate compensator. The microscope is available at all times to fellows. *Faculty supervision of fellows in 5*
synovial fluid examinations is required for documentation of competence.

* OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION GUIDELINES

Residents must have formal instruction in current OSHA regulations and universal precautions and protection of health care workers.

27. Fellows will learn current OSHA regulations and the universal precautions for protection of health care workers.

Methods:
Each fellow will
a. Attend the introductory session during Orientation by the Infection Control Officer
b. Attend one of the annual sessions on “HIV and the Health Care Worker” presented at UCSDMC
c. Become familiar with the Infection Control manual (OSHA Regulations in back of manual)
d. Attend Core Conferences of the Department of Internal Medicine, covering OSHA Blood Borne Illnesses and Emergency Preparation Plan

Evaluation:
a. Observation of use of appropriate precautions, such as use of gloves during performance of procedures that involve potential contact with blood or body fluids
b. Monitor sign-in sheet for fellows at Core Conferences

28. Fellows will maintain current immunization status.
Each fellow will
a. Provide evidence of immunization against hepatitis B or obtain immunization through Employee Health
b. Obtain annual immunization against influenza
c. Maintain personal immunization records

Evaluation:
Examination of personal immunization records

29. Research involving hazardous materials
Each fellow participating in research involving hazardous materials is required to attend a seminar presented by Environmental Health and Safety on “Managing Hazardous Materials”.

66
30. Research involving animals
Each fellow participating in research involving animals is required to become familiar with the pertinent Rules and Regulations relating to “Health and Medical Surveillance Program for Laboratory Animal Care Personnel”.

31. Research involving radioactivity
Each fellow participating in research involving radioactive materials is required to:
   a. Attend a Radiation Review session
   b. Work with an Authorized User and receive appropriate instruction from this person.

CRITICAL ASSESSMENT AND DECISION SERVICES

Residents must have instruction in the evaluation of medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical decision-making.

Methods:
Each fellow will
   a. Attend and participate in the research conferences of the Department of Internal Medicine and the Division of Rheumatology
   b. Attend and participate in the presentation and discussion of current literature at Rheumatology Grand Rounds, and at the research and clinical journal clubs of the Division of Rheumatology
   c. Attend the regularly scheduled Core Conferences of the Department of Internal Medicine, including lectures on “Critical Assessment of Medical Literature”, Statistics and Epidemiology.

Evaluation:
   a. Faculty discussion of fellows’ progress in conference participation through the Clinical Evaluation Committee
   b. Monitor fellows’ sign sheets from Department of Internal Medicine Core Conferences

CONTINUOUS QUALITY IMPROVEMENT

Residents are expected to have instruction and experience in the principles, objectives and processes of quality assessment and improvement and risk management.

Methods:
Each fellow will
   a. Attend the Orientation session at which risk management issues are presented
   b. Attend a presentation on the principles of quality assessment and
improvement
c. Become familiar with the tools of continuous quality improvement i.e. flowcharts, control charts, Ishikawa cause and effect (“fishbone”) charts and Pareto bar charts
d. Become familiar with the 10 steps listed by the JCAHO for the continuous process of monitoring and evaluation of the quality of care

References:
a. University Hospital and Clinics Quality Assessment and Improvement plan 1995

PSYCHOSOCIAL, ECONOMIC AND ETHICAL ISSUES

Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources. Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society.

Methods:
Each fellow will
a. Become familiar with the Project Professionalism Manual of the American Board of Internal Medicine.
b. Attend Core UCSD lectures on psychosocial, economic and ethical issues

EDUCATIONAL AND COUNSELING SKILLS

Residents should have instruction and experience in patient counseling skills and community education. This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education.

Methods:
a. This program provides an environment for the fellow which fosters and highly regards the activities of teaching. These activities include educating not only medical students, physicians and other health care personnel but also educating the patients. The curriculum for the Consultation/inpatient experience, the Ambulatory experience and the conferences provide ample opportunities for fellows to learn to teach.

b. Developing teaching skills requires the fellow to receive instruction and feedback in counseling and communication techniques. This training includes cultural, social, behavioral and economic issues. These topics are covered in regularly scheduled Core Conferences of the Department of Internal Medicine which
allow fellows to receive instruction in important psychosocial, economic and ethical issues; specific topics include confidentiality of information and indications for life support systems.

K. RESEARCH EXPERIENCE

As part of the academic environment, an active research component must be included within each subspecialty program. The program must ensure meaningful, supervised research experience with appropriate protected time for each resident while maintaining the essential clinical experience. Recent productivity by the program faculty and by the residents will be required, including publications in peer-reviewed journals. Residents must learn the design and interpretation of research studies, responsible use of informed consent, and research methodology and interpretation of data. The program must provide instruction in the critical assessment of new therapies and of the medical literature. Residents should be advised and supervised by qualified staff members in the conduct of research.

1. Educational purpose/rationale/value

a. In order for trainees to understand the medical literature, it is necessary for them to understand how to search the literature on the subject of interest and to review the articles critically.

b. To understand the limitations and rewards of research, the fellow needs to actually participate in an investigative program.

c. Fellows will be using new drugs developed through laboratory synthesis and validated in research trials. In order for them to provide optimum treatments in the future, it is necessary to understand the basic sciences relevant to rheumatic diseases. This understanding is obtained through perusal of the literature and performing research.

2. Goals

a. Provide a meaningful, supervised research experience with appropriate protected time for each fellow, employing the active research environment in the Division of Rheumatology

b. Learn design and interpretation of research studies

44. 2. Learn research methodology and interpretation of research data

45. Learn ethical conduct of clinical research studies, including responsible protocol design, function of the Institutional Research Board and responsible
use of informed consent

4. Learn scientific writing and the procedures for submitting abstracts for consideration for presentation at a scientific meeting, and procedures for submitting a paper for consideration for publication in a scientific journal

3. Objectives

1. By the spring of the first year fellowship period, each fellow is encouraged to have an interview with each faculty investigator. This will allow the fellow to gain adequate insight into the areas of research in preparation for the ultimate selection of a faculty member to serve as a specific research mentor for the remainder of the fellowship training program, including dedicating educational time through the second year of the fellowship, at a minimum. Each fellow is expected to have a significant role in a minimum of one research project during the training period.

2. The fellow works closely with the research mentor to learn sound methodology in designing and performing research studies and the correct interpretation and synthesis of research data.

46. Fellows will reinforce these objectives by regular attendance at the regularly scheduled Division of Rheumatology Research Conferences and research journal club. The CIT Monday Conference meets weekly, and is a recommended venue to review clinical research concepts.

47. Clinical research design, interactions with the Institutional Research Board and results of clinical studies are presented regularly at the division’s research conferences by faculty engaged in such research and by participating fellows.

5. Each fellow is expected to submit at least one abstract for presentation at the national meeting of the American College of Rheumatology, and to be the primary author of at least one well-written and researched medical manuscript per year during the training period. This manuscript may be a report of a successful research project, or a review article in a medical peer-review journal (ie, not a Book Chapter), and should be written with the primary research mentor. There is no limit imposed on writing by the fellows or original, peer-reviewed research papers or abstracts. In contrast, the fellow may be asked to write additional review articles or case reports with faculty other than the primary research mentor, but this should first be cleared with the training program director prior to agreeing to carry such an assignment. It is required that at least one member of the division oversee writing of papers by fellows and be coauthor on presentations and publications resulting from research projects.

4. Defined method of teaching
This experience is based upon close supervision of the fellow by the research mentor. The methods for teaching in the research experience include:

48. Attendance at clinical research and laboratory meetings and conferences between the fellow and the research mentor. Instruction is one-on-one and also includes discussions of research problems and results in seminar format.

2. Attendance at department and division research conferences, where teaching is by didactic lecture and open discussion.

49. Self-study in reading relevant research literature and searching the literature.

50. The fellow attempts designing experiment and constructing hypotheses, and these are reviewed with the research mentor.

5. One-on-one instruction in performing the experimental methods

52. Individual instruction in data collection and synthesis and statistical analysis of data

7. Individual instruction in making application to the Institutional Review Board and writing informed consent documents

8. Individual supervision and instruction in writing and submitting abstracts and manuscripts

5. Educational Content

(a.) Diseases

The research experience does not focus on individual disease states, unless the disease is the topic of an investigative study. Currently, these diseases are under investigation by faculty in the Division of Rheumatology and their collaborators: rheumatoid arthritis, systemic lupus erythematosus, mixed connective tissue disease, and osteoarthritis.

(b.) Patient characteristics and types of clinical encounters

Patients in clinical studies are followed and evaluated by faculty members and fellows in the Innovative Therapies Center. The patients have the diagnosis of a rheumatic disease that is the topic of a research study, and they are enrolled in such a study. The fellow will participate by reading and understanding the research protocol and Institutional Review Board-approved summary and informed consent, and by reviewing literature relevant to the study. In many instances, the fellow will perform the protocol evaluation and/or treatment.
In some instances, fellows work with serum or lymphocytes from patients and the fellows do not have a patient encounter. Projects dealing with research animals such as mice also do not include patient encounters.

(c.) Procedures and services

Research protocols in the Division of Rheumatology involve administration of experimental therapy on protocol to selected patients. Other than clinical evaluation and possibly writing a prescription for an experimental therapy, fellows do not provide procedures and services.

(d.) Principal and ancillary educational materials: The classic papers


36. US Department of Health and Human Services. PHS 398. Application for Public Health Service Grant

37. Endocrine Society: Introduction to molecular and cellular research

38. Bailar JC and Mosteller F. Medical uses of statistics.


40. Fellows are expected to continue the tradition of self study on this rotation. They are expected to be responsible for using and taking proper care of all resources made available to them such as articles and other reference materials from the library. Fellows are expected to be aware of the rapid advances in the field and the necessity for life-long learning.
(e.) Research involving hazardous materials

Fellows participating in research involving hazardous materials are required to attend a seminar presented by Environmental Health and Safety, entitled: “Managing Hazardous Materials.” Additional safety is ensured by direct counseling from the research mentor and the safety officers at UCSDMC and SDVAHCS.

(f.) Research involving animals

41. Fellows participating in research involving animals are required to become familiar with the pertinent Rules and Regulations of UCSD, especially the rules that relate to “Health and Medical Surveillance Program for Laboratory Animal Care Personnel.”

2. Fellows are expected to become familiar with the Animal Care and Use Committee policies and federal guidelines.

42. Fellows are expected to read the Guide for the Care and Use of Laboratory Animals

4. Fellows are expected to read Care and Use of Vertebrate Animals as Subjects in Research and Teaching

43. Additional training in animal care and husbandry is available through the Office of Laboratory and Animal Medicine.

(g.) Research involving radioactivity

Each fellow participating in research involving radioactive materials is required to attend a Radiation Review session and to work with an Authorized user to receive appropriate

(h.) Evaluation

(1.) Evaluation of fellows

All research projects, like those for basic research, will require a 1-2 page research proposal to be prepared in advance with the advice of the proposed mentor, and subject to review and approval by the Training Program Director and a committee assembled by the Training Program Director to review the proposed research. In addition, regular 1-2 page progress reports will be requested at a minimum of every 6 months. The content of evaluations of the fellow's aptitude and interests in research will be communicated to the fellows individually, and on a semi-annual basis by the
fellowship training program director or the director's designee. The fellow’s performance will be formally evaluated by the supervising faculty mentor and the fellow will in turn evaluate the research training, using standardized forms. The main avenue for feedback to the fellow is between the research mentor and the fellow who is being mentored in the research experience.

**Research Evaluations** are submitted immediately to the Program Director, who reviews them and places them in the fellow’s permanent file. Any forms that contain an unsatisfactory rating will require an immediate conference between the fellow and the Program Director to identify causes for the poor performance.

(2.) Evaluation of program performance

Fellows who have concerns or questions about their research experience are able to discuss the situation at any time with the Program Director, who has the option of discussing the situation with the research mentor or the Division Director. The Division Director will take appropriate action to intervene if necessary.

(3.) Strengths and limitations specific to resources

The Division of Rheumatology has adequate resources to provide a meaningful experience in rheumatology that has the potential to result in publication in a reviewed scientific journal, presentations at national meetings, and a career in investigative rheumatology. These goals have been accomplished by many graduates of this program. Success depends upon the fellow’s own commitment to, and interest in, scientific investigation.

(i.) Expectations of fellows at each level of training

*Year 1*, by the spring of the first year of training, the fellow will meet with investigators on the faculty to choose a project. He/she will read literature to form a background for the research project. The fellow will learn research methods. *Year 2* - The fellow will work in the mentor’s laboratory/Clinical Research Unit. Data will be accrued and analyzed. Abstracts and manuscripts will be written.

L. OTHER SCHOLARLY ACTIVITIES

In addition to participating in the organized didactic conferences established within the fellowship program it is also strongly encouraged that all fellows become members of the *American College of Rheumatology* and the *American College of Physicians*—American Society of Internal Medicine. Participation in the continuing medical education activities of these professional organizations helps to foster standards.
of professionalism and the process of lifelong learning.

Evaluation

In order for the training program to assess its ability to meet its goals and objectives, it is essential that the program have an evaluation process, including formative and summative evaluations of the fellows, and an evaluation process of the program and the faculty.

A. Formative Evaluation of the Fellows

Formative evaluations occur at the completion of every four-week inpatient/consultation rotation, when the supervising faculty member completes evaluation forms for the first call fellow and the second call fellow and reviews the evaluations directly with the fellows. The form used is the one that is distributed and recommended by the American Board of Internal Medicine. The faculty member is required to add a notation concerning the humanistic attributes of the fellow. The faculty member and the fellow both sign the form.

All faculty must complete the form prior to the completion of the rotation and review their impressions directly with the fellow. All completed evaluation forms are returned to the Program Director for review and placed in the fellow’s permanent file, where the forms are always accessible to the respective fellow.

CLINICAL SUPERVISING ATTENDING FACULTY MEMBERS WILL EVALUATE EACH FELLOW UNDER SUPERVISION IN THE OUTPATIENT CLINIC SETTING, USING A WRITTEN FORM. THE AMBULATORY CARE EVALUATIONS WILL BE HANDLED THE SAME AS THE FORMATIVE EVALUATIONS OF THE CONSULTATION EXPERIENCE.

During the research phase of training, an evaluation form will be completed by the fellow’s research faculty mentor. These evaluation forms are completed every month, reviewed with the fellow by the faculty research mentor, signed by the fellow and the faculty mentor, and submitted to the Program Director for placement in the fellow’s permanent file, where the forms are accessible to the fellow.

Completed evaluation forms submitted to the Program Director are reviewed immediately upon their receipt. Any forms that contain a rating less than satisfactory in any category will require an immediate conference between the fellow and the Program Director to identify causes for the poor performance and identify means for improving the deficiency.

Fellows are accredited to perform procedures and to examine synovial fluid for crystals by performing 30 of each, as directed by the American College of Rheumatology.
All fellows are required to keep a *procedures log throughout the entire fellowship period*, identifying invasive procedures, date, indication, outcome, complication, and name of supervising physician. A copy of this log is provided to the Program Director semi-annually for placement in the fellow’s permanent file.

SEMIANNUALLY, all fellows confer individually with the Program Director to review all of their FORMATIVE and other evaluations. This meeting is to provide feedback to the fellow on his/her performance and to identify areas for professional enhancement. A *written summary* of this session is placed in the fellow’s permanent file and is accessible to the fellow.

Mini-CEX for objective evaluation of fellow performance:
Structured objective min-CEX clinical exams are conducted at months 6 and 18 in clinic at Hillcrest and the VA, and are graded by the faculty according to ABIM format and addressing the core competencies. All Fellows also take the ACR national standardized exam for Rheumatology Fellows in first and second years. To help assess knowledge and guide preparations for subspecialty board exams, the Division will give an essay/multiple choice exam in rheumatology to second year fellows at the beginning of their second training year.

B. Summative Evaluation of the Fellows

The Program Director prepares a detailed, written evaluation of the clinical competence of each fellow annually. These evaluations stipulate the degree to which the fellow has mastered each component of clinical competence (clinical judgment, medical knowledge, clinical skills, humanistic qualities, professional attitudes and behavior, and provision of medical care) and has acquired proficiency in the procedures identified by the curriculum. A record of the summative evaluation is maintained in the fellow’s permanent file, where it is accessible to the fellow.

The overall performance of each fellow is reviewed regularly by the Division of Immunology & Rheumatology *Clinical Evaluations Committee*. This committee is asked to monitor the performance of the fellows and assess the level of competence for each fellow. The committee’s assessment is written and recorded in the program files for future reference purposes. The results are shared with each fellow at the time of the semi-annual review with the Program Director.

A policy is in effect in this Division.

Summary of Discipline, Dismissal and Due Process policies

The UCSD Rheumatology Training Program follows the Discipline, Dismissal and Due Process policies identified in the UCSD House Staff Policy and Procedure Document given to all fellows. The program’s standard evaluation forms include questions regarding clinical performance and professionalism, and the program director asks the faculty to document instances of unprofessional behavior on written
evaluations or in a letter form that is then included in the Fellows file and at Division meetings. If any significant concerns arise, the Program Director addresses the issue with the Fellows and makes suggestions for how to improve performance. Even when there is no concern regarding aspects of performance, fellows receive biannual feedback from the Program Director. When problems exist that need to be addressed at a higher level, the program consults the GME office and takes appropriate actions in accordance with the UCSD House Officer Policy and Procedure Document. The UCSD GME office also supports the Physician Well-Being Committee, which serves as the identified group for referring physicians with mental, emotional, or physical impairment that interferes, even potentially, with the ability to practice medicine with reasonable skill and safety. The committee monitors practitioners for compliance with terms of agreements and assists, return-to-work issues, and provides resources for treatment and education.

A fellow may be placed on probation when his/her performance is consistently unsatisfactory. The Program Director informs the fellow in person that he/she has been placed on probation. The Program Director delineates the terms of the probation, and subsequently, confirms them by letter. In general, terms provide for the fellow to be placed on probation for a specific period. At the end of that time, the Program Director and faculty arrive at one of the following decisions based on the fellow’s performance during the probationary period:

1. The fellow shall be terminated from the program
2. The fellow may continue in the program, but without full credit for the period his/her performance was unsatisfactory, or
3. The fellow may continue in the program with full credit for the probationary period if his/her performance was satisfactory during that time.

The Program Director makes the final decision in cases involving dismissal. Fellows facing dismissal may ask the Program Director and faculty to reconsider their decision. If the appeal is denied, the fellow may then appeal to the Dean of the School of Medicine. Probationary status may not be appealed since this constitutes a positive action to assist a fellow who is experiencing difficulty.

The Program Director is required to notify the Quality Assurance Committee when a fellow is placed on probation and may, at its discretion, also notify faculty on backup call and supervisors.

D. Advancement to Position of Higher Responsibility

Fellows are advanced to positions of higher responsibility only on the basis of evidence of their satisfactory progressive scholarship and professional growth.
It is expected that a fellow’s ability to function independently will increase throughout the training period, and intensity of supervision will be altered as appropriate.

YEAR 1 — Fellows will be supervised closely and instructed in performing a rheumatologic examination, interpreting radiographs and results of other imaging studies, aspirating and injecting joints, examining synovial fluid by microscopy, and planning rehabilitative and therapeutic programs for patients.

YEAR 2 — Fellows will generally be more independent in their abilities to perform a rheumatologic examination, aspirate and inject joints, and examine synovial fluid.

E. Unsatisfactory Evaluations of Fellows

Monthly and semiannual reviews enable the attending rheumatologists and the Program Director to evaluate fellows for stress, evidence of substance abuse, and other situations that may contribute to an unsatisfactory evaluation.

Adverse judgments or evaluations regarding the fellow’s level of performance or competence should first be directed to the Program Director. If the fellow feels that this is not settled satisfactorily, the grievance can be addressed by established institutional policy. Fellows are offered the opportunity to address judgments of academic deficiencies or misconduct before an independent, appropriately constituted clinical competence committee.

F. Evaluation of the Faculty and Program

Anonymous evaluations of faculty attending physicians by fellows take place at the end of each rotation on the consultation service. These evaluations are reviewed by the Program Director and the Division Director. The Division Administrator collects the forms. The fellow’s name is not on these forms. The Division Administrator arranges reviews so that Dr. Terkeltaub and Dr. Firestein do not review their own evaluations. Results are typed and distributed every 6 months to individual faculty members. Each member of the faculty sees his or her evaluations, not all evaluations. Results are reviewed by the Program Director and the Division Director. Results are used by the Division Director for counseling faculty members on teaching ability and professional development, and to support faculty promotions and applications for tenure. Each member of the faculty also undergoes annual review by the Division Director and the Chair of Internal Medicine.

TWICE A YEAR, fellows are required to complete and return a confidential form that evaluates the faculty and the program. Evaluations are collected and tabulated in a fashion to assure the anonymity of the fellow. Coded forms are used so that the
Division Administrator knows what forms have been returned, and can ensure that all are returned. Anonymous results of these evaluations are collated and typed and returned to each faculty member so that the evaluating fellow cannot be identified. Results are made available to the Program Director and the Division Director.

THE FACULTY MEETS EACH YEAR TO REVIEW THE PROGRAM. A FELLOW IS APPOINTED TO SIT IN ON THE MEETING TO ASSURE THAT FELLOWS MAKE APPROPRIATE CONTRIBUTIONS TO THE CRITIQUE OF THE PROGRAM, AND TO SUGGESTIONS FOR TROUBLE-SHOOTING.

Fellows are encouraged to maintain a high level of communication with the Program Director and faculty. At the Program Director’s quarterly conferences with the fellows and Program Director, there is an opportunity for the fellows to disseminate information and provide timely feedback. The feedback that is received from trainees by means of the written evaluations, informal meetings, and formal meetings are reviewed in regularly scheduled Faculty Meetings, and this information is used to make needed changes in the program.

Examples of the changes that have been made in the program, based on the critiques of the fellows, are reinstitution of the Rheumatology/Orthopedic Surgery conferences.
Appendix:
A. Curriculum for Fellows in Rheumatology Clinical Research Rotation

B. Core Curriculum Material

C. Curriculum for Joint Radiology Elective

D. Curriculum for Medical Orthopedics Elective

E. Reading Outline for Ethics for Rheumatology Fellows

F. Guidelines for Friday Rheumatology Clinical Conferences

G. Inservice Exams as Part of Training Evaluation

Final Appendix Material:
--Milestones Evaluation Forms of Fellows by Faculty
--ACR Description, for reference purposes, of Detailed Rheumatology Curriculum and Core Competencies
A. Curriculum for Fellows in Rheumatology Clinical Research Rotation

I. Goals
The principal goal of the clinical research training component of the Rheumatology fellowship is to teach the rationale, design considerations, ethical conduct, interpretation and statistical analysis required for clinical research in rheumatology and clinical immunology. The fellow will be expected to demonstrate academic excellence by the initiation and completion of a research project during fellowship.

II. Objectives
A. Baseline Competencies
Those activities in which the physician will be expected to be competent before fellowship, or which they will acquire through self learning include the following:

I. History, Physical Examination, Laboratory Test Result and Imaging Study Interpretation. The fellow will be capable of eliciting a focused history, performing a thorough physical examination, and interpreting relevant test results related to various rheumatic diseases

2. Fund of Knowledge
   a. The fellow will be able to appropriately describe factors relevant to the severity of and activity of rheumatic diseases
   b. The fellow will be able to formulate an appropriate diagnostic plan
   c. The fellow will be able to consult appropriate medical literature (i.e. textbooks, journal articles, computer databases, internet sites, etc.)

B. Learning Objectives
The activities that will be taught to the physician during the clinical research component of the rheumatology fellowship include:

1. History, Physical Exam, Laboratory Test Result and Imaging Study Interpretation
   a. Elicit a detailed and specific history from a patient with established or suspected rheumatic disease, and utilize information from such a history to:
      1) stratify patients with regard to severity and activity of disease, and use such information to satisfy inclusion and exclusion criteria for clinical trials
      2) assess patients for co-morbid conditions, and appropriately define
eligibility for various therapeutic interventions based on the presence and severity of such conditions

b. Examine the diarthrodial joints, relevant periarticular structures, and other target tissues (e.g., skin, oral mucosa) and determine:

1) the level of disease activity (e.g., tender and swollen joint scores/counts)
2) the differences between typical clinical assessments as performed in routine practice and disease assessments performed in the course of clinical trials

c. Interpret laboratory test and imaging study results, in order to:

1) assess levels of disease activity
2) assess the extent of disease related damage

2. Protocol Design

a. Understand the various types of clinical research studies; describe the strengths/limitations, and the most appropriate use of the various types

b. Understand and utilize the outcome measures that are commonly used to assess response in clinical research (e.g. ACR20/50/70, DAS; SLAM, SLEDAI, PASI, etc). Address the strengths and limitations of different measures used to assess the same rheumatic conditions

c. Understand utility analyses and pharmacoeconomic assessments

d. Understand the rationale and statistical basis for determining the sample size in the design of a clinical trial as well as the most appropriate endpoints

e. Understand the use of biomarkers as an adjunct to clinical endpoints

3. Imaging Studies

Be familiar with the use and interpretation of plain roentgenograms, computerized tomography, magnetic resonance imaging, and ultrasound as they relate to assessment of patients with rheumatic disease in clinical research

4. Procedures

Arthrocentesis and synovial biopsy—utilize appropriate techniques for obtaining fluid and synovial tissue from and joints and periarticular structures:

5. Ethical Issues

a. Be familiar with the history of medical ethics, as it relates to clinical research

b. Incorporate ethical considerations into the design of research trials
6. **Statistical Analyses**
   a. Be familiar with basic statistical instruments involved in the evaluation of clinical trial data
   b. Appropriately use power analysis to determine sample size, evaluate data sets for potential errors (e.g., type II error), and determine the use of parametric and non-parametric instruments
   c. Understand various basic study designs required for appropriate statistical analysis (e.g., intention to treat)

7. **Clinical Immunology**
   Be familiar with the immunopathophysiology of rheumatic diseases, particularly as it relates to potential therapeutic intervention

### III. Educational Environment

A. **Conferences**; the physician will be expected to attend and participate in the following rheumatology conferences
   1. Clinical Immunology conference (1 hour, weekly)
   2. Rheumatology grand rounds (1 hour weekly)
   4. Rheumatology clinical research works-in-progress conference (1 hour, weekly)

B. **Journal club (1 hr/month)**

### IV. Research

A. **Baseline Competencies**
   Those activities in which the fellow will be expected to be competent before beginning a research project, or that they will acquire through self learning include:
   1. **Literature Review**
      The fellow will be able to perform literature searches on a given topic utilizing texts, journals and other means
      The fellow will be familiar with the utilization of computer databases as a means of assisting in this process
      c. Having acquired pertinent data, the fellow will be able to synthesize the information from these resources into a cogent summary and critical review

B. **Learning Objectives**
   The activities that will be taught to the fellow during the course of completing their research project include:
   1. **Research plan**
      The fellow will be familiar with the synthesis of a defined research project, including
      a. Background
      b. Hypothesis
c. Experimental plan

d. Data generation

e. Conclusions generated from data obtained

f. Further plans and hypotheses generated based on the conclusions

2. Techniques
The fellow will be facile in the performance of techniques relevant to the research project

3. Presentation
The fellow will be able to transmit the knowledge gained during the research project in public presentations

4. Writing
Be able to communicate effectively in writing as demonstrated by authoring abstracts and manuscripts describing the clinical research. It is expected that the trainee will conduct a thorough literature review on a clinical research topic, and format this review into a presentation suitable for publication.

V. Evaluation / Feedback
All research projects, like those for basic research, will require a 1-2 page research proposal to be prepared in advance with the advice of the proposed mentor, and subject to review and approval by the Training Program Director and a committee assembled by the Training Program Director to review the proposed research. In addition, regular 1-2 page progress reports will be requested at a minimum of every 6 months. The content of evaluations of the fellow's aptitude and interests in research will be communicated to the fellows individually and on a semi-annual basis by the fellowship training program director or the director's designee. The fellow’s performance will be formally evaluated by the supervising faculty mentor and the fellow will in turn evaluate the research training using standardized forms.

B. Core Curriculum: Includes Professor’s Rounds Conference, Rheumatology Boot Camp for all First Year Fellows, Ultrasound Core Curriculum (see below) Imaging Conferences, and EMG and PT/OT, and Interactive Pathology and Dermatology, Renal, and Ophthalmology Conferences and Pathology Review

i. Professor’s Rounds Conference

1. The principal goal of Professors Rounds conference is to assure that Fellows receive and process information concerning basic and clinical aspects that may not be covered in other formal conferences. The conference directors will be Dr. Gary Firestein, Director, and Dr. Robert Terkeltaub, Co-Director.

2. The textbook review inherent in this conference occurs in a manner coordinated with a Faculty member at each meeting. Thus provides for increased faculty contact with the Fellows and allows the Fellows to explore questions that they might not otherwise pose during rounds and in more formal conferences.
A. Objectives

The Fellows review chapters assigned by Rheumatology faculty members on core topics including:
differential diagnosis
synovial pathology
the pathogenesis and treatment of rheumatoid arthritis as well as osteoarthritis
crystal deposition diseases
complement, immunoglobulins, and B and T cells
epidemiology, outcomes and socio-economic factors in rheumatology

Specific reviews will also address bone biology and metabolic bone disease as well as immunogenetics and autoimmunity and the basis of connective tissue destruction, and the immune-mediated pathogenesis of SLE and spondyloarthropathy.

In addition, the Fellows will discuss Lyme Disease, infectious arthritis and systemic connective tissue diseases.

The learning objectives will be a deeper understanding of the fundamental basis for rheumatologic practice. The Fellows will read chapters assigned by the faculty mentor and be prepared to discuss the intricacies of the material in each chapter directly with the faculty mentor during the 90-minute discussion. These conferences will take place approximately 20 times per year in an informal lunch setting.

B. Evaluation/Feedback

1. The Fellows will be formally evaluated by the faculty at the end of these conferences as part of their formative evaluation during their training. The Fellows will formally evaluate, in writing, the content of the core curriculum conferences at the end of each academic year and evaluate each faculty mentor for their performance (in order to improve the conference and overall quality of teaching). The conference also will be evaluated semi-annually as part of Rheumatology Divisional review of the teaching program, with both informal and formal participation of Fellows in this process, as customary.
ii. **Core Curriculum: PT, OT, EMG**

**Curriculum in Physical and Occupational Therapy**
Fellows must attend mandated half day orientation and training session with Merry Johnson (OT) and Rick Crabtree (PT) at the VA Medical Center once during the 2 year training curriculum. Fellows will be oriented to assistive devices, therapy devices and modalities such as iontophoresis and therapeutic ultrasound, wax baths, and appropriate exercises and indications for PT or OT referral.

Reference: Kelley, Textbook of Rheumatology Chapters on Rehabilitation in Rheumatology.

**Curriculum in Electromyography and Nerve Conduction Studies**
The Fellows must attend mandated half day orientation and training session with Dr. Lesher of Neurology at the VA Medical Center once during the 2 year training curriculum. Fellows will be oriented to EMG and nerve conduction study training and interpretation.

Reference: Kelley, Textbook of Rheumatology Chapters on Rehabilitation in Rheumatology.

iii. **Rheumatology Boot Camp:**
In the first month of the fellowship, the first year fellows are required to attend, and second year fellows encouraged to attend and actively participate in a Boot Camp didactic session series, in which there will be the following six 1 hour sessions by the faculty listed, as a core curriculum primer to Rheumatology:
1. Introduction to Rheumatology - Terkeltaub
2. Diagnostic Entities and Microscopic and Joint Fluid Analysis Tools - Terkeltaub
3. Rheumatology Physical Exam - Ceponis
4. Pathology of Rheumatic Diseases - Bottini
5. Blood and serum tests in Rheumatology - Bottini
6. Infections that Cause Arthritis - Terkeltaub

iv. **Core Curriculum Interdisciplinary Conferences:**
Fellows need to collect case series each year of their training to present in 1-2 hour interactive conferences to UCSD Pathology, Renal, Dermatology, and Ophthalmology faculty for Detailed discussion. This will include muscle, renal, skin, artery, and synovial pathology slide review and discussion for Pathology cases collected and identified by the fellows.

v. **Core Curriculum Imaging (Imaging by Ultrasound and Other than Ultrasound):** see below

C. **Core Curriculum Training in Radiology**

1. The principal goal of the Radiology training is to increase the capability of the Fellows to interpret standard X-Ray as well as more modern radiologic approaches including MRI,
ultrasound, and CT of the skeleton. There will be participation of the Fellows in the regular film reading activities in the Radiology Department at UCSD under supervision of a faculty mentor in Radiology for a minimum of 4 Monday PM sessions during the Fellowship, and those Fellows with deeper interest and training needs for Radiology based on their career plans for clinical practice will be encouraged and allowed to do an additional 8 Monday PM sessions of Radiology training.

2. The training experience will take place over the 2 year curriculum, during which the Fellow will be under the tutelage of Dr. Karen Chen, Assistant Professor of Radiology at UCSD. The Fellows will leave their laboratory or clinical research elective responsibilities for the Monday PM sessions, but will remain in their ambulatory clinics that week. They will read films with the Radiology faculty person Dr. Chen at the VA Hospital on Monday afternoon.

A. Objectives:

1. The objective is for the Fellows to have baseline competence in reading plain radiographs of joints and the spine, as well as increased proficiency in interpretation of plain bone radiographs. In addition, the Fellow should have rudimentary skills in interpreting MRI, performing and interpreting ultrasound, and reading CT of bones and joints.

2. The schedule for readings of films and teaching files are available on line at http://medicine.ucsd.edu/bonepit.com. Additional teaching materials are available at the VA in the form of an X-ray file of plain films and MRIs, which the Fellows can utilize (as they are annotated with the proper diagnosis and attention to the positive findings). Further materials are available and under ongoing development on the ACR fellows web page. In addition, the Fellows are given a copy of the radiology textbook "Arthritis in Black and White" as supplementary curriculum material in the first year.

B. Evaluation/Feedback

1. At the end of the rotation group the faculty mentor in Radiology (Dr. Chen) will fill an evaluation form to judge the Fellows performance. Conversely, the Fellow will judge the faculty member's performance and the value of the elective, and use a standardized form.

D. Curriculum for Medical Orthopedics/Sports Medicine Elective

A. Objectives and structure of the Rotation:
The principal goal of this introduction to Medical Orthopedics is to help the Fellows gain experience in evaluating and treating acute and sub-acute muscular and joint injury due to sports and physical trauma and to gain experience in Podiatry Medicine. In doing so, the Fellow will see patients at Thornton/Perlman Hospital with Drs. Gregg Middleton (Rheum), Catherine Robertson (Ortho, arthroscopy), and Natalie Voskanian (Sports Med/Rehab) The Fellow will take an active role in working up and diagnosing the patients and will present the findings to the attending physician and formulate a treatment plan under the tutelage of the attending physician.

On Thursday mornings the Fellow are able to attend Podiatry Clinic under the direct tutelage
of Dr. John Malone at the Podiatry Clinic at the VA. The Fellow will gain experience of the common medical problems of the foot including halux valgus, diabetic foot, plantar fasciitis.

The rotation will last for a minimum of one month, and those Fellows with deeper interest and training needs for Sports Medicine, Podiatry, and Medical Orthopedics, based on their career plans for clinical practice, will be encouraged and allowed to do an additional 2-4 months of this elective.

B. Evaluation/Feedback

The Fellows will be formally evaluated by Dr. Ken Taylor and/or Dr. Malone after completion of the elective. Conversely the Fellows will evaluate, in writing, the elective experience and the performance of all involved faculty.
E: ETHICS

Ethics for Rheumatologists

prepared with assistance of: LAWRENCE J. SCHNEIDERMAN, MD

Ethical Decision-Making in Critically Ill Patients
1) Medical indications:
   (a) Ethical duties of health care professionals
   (b) To cure sometimes to relieve often, to comfort always
   (c) Effect vs. Benefit
   (d) Medical futility

2) Patient Autonomy:
   (a) Rights of patient and surrogate with respect to decision-making
   (b) Substituted judgment
   (c) Advance Directives (Living Wills; Durable Powers of Attorney for Health Care)

3) Best interests:
   (a) What are ethical duties when the patient's wishes are not known?
   (b) Benefits vs. burdens
   (c) Ordinary and extraordinary (disproportionate) care
   (d) Who decides?

4) External (Contextual) factors:
   (a) When and how should factors of costs and burdens to the health care system be considered?
   (b) Burdens on family
   (c) Compassionate exceptions

REFERENCES:


Schneiderman LJ, Pearlman RA, Kaplan RM, Anderson JP, Rosenberg EM. Relationship of


Ethics for Rheumatologists, et al.

Lawrence J. Schneiderman, M.D.

Turning from Life-Prolonging Treatment to Comfort Care: Ethical Reasoning and Ethical Actions.

I. Ethical Reasoning

A. What are the Goals of Medical Treatment?

Hippocratic tradition: To restore health and alleviate suffering.
Late Middle Ages (religion) and 17th Century (science v. nature): to prolong life.
Old French adage: "To cure sometimes, to relieve often, to comfort always."

B. What Kind of Life?
Neither late Middle Ages theologians nor 17th Century scientists could imagine the various states of life we are capable of sustaining today, e.g. persistent vegetative state first coined as diagnostic entity in 1972.

Are there states of prolonged life worse than death?

Measures of treatment success: body parts v. person (effects v. benefits)
Measures of treatment failure: medical futility (physiologic v. patient-centered)
Patients and families who demand: "Do everything!"
Consider: Does not include futile treatment. Demand may reflect fears of pain, loss of control, loss of dignity, being abandoned, being a burden. Though a treatment may be futile, care is never futile.

C. Patient Autonomy

Patients have the right to refuse any treatment, even life-sustaining treatment, but do not have right to demand any treatment, e.g. cannot force physicians to provide anabolic steroids to achieve goal of becoming world-class body-builder, or remove appendix to prevent future appendicitis, or give lethal dose of drugs to a patient who would rather be dead.
Decision-making capacity required to participate in treatment decisions, is situation-specific and may exist even when patient has been declared legally incompetent.
Patient's wishes may be carried out by others under principle of substituted judgment. However, designated agent and advance directive instructions take over only when patient lacks decision-making capacity. Patient can change mind and override prior decisions at any time.

D. What is in the Patient's Best Interests?

Requires estimation of benefits v burdens; most frequent source of conflict, since even the best-intentioned persons may disagree. Remember, burdens not limited to pain, may include other forms of suffering, including perceived burdens on others. Benefits achieved must be viewed in proportion to burdens imposed.
When conflict occurs, who should decide? The party who most bears the consequences of the decision.

E. External Factors

Involves family, health care providers and society in issues of distributive justice, such as benefits and burdens experienced not by the patient but by others, competing needs, opportunity costs, the tragedy of the commons, rationing, resource allocation. But the question: How does this patient's medical treatment affect others, cannot be answered at the bedside. Without a closed system of health care and a policy justly allocating resources, there is no guarantee that withholding resources on any single patient will be transferred to a medically more deserving patient. Thus, withdrawing life-support on grounds of limited resources is not ethically defensible without a just
II. Ethical Actions

A. CPR, Vasopressors, Antibiotics, Oxygen, Surgery, Narcotics, Sedatives.

When the decision has been made to forgo life-sustaining treatment, either because the patient requests it or the treatment is futile, each intervention should be evaluated according to one standard: Does it comfort the patient? Consider the quality of remaining life in terms of pain, dignity, control, function, and emotional and spiritual needs and desires.

B. Mechanical Ventilator

Discontinue if patient refuses treatment, or if futile, i.e. no reasonable chance of escaping permanent dependency in the intensive care setting.
Provide sufficient narcotics to eliminate respiratory distress, even at risk of shortening life (double effect).
If patient is ventilator-dependent, can inform patient and family that death is expected within hours. If possible arrange private, intimate setting in hospital.

C. Artificial Nutrition and Hydration

Discontinue if patient refuses treatment, or if futile, i.e. patient lacks capacity to appreciate benefits, e.g. patient is permanently unconscious or in a condition that burdens outweigh benefits. Removing artificial hydration permits dehydration which reduces respiratory secretions and produces euphoria of acidosis. Patients die of electrolyte imbalance. Discontinuing tube feeding reduces risks of aspiration and death by choking.
Can overcome sensations of starvation and thirst with adequate sedation, local measures such as moistening of lips.
Can involve family in simple nursing care and reassure that they are helping keep patient comfortable.
Depending on patient's illness and condition, can inform patient and family that death is expected in days to weeks. If possible arrange private, intimate setting—home? hospice?

D. Essentials of Comfort Care

Physicians should guarantee that doses of narcotics, sedatives or other measures will be provided to completely relieve pain if that is what the patient fears. This is not euthanasia.
Physicians should not abandon patients "because nothing more can be done."
Comfort care should be pursued with the same skills and dedication as life-saving treatment.
Physicians should work closely with nurses to prevent and alleviate "moral distress" and to assure best treatments and assessments of treatments. Physicians and nurses should encourage family members to participate as much as they wish in comfort care measures, e.g. moistening and lubricating lips, bathing, touching, holding, etc.

Institutions should provide settings for a good death, allowing privacy, intimacy, control and flexibility according to the patient's wishes. Since death is inevitable it is not necessarily a medical failure. Causing or allowing a "bad death" is a medical failure.

Remember, comfort care can involve loved ones, family, friends, spiritual advisers, hospice.

References:


11. McCann RM, Hall WJ, Groth-Juncker A. Comfort care for terminally ill patients: the
appropriate use of nutrition and hydration. JAMA 1994;272:1263-1266.


Rheumatology Fellowship Curriculum:
Research ethics Component

Reading list

Kahn JP; Mastroianni AC. Moving from compliance to conscience: why we can and should improve on the ethics of clinical research. Archives of Internal Medicine, 2001 Apr 9, 161(7):925-8.


F. Manual for Friday Rheumatology Grand Rounds Teaching Conferences and for Clinical Case Conferences:

Friday Rheumatology Teaching Rounds:

Guidelines
*15 minutes for each talk with 15 minutes discussion period

*the presentation is focused on a selected issue within a topic rather than "encyclopedic"

*the presentation is case-based (or a discussion of evidence-based treatment guidelines for numbers 33-37) and a maximum of 5-10 references are provided

* the presentation is discussed at least 1 week in advance with a faculty mentor, if the suggested mentor is not available then the attending on the consult service that week serves as the mentor, and that attending is always informed a few days in advance about the topic

* if a medicine resident or medical student presents, then their discussion is a 10 minute
presentation highly focused on a single evidence-based treatment recommendation with 5 references maximum in a 1 page maximum handout

Suggested Topics in one 12 month block starting July 1 of the academic year (to ideally be based on a case, and must be selected from in July of each year by the Fellows and then mentored by the faculty indicated)

1. Economic Burden of a Common Rheumatic Disease or Treatment (Dr. Lee)
2. NSAIDs toxicity (Dr. Kalunian)
3. Biologic Drug Toxicity (Dr. Firestein)
4. Fibromyalgia (Dr. Kavanaugh)
5. Glucocorticoid Toxicity (Dr. Lee)
6. RA (Dr. Firestein)
7. RA Extra-articular Complications (Dr. Kavanaugh)
8. Sjogren's Syndrome (Dr. Kalunian)
9. SLE treatment (Dr. Kalunian)
10. SLE Renal, CNS or other (Dr. Kalunian)
11. Ank Spond (Dr. Corr)
12. Psoriatic Arthritis (Dr. Kavanaugh)
13. Other Spondyloarthropathy (Dr. Terkeltaub)
14. Scleroderma (Dr. Kavanaugh)
15. Myositis or Metabolic Myopathy (Dr. Terkeltaub)
16. Giant Cell Arteritis/PMR (Dr. Terkeltaub)
17. Medium Vessel Vasculitis (Dr. Sweeney)
18. Cryoglobulinemia (Dr. Kavanaugh)
19. Behcet's or FMF or Periodic Syndromes (Dr. Firestein)
20. Gout (Dr. Terkeltaub)
21. CPPD or Calcific Crystal Deposition Disease (Dr. Terkeltaub)
22. Osteoarthritis (Dr. Kalunian or Dr. Terkeltaub)
23. Bone: Osteoporosis, AVN, Paget's (Dr. Terkeltaub)
24. Lyme Disease (Dr. Terkeltaub)
25. Viral or Post-Infectious Arthritis (Dr. Lee)
26. Amyloidosis (Dr. Corr)
27. Sarcoidosis (Dr. Corr)
28. Septic Arthritis or GC (Dr. Kavanaugh)
29. Hematologic Arthropathies (hemoglobinopathy, hmophilia, iron storage disorders, etc) (Dr. Ceponis)
30. Tumors and Tumor-Like Diseases with Arthritis (Dr. Lee)
31. Juvenile Chronic Arthritis (Dr. Sheets)
32. Still's Disease (Dr. Firestein)
33-37. Evidence-based Medicine/ Treatment Guidelines for one Problem from numbers 1-32 above (Dr. Kavanaugh)

Other Open Topics for Formal Teaching Rounds: will be selected during the year by the Fellows and then mentored by faculty chosen by the fellow

Guidelines for Case Conference Presentations
*2 cases per session
* for each case, a 5 minutes case presentation by power point of highlights of case, then 3 bulleted questions are presented, the first of which should generally deal with the differential diagnosis of the disease or response effect to therapy

G: Inservice Exams as a Component of the Training Evaluation
The evaluation of fellow performance in core competencies described above will be complemented by assessment of fellow performance in each year of accredited training (and in the third year, if applicable) in the American College of Rheumatology National Inservice Rheumatology Fellows Training Exam. This multiple choice test is administered in the spring of each year and detailed scores are sent to the program director for review with each fellow. The results are summarized in each Fellow's training file. Additionally, at the beginning of the second year of training, each fellow is asked to take the UCSD Rheumatology fellowship inservice exam, a 3-hour mixed essay-style and multiple choice format exam judged by the training program director and whose results are reviewed personally with each second year fellow. Results are summarized in the Fellows files.

H: Interpretation of Clinical Trials in Rheumatology
Making Sense out of Clinical Trials
Kenneth Kalunian, MD
Clinical Trial Development
Many books on the basics of clinical trial design and analysis
Pocock
Freedman, Furberg and DeMets
Plantadosi

Clinical Trial Development
FDA has many guidance documents on their web site www.fda.gov
The International Conference on Harmonization (ICH) has issued many reports that worldwide regulatory agencies will abide by. www.ich.org

What’s The Question?
What’s the outcome?
What’s the intervention?
When and for how long?
For whom?
How many participants are needed?
How can we optimize potential benefit (and what we learn) while minimizing potential harm?

Answering the Question
Response variable selection
Define the intervention
Study design
Eligibility criteria
Sample size estimate
Patient management procedures
Monitor for safety and benefit
Data analysis approaches

Response Variable Selection
“Dose ranging”
Biologic activity
Biomarker
Understand mechanism
Surrogate outcome
Toxicity
Feasibility for larger study
Clinical outcome

Response Variable Criteria
Well defined
Stable
Reproducible
Unbiased
Ascertainable in all participants
Adequately address study hypothesis

Study Design
Uncontrolled
Controlled
Historical
Concurrent, not randomized
Randomized

Comparing Treatments by Randomization
Fundamental principle
Groups must be alike in all important aspects and only differ in the intervention each group receives
In practical terms, “comparable treatment groups” means “alike on the average”

Randomization
Each participant has the same chance of receiving any of the interventions under study
Allocation is carried out using a chance mechanism so that neither the participant nor the investigator will know in advance which will be assigned

Blinding
Avoidance of conscious or subconscious influence
Fair evaluation of outcomes

Advantages of Randomized Control Clinical Trial
Randomization "tends" to produce comparable groups
Randomization produces valid statistical tests

Origin of Randomization
Randomization for experimental Studies was established by R.A. Fisher in 1923
Statistician at the Rothamsted agricultural experimental station
The problem was to compare the effect of different fertilizers on potato yield
Old method was
Apply each fertilizer to an entire field
Compare yields between fields
But, some fields (and parts of each field) are more fertile than others
Fisher’s method
Divide fields into small plots and rows within plots
Apply fertilizers by row within plots
Randomly assign fertilizers to rows
Randomization destroys any connection between soil fertility and treatment
Randomization allows experimental results to be analyzed by permutation test
Treats outcomes as fixed
Treatment assignments are source of randomness in the analysis
Standard statistical tests (t-test, F-test, etc) approximate permutation test results
Randomization plays 2 key roles
Produces groups that are not systematically different with regard to known and unknown prognostic factors
Permits a valid analysis
Permutation test is justified by randomization
Standard analyses are valid approximations of the correct permutation test

Randomization in Clinical Trials
Fisher’s method is the foundation of randomized controlled trials
However, unlike rows of plants, people sometimes
Fail to comply with randomly assigned therapies
Do not complete the trial
Any difference between groups that arises after randomization could be due to consequences of the randomized treatment assignment
Adjusting the analysis of treatment effect by post-randomization group differences could introduce bias

Disadvantages of Randomized Control Clinical Trial
1. Generalizable Results?
   Participants studied may not represent general study population.

2. Recruitment
   Hard

3. Acceptability of Randomization Process
   Some physicians will refuse
Some participants will refuse

Administrative Complexity

Sample Size

Need enough participants to answer the question
Should not enroll more than needed to answer the question
Sample size is an estimate, using guidelines and assumptions

Sample Size
Assumptions depend on
Nature of condition
Desired precision of answer
Availability of alternative treatments
Knowledge of intervention being studied
Availability of participants

Regular Follow-up
Routine Procedures (report forms)
Interviews
Examinations
Laboratory Tests
Adverse Event Detection/Reporting
Quality Assurance

Data Analysis
Specify in advance
Primary
Secondary
Other
Statistical approach
Exploratory

Data Analysis
Intention-to-treat
Explanatory

Intention-to-Treat Analysis
Includes all randomized patients in the groups to which they were randomly assigned, regardless of their adherence with the entry criteria, regardless of the treatment they actually received, and regardless of subsequent withdrawal from treatment of deviation from the protocol. (Lloyd) Fisher et al., 1990

Intention-to-Treat (ITT)
The fundamental efficacy data set includes all subjects as randomized
Note this does not say “ignore patients who didn’t get medication” – doing this messes up the randomization plan and allows data shaping.
This is called Intent to Treat (ITT)
Modified ITT relaxes this to patients who have had at least one treatment

Intention-to-Treat Analysis
Key points
Use every subject who was randomized according to randomized treatment assignment
Ignore noncompliance, protocol deviations, withdrawal, and anything that happens after randomization
As randomized, so analyzed

Pragmatic vs. Explanatory Analysis
Some authors categorize hypotheses from clinical trials as being either
Pragmatic – identify the utility of a treatment for clinical practice
Explanatory – isolate and identify the biologic effects of treatment
Both types of hypotheses are important and relevant
Both types of hypotheses cannot always be addressed in the same trial
The hypothesis that an ITT analysis addresses is pragmatic, the effectiveness of therapy when used in autonomous individuals
Analyses that focus on the biologic effects of therapy are addressing explanatory hypotheses
This is often done by excluding noncompliant subjects from analysis

Per Protocol Data Set
Per Protocol Data set
Subjects who had no protocol violations (completed study, etc)
Can provide various analysis data sets that may be subsets – e.g. no protocol violations, no withdrawals or dropouts
Important to examine comparability of groups and outcomes to ITT, mitt

How to Deal with Missing Data
Don’t have any
Don’t have very much (under 5% is my initial break point)
Discuss how you will deal with it prospectively!!!
Complete cases analysis (ugh!)
Last Observation Carried Forward (LOCF)
Mean values for replacement
Regression models for replacement
Imputation models

Missing Data
Types of missing values
Patient misses visit, and an ‘interior’ value is missing
Patient drops out, and a series of values at the end are missing
(Some) Covariates are missing in one or more visits
Last Observation Carried Forward (LOCF)
Is almost always a problem
It ignores any trends in data
It reduces variability arbitrarily

Imputed Data Modeling
More sophisticated imputation models have been developed recently
Determine classes of similar patients (“propensity scores”)
Fill in missing values by selecting randomly from observations in the same class.
Do this multiple times, (5 to 10 is usually enough)
Analyze the data and pool results

Compliance with Treatment
Some subjects do not comply with their assigned treatment
For explanatory analyses these subjects might not be used
No biologic effect if no treatment taken
For ITR analysis they would be used
Why?
Why include noncompliant subjects in ITT analysis? The statistical reasons are
Compliance or non compliance occurs after randomization
Attempting to account for non compliance by excluding non compliant subjects can bias the
treatment evaluation
Why include non compliant subjects in ITT analysis? Other considerations are
In clinical practice, some patients are not fully compliant
Compliant subjects usually have better outcomes than noncompliant subjects, regardless of
treatment

Withdrawal from Trial
Issues raised by withdrawals from the trial
Some subjects chose to end participation before the end of the trial
For both explanatory and ITT analyses these subjects are problematic
Outcome information is usually not available
Results in exclusion from analyses unless an analytic approach such as last-observation
carried forward is used to impute the outcome values
Why should we try to include withdrawals in ITT analysis?
Withdrawal occurs after randomization and might be treatment-related
Excluding subjects who withdraw could bias results
Often outcome information cannot be obtained on subjects who withdraw
Experts encourage proactive steps to minimize withdrawal from trials.
How can we deal with withdrawals in an ITT analysis?
Design trial to minimize withdrawal
Use alternative source of outcome information when possible (e.g. death registries)
Analytic approaches (last-observation-carried-forward, multiple imputation) can be used to
reduce, but not remove the effect of withdrawal
Summary
Randomization is of central importance in clinical trials
ITT analyses try to preserve the randomized groups and address pragmatic hypotheses about the clinical utility of treatment
Explanatory analyses address interesting hypotheses about the biological effect of treatment, but are more prone to bias
ITT analyses should be the primary analysis for most clinical trials
Explanatory analyses should carefully consider the effect of compliance
Clinical trial reports should document compliance and withdrawal in detail

Journal Club “Clinical Trials Design”
Stephanie Hennigan, MD
September 14, 2007

Why do trial results differ? For Example:
Multiple studies of glucosamine (formulations) in hip and knee OA.
Significant disparity in trial results. Why?
Industry vs. independent investigator study
Differences in drug formulations
Quality control of drug
Differences in Dosing and administration
Investigator bias
Allocation concealment
Patient selection
Trial duration
Type of analysis
Power of study

Industry Bias
In glucosamine RCT, industry-sponsored trials more often report positive results than non-industry-sponsored.
Vlad et al – examined differences in effect size in 15 RCT of glucosamine vs. placebo.
Effect size – measures the magnitude of a treatment effect or whether a treatment has a statistically significant effect (0.2 = small, 0.5 = moderate, 0.8 = large).
Or can also be thought of as the "percentile standing of the average treated (or experimental) participant relative to the average untreated (or control) participant. An ES of 0.0 indicates that the mean of the treated group is at the 50th percentile of the untreated group. An ES of 0.8 indicates that the mean of the treated group is at the 79th percentile of the untreated group. An effect size of 1.7 indicates that the mean of the treated group is at the 95.5 percentile of the untreated group."
Industry funding – industry provides funds to conduct the trial.
Industry-supplied drug – if study drug was provided free of charge by manufacturer
Industry participation – utilization of drug manufacturer for data storage, collection, management, or analysis.
Industry-affiliated author – receives service fees.
Many published reports do not provide this information.
Industry-funded trials (11) vs. non-industry-funded (4) pooled effect size of glucosamine 0.47 vs. 0.05.
Trials with industry-affiliated authors (7) vs. non-affiliated authors (8) pooled effect size of glucosamine 0.55 vs. 0.16.
Trials with industry-participation (8) vs. no industry participation (7) pooled effect size of glucosamine 0.55 vs. 0.11.
Only 2 trials where industry did not supply drug.

Allocation Concealment
Allocation concealment – system to ensure investigators, subjects, and other involved health care providers do not know to which group a patient will be allocated before entering the study or which drug is allocated at any time.
Inadequate allocation concealment -- can yield estimates of treatment effect up to 40% higher than trials with adequate allocation concealment (Viera et al, 2007).
Inadequate allocation concealment may also lead to underestimation of effect.
Adequate – impossible to predict next tx assignment.
Intermediate – small chance the next tx can be predicted.
Inadequate – does not meet criteria for adequate or intermediate or not described.
Effect size based on allocation concealment (Vlad):
Adequate 0.09
Intermediate 0.47
Inadequate 0.54
Allocation concealment GUIDE trial – intermediate (sealed, opaque envelopes).

Allocation Concealment Criteria (Rochon et al, 1994)
Adequate
Central randomization by telephone, internet, fax, or interactive voice response
Indistinguishable meds, randomly precoded by pharmacy
Intermediate
Open tables of random numbers
Sealed envelopes
Inadequate
Use of patient chart numbers, birth dates, dates of admission, coin flips, odd-even.
Pharmacy-supplied tablets are labeled (A & B)

Table 1
Examples of Methods of Deciphering Allocation Concealment
Holding translucent envelopes up to bright lights to reveal upcoming assignment (even using the hot light in a radiology department for more opaque envelopes)
Opening unsealed assignment envelopes
Opening a well-sealed, opaque envelope in advance of consent
Opening unnumbered envelopes until desired allocation found
Determining different weights of the assignment envelopes (eg, the heavier envelope means intervention group)
Asking a central randomization center for the next several assignments all at once
Deciphering assignments to active drug or placebo based on appearance of drug container labels

Allocation Concealment
Different sets of criteria.
Identify which set of criteria study is using.
Poorly documented allocation concealment considered “unclear” or inadequate.

Statistical Analysis -- LOCF
Last Observation Carried Forward (LOCF)
missing values are replaced by the last observed value of that variable.
single value replacement vs. value distribution.
May have better results with value distribution over time.
poor system for longitudinal data analysis.
may bias results (↑ or ↓ drug effectiveness).

References
MOONLIGHTING POLICY: Rheumatology Training Program

Financial obligations of housestaff are often burdensome and supplemental income can be quite welcome. Moonlighting also offers residents opportunities to explore the local job market and different practice settings as well as to broaden their clinical experience. We grant the privilege of moonlighting to licensed Fellow physicians with the following restrictions/guidelines:

1. Fellows may NOT moonlight during the following rotations:
   Inpatient Consult Service

2. Teaching activities, clinics, and consult rounds take priority over moonlighting during all time periods. Residents may NOT miss or leave clinics, conferences, or rounds before they are completed in order to moonlight.

3. Overnight moonlighting activities MUST NOT interfere with scheduled next-day morning activities on any rotation.

4. The privilege to moonlight during Fellowship can be revoked by the program director for failure to comply with these guidelines or because of less than or marginally satisfactory performance during residency which may be negatively impacted by time devoted to moonlighting.

5. UCSD malpractice insurance does not cover moonlighting activities.

6. The sum of hours a Fellow moonlights each week and those worked in the residency program during any given rotation cannot exceed the maximal allowable total work hours per week, which is 60 hours/week.

Per the UCSD Institutional Policies and ACGME Guidelines, http://meded.ucsd.edu/assets/6/File/housestaff/HOPPD.pdf all moonlighting activity must be reported in writing to the Program Director. A separate page is required for each activity.
Moonlighting Contract, Academic Year _____

I am a fellow (F4 or F5) in the Rheumatology Fellowship Program. I understand that fellows are not required to engage in moonlighting activities as part of UCSD training. Indeed, under no circumstances will UCSD liability coverage be extended to cover moonlighting activities that fall outside the course and scope of my UCSD activities. This means that in order to moonlight I must be hired at another institution as a licensed independent practitioner, and would be personally responsible for any resultant litigation.

I agree that:

Participation in moonlighting activities shall not interfere with my effectiveness in the training program, and that if this is noted I will be unable to continue moonlighting activities.

2. I will report all moonlighting activities to Dr. Robert Terkeltaub, Program Director, in real time as shifts are assigned, since these moonlighting shifts must be counted in the ACGME duty hours. I will not accept any moonlighting shifts that result in violocation of any ACGME duty hour requirements (such as maximum number of hours/week and time off between shifts), as moonlighting time counts toward these requirements. I understand that any violation will result in immediate cessation of my moonlighting activities.

_________________________  __________
Fellow, Date
Rheumatology Fellowship Program
PORTFOLIOS:
All first and second-year fellows are expected to provide the training director (Dr. Terkeltaub) with appropriate material with which to maintain a portfolio of your accomplishments. Portfolio materials, besides those listed in the form to be given you, should include a cv, updated from time to time, including publications; copies of any manuscripts you may have submitted/published; copies of any abstracts you may have submitted/published; copies of your powerpoint presentations (grand rounds, M &M); a list of the journal club articles you have presented (updated from time to time), and any other material which you feel appropriate (for example, posters or powerpoint talks from meetings, evidence of awards or other accomplishment in the community, etc). Please keep an electronic copy of your portfolio on flash drives, and give them to Cynthia every 6 months update her files. Your portfolio will be reviewed with you at your biannual reviews.

UCSD RHEUMATOLOGY FELLOWSHIP PORTFOLIO
OF SCHOLARY AND EDUCATIONAL ACTIVITIES
First mi last name, M.D.

INSTRUCTIONS: Please submit your electronic portfolio to the Program Coordinator every 6 months. An electronic version by email to cmurillo@ucsd.edu with your up to date information relevant to the ongoing activities is to be provided to the Program Director as part of ongoing review. Once a year, be sure to include a revised CV with any changes relevant to your current status.

☐ @3months ☐ @6months ☐ @9months ☐ @12 months
☐ @15months ☐ @18months ☐ @21months ☐ @24 months

| ☐ | Continuity Clinics: |
| ☐ | Adult |
| ☐ | Pediatric |

☐ Ongoing Research Projects
☐ QA Projects
☐ Regional/National Presentations
☐ Regional/National Meetings
☐ UCSD Presentations
☐ UCSD Committees
Supervised Procedures are Logged into New Innovations

Joint Aspiration at Sites: Total Accrued During Fellowship

- Knee
- Ankle
- MTP
- Shoulder
- Subacromial Bursa
- Rotator Cuff
- Elbow
- Olecranon Bursa
- Wrist
- De Quervain's Tendon Tenosynovitis
- Injection of Sheath
- Carpal Tunnel
- MCP
- PIP
- DIP
- Sternoclavicular
- Acromioclavicular
- Synovial Fluid Analyses

Other Activities and Skills:

- Protocol for IV Infusion of Biologics
- Ultrasound of Joints
- Arthroscopy of Knee Joint
- Interpretation of EMG and Nerve Conduction
- Ordering of Physical Therapy
- Ordering of Occupational Therapy
- Interpretation of Plain Radiographs of Joints
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Performance Improvement Process in UCSD Rheumatology Fellowship

The program is committed to identify and participate in at least one ongoing performance improvement activity that relates to the competencies. The performance improvement activities must involve both fellows and faculty in planning and implementing. The performance improvement activities should result in measurable improvements in patient care or residency education. As examples, selected by faculty and fellows for past training years first is the AIM Rheumatoid Arthritis Practice Improvement Module. This ACR-sanctioned activity is the Assess, Improve, Measure, or AIM, a performance improvement module, which focuses on rheumatoid arthritis. AIM is a Web-based self-evaluation of practice performance tool that provides guidance through medical chart abstraction of de-identified data. Each question in the AIM template relates directly to evidence-based quality measures and provides a cumulative, automated data report enabling physicians to:

- Reflect on practice performance data
- Identify practice strengths and areas for improvement
- Develop and implement an improvement plan
- Assess impact of practice changes through chart re-measurement
- Report changes

Equipped with comprehensive data reports and templates for the development of the physician improvement plan and impact statement, AIM is designed for quality improvement programs. New performance improvement programs will be designed at UCSD with fellow input in future years as this activity evolves and needs change.

As other examples, also selected by faculty and fellows for as past performance-improvement projects, with emphasis on the fellow-designed and fellow-directed aspects of the process are:

1. Assessment and standardization of intra-articular steroid preparations for clinic use at UCSD and VA Medical Centers, with evidence-based analysis and work with the Pharmacy services at both hospitals (and advise their formulary committees) to provide guidelines for available preparations.

2. Development and application of treatment guidelines and algorithm for acute digital ischemia treatment at UCSD and VA Medical Centers, with evidence-based analysis and work with the Pharmacy services at both hospitals (and advise their formulary committees) to provide guidelines for clinical use (and outcome evaluation) of available drugs including sildenafil and bosentan, which have not been universally available to patients thus far.
Identifying and Preventing Adverse Patient Events (System Errors)  
(many sections copied and further adapted from University of Maryland Medical School web page)

We often hear about medical errors from the tragedy of incompatible organs being transplanted, illegible handwriting leading to prescribing errors. Fortunately on this issue, we in the medical community are trying to be proactive. Identifying potential sources of errors is the first and critical step to fixing the problem. As a Rheumatology Fellow, you will be in a position to see how errors can occur in the UCSD/VA system and whether you do things that either promote or prevent errors. The goal of this experience is to introduce you to some concepts of how errors may occur and to raise your awareness so you will be part of the solution as you develop your own practice style. We ask you to start paying closer attention to how errors, particularly system errors, are potentially occurring on your service or in clinic. Choose one incident that could be a potential adverse event that was averted or an adverse event that might have been averted. This is not an indictment on anyone so please do not use names and make every effort to protect privacy. For this to be effective, you will need to probe into the root cause of the problem you identify and try to avoid making assumptions. Below are some suggested reading to choose from that will help you analyze the event and all articles are available at UCSD online.

Formal mechanism for discussing system errors is in regular "Chief's Rounds" (every 8-12 weeks) with the Division Director Dr. Firestein (where issues pertaining to the overall program, trainee's lives, Rheumatology as a field, and other topics are discussed at lunch in an informal setting), but also these can be brought to the attention of the Training Program Director at any time. The following is a suggested format for writing up the incident and it should take no more than a page. Alternatively, if Fellows would like to discuss, rather than write-up the event, I am happy to arrange a time for a small group discussion that would still follow the same general format below.

Briefly describe the event.

Identify the potential causes of the adverse event.

Comment on key issue(s) you learned from the reading.

Suggest possible solutions.

Evaluation criteria: Based on the four criteria above.

References

To Err is Human, report from the Institute of Medicine

This was the seminal report that drew the public's attention to the issue of medical errors and consequently has driven the medical community to take more aggressive action to address this problem.

This editorial introduces the series Quality Grand Rounds in the Annals of Internal Medicine. The following is a list of the articles in that series along with the website for the abstract:

   www.annals.org/issues/v138n10/abs/200305200-00009.html

   www.annals.org/issues/v138n1/abs/200301070-00009.html

   www.annals.org/issues/v137n8/abs/200210150-00011.html

   www.annals.org/issues/v137n2/abs/200207160-00009.html

   www.annals.org/issues/v137n5/abs/200209030-00008.html

   www.annals.org/issues/v136n11/abs/200206040-00012.html


This is an excellent, highly readable book written by a surgical resident. He addresses many types of errors through the use of compelling stories. This was a NY Times notable book.
Patients ideally deserve to have a compassionate doctor, but might they be satisfied with one who is simply well-behaved? When I hear patients complain about doctors, their criticism often has nothing to do with not feeling understood or empathized with. Instead, they object that “he just stared at his computer screen,” “she never smiles,” or “I had no idea who I was talking to.” During my own recent hospitalization, I found the Old World manners of my European-born surgeon — and my reaction to them — revealing in this regard. Whatever he might actually have been feeling, his behavior — dress, manners, body language, eye contact — was impeccable. I wasn’t left thinking, “What compassion.” Instead, I found myself thinking, “What a professional,” and even (unexpectedly), “What a gentleman.” The impression he made was remarkably calming, and it helped to confirm my suspicion that patients may care less about whether their doctors are reflective and empathic than whether they are respectful and attentive.

I believe that medical education and postgraduate training should place more emphasis on this aspect of the doctor–patient relationship — what I would call “etiquette-based medicine.” There have been many attempts to foster empathy, curiosity, and compassion in clinicians, but none that I know of to systematically teach good manners. The very notion of good manners may seem quaint or anachronistic, but it is at the heart of the mission of other service-related professions. The goals of a doctor differ in obviously important ways from those of a Nordstrom’s employee, but why shouldn’t the clinical encounter similarly emphasize the provision of customer satisfaction through explicit actions? A doctor who has trouble feeling compassion for or even recognizing a patient’s suffering can nevertheless behave in certain specified ways that will result in the patient’s feeling well treated. How could we implement an etiquette-based approach to patient care?

The success achieved by Peter Pronovost and colleagues in solving a different kind of complex problem — reducing the likelihood of central-line infections in critical care patients1 — provides a thought-provoking suggestion. Instead of taking an elaborate, “sophisticated” approach — say, tackling infections by developing more advanced antibiotics or clarifying the genetic basis for drug resistance — Pronovost et al. introduced a checklist to enforce the use of hand washing, thorough draping of the patient, and other tasks that could be easily performed. The results of this simple intervention were swift and dramatically effective. I would propose a similar approach to tackling the problem of patient satisfaction: that we develop checklists of physician etiquette for the clinical encounter. Here, for instance, is a possible checklist for the first meeting with a hospitalized patient:

Ask permission to enter the room; wait for an answer.
Introduce yourself, showing ID badge.
Shake hands (wear glove if needed).
Sit down. Smile if appropriate.
Briefly explain your role on the team.
Ask the patient how he or she is feeling about being in the hospital.

Such a checklist has the advantages of being clear, efficient to teach and evaluate, and easy for trainees to practice. It does not address the way the doctor feels, only how he or she behaves; it provides guidance for trainees whose bedside skills need the most improvement. The list can be modified to address a variety of clinical situations: explaining an ongoing workup, delivering bad news, preparing for discharge, and so forth.

Training for an etiquette-based approach to patient care would complement, rather than replace, efforts to train physicians to be more humane. Pedagogically, an argument could be made for etiquette-based medicine to take priority over compassion-based medicine. The finer points of patient care should be built on a base of good manners. Beginning pianists don’t take courses in musicianship and artistic sensibility; they learn how to have proper posture at the piano and how to play scales and are expected to develop those higher-level skills through a lifetime of study and practice. I may or may not be able to teach students or residents to be curious about the world, to see things through the patient’s eyes, or to tolerate suffering. I think I can, however, train them to shake a patient’s hand, sit down during a conversation, and pay attention. Such behavior provides the necessary — if not always sufficient — foundation for the patient to have a satisfying experience.

Furthermore, it’s simpler to change behavior than attitudes. Although reading medically relevant literary classics and writing reflection pieces (as is now done in many medical schools) may make some students more mature and humane, I wonder whether these exercises are most helpful for those students who arrive at medical school already in possession of those qualities to some degree. For many students, I suspect that these exercises may have a more limited effect, if only because they are too brief to allow the student to comprehend, practice, and master the intended values. It isn’t easy to modify a person’s character or outlook in a classroom; besides, clinical training is more effective when it resembles apprenticeship rather than graduate school. Trainees are likely to learn more from watching colleagues act with compassion than from hearing them discuss it.

Etiquette-based medicine would prioritize behavior over feeling. It would stress practice and mastery over character development. It would put professionalism and patient satisfaction at the center of the clinical encounter and bring back some of the elements of ritual that have always been an important part of the healing professions. We should continue our efforts to develop compassionate physicians, but let’s not overlook the possibly more immediate benefits of emphasizing good behavior.
Final Words: A few aphorisms to consider about becoming a physician-specialist (adapted from Dr. RE Schweitzer, 2007)

1. CARING FOR ELDERLY PATIENTS IS MOSTLY ABOUT DRUGS, RESIST PRESCRIBING TOO MANY OF THEM.

2. MAKE EYE CONTACT EARLY, BUT MAINTAIN IT ONLY IF THE PATIENT ACCEPTS IT.

3. NATURE ALWAYS SIDES WITH THE HIDDEN FLAW IN THE SYSTEM.

4. IT IS RELATIVELY EASY TO BECOME A COMPETENT SPECIALIST, BUT IT IS MUCH MORE DIFFICULT TO BECOME A GOOD PHYSICIAN AND TAKES MUCH LONGER.

5. YOU SHOULD NOT PREVENT PATIENTS FROM GETTING WELL ON THEIR OWN. -- SIR WILLIAM OSLER

6. GOOD LISTENERS ARE NOT ONLY UNIVERSALLY POPULAR, AFTER A WHILE THEY KNOW SOMETHING.

7. DOCTORS DO BETTER WHEN THEY METHODICALLY TREAT THEMSELVES TO SIGNIFICANT TIMES OF RENEWAL.

8. WHEN ENTERING A PATIENT'S HOSPITAL ROOM EVEN FOR A SHORT VISIT, SIT DOWN.

9. IT IS ALL RIGHT TO LEAVE A PATIENT WHEN YOU ARE TALKING, BUT NOW WHILE HE OR SHE IS TALKING.

10. DIAGNOSIS IS FOUNDED ON OBSERVANCE OF TRIFLES.

11. ALWAYS PAUSE TO EXPRESS SYMPATHY WHEN A PATIENT MENTIONS THE RECENT DEATH OF A FAMILY MEMBER, FRIEND, OR COLLEAGUE. SPONTANEOUSLY MENTIONED DEATHS, EVEN REMOVE ONES, OFTEN HAVE CLINICAL MEANING.

12. WHEN PRESCRIBING ONE MEDICATION FOR TWO CONDITIONS, DON'T SAY, "LET'S KILL TWO BIRDS WITH ONE STONE". THE REFERENCE IS NOT APPRECIATED.

13. CLINICAL MEDICINE IS NOT ABOUT DISEASES: IT IS ABOUT THE PEOPLE WHO HAVE THE DISEASE.

14. WHEN TREATING A PATIENT, REMEMBER THAT YOU ARE THE
PATIENT’S EMPLOYEE. YOU DO NOT WORK FOR THE REFERRING PHYSICIAN, THE HOSPITAL, OR THE INSURANCE COMPANY.

15. EMPATHY IS THE ONLY PANACEA IN MEDICINE.
1. Introduction

Musculoskeletal ultrasound (US) is an important imaging modality that is being increasingly incorporated into the diagnosis and monitoring of inflammatory and other disorders of tendons, ligaments, and joints (1-7). Unlike other imaging techniques, US is uniquely suited for use by rheumatologists, in that it is readily available at the bedside, is relatively inexpensive, and can provide dynamic real time images of pathology or guidance for procedures. The knowledge and skills basic to rheumatology provide a good background for US, and likewise US can be used to enhance the understanding of dynamic anatomy.

Consensus has been developing as regards the spectrum of knowledge, skills, and procedures most relevant to the use of US in rheumatology, and how to optimally introduce such knowledge and skills into rheumatology practice is less certain. Various methods, including self-taught training, instruction from a mentor locally, and attendance at seminars specific to the purpose have all been utilized. As the knowledge and skill set necessary are a continuum of complexity across techniques and rheumatic diseases, a staged approach (beginning – intermediate – advanced) has been suggested (6). There appears to be universal agreement that hands-on experience is critical to mastering US, although the best way to evaluate musculoskeletal US skills has not been determined. Several individual centers have taken the lead in proposing and developing curricula, including Dr Eugene Kissin at Boston University, who developed a curriculum upon which this UCSD curriculum is based. The curriculum is organized around the six core competencies as described by the Accreditation Council for Graduate Medical Education. The Core Curriculum Outline for Rheumatology Fellowship Programs of the American College of Rheumatology was used as a template for this curriculum.

Several principles for US are similar to rheumatology fellow training in arthrocentesis and injection, including: (1) a fellow may demonstrate competence in one anatomic area of MSK-US before another, (2) extensive experience in one anatomic area may shorten the learning curve for another, (3) fellows may require variable degrees of experience to reach competence. Therefore, performing the minimum number of examinations is not sufficient; the fellow must also be signed off as competent to perform without direct supervision. This curriculum is meant for rheumatology fellow education only. It does not apply to credentialing of other clinicians, who may gain expertise by alternate pathways, such as attendance at an intensive course followed by independent study.

2. Goals and objectives
a. **Medical knowledge** (Definition: Medical knowledge refers to the understanding of established and evolving biomedical, clinical, and cognate science, and to application this knowledge to patient care).

**Goal:** To understand the principles of MSK-US sufficient to select appropriate cases for study, perform quality studies, and interpret the results within the context of other patient information.

**Objectives:** The trainee should be able to discuss and answer questions on the following topics:

1) Basic ultrasound physics
2) Safety aspects of ultrasound; principle of “ALARA” (i.e. using an amount of ultrasound exposure that is ‘as low as reasonably achievable; the minimization of exposure to that necessary to achieve the required diagnostic results)
3) Anatomy of target musculoskeletal structures.
4) Indications for musculoskeletal US
5) Limitations of MSK US
6) Artifacts commonly seen on US
7) Ultrasound equipment function, operation, image optimization
8) Data management, security
9) Anatomic planes of examination
10) The role of dynamic assessment
11) The roles of color and power Doppler US techniques
12) For each joint studied; normal anatomy, sequence of study, best anatomic position of the patient
13) For each joint studied, detectable rheumatologic pathology
14) Indications and methods for US guided procedures

**Methods of acquisition:**
Ultrasound Clinic at ACC/MOS twice per month; each fellow expected to go once per month to these Tuesday sessions and to perform 5-7 ultrasound procedures per month under supervision of clinic attending Dr. Kavanaugh or Lee
Personal textbook study
Critical review of journal literature
Attendance at lectures (e.g. at US courses or at other rheumatology meetings)
Bedside teaching
**Evaluation tools:**
- Objective knowledge assessed by mentor
- Log book of procedures performed, with mentor assessment

b. **Patient Care:** (Definition: Patient Care that is compassionate, appropriate, and effective for the treatment of disease and the promotion of health.)

**Goal:** To perform US that contributes to the quality of rheumatologic patient care.

**Objective 1:** For each site listed below, the trainee must demonstrate proper positioning of the patient and the ability to identify anatomic structures important to rheumatic disease. In at least five patients or in normal joints, the trainee must record a
comprehensive standard scan.

Hand and Fingers
Wrist
Elbow
Shoulder
Hip
Knee
Ankle and heel
Forefoot and toes

A fellow may be certified as “qualified to perform without direct faculty supervision” for a portion of this list. A minimum of 5 complete examinations of each site must be performed before the fellow is certified to perform independently at that site.

Before a graduating fellow is deemed competent to perform diagnostic US independently, a minimum of 40 examinations must be supervised and signed off by a mentor.

Objective 2: Use US as a guide for arthrocentesis and injection at sites defined in the standard rheumatology curriculum for these procedures. This will include both site marking and real time observation of needle action.

Prerequisites: A fellow may perform US guided procedures without supervision only for sites for which he or she is first certified as able to perform without direct supervision
  1) routine (unguided) arthrocentesis and injection AND
  2) standard US imaging

The minimum number of required MSK US guided procedures to be certified to perform without direct supervision;
  1) site marking (indirect ultrasound guidance)– one at any site
  2) direct ultrasound guidance - five at any site (at least 3 by long axis)

Methods of acquisition: Bedside teaching

Evaluation tools:
Log book of procedures performed, with mentor assessment. The log book should contain the following information. Note that the log book requires protection of information in accordance with the Health Information and Portability Accountability Act.

1. Name of trainee
2. Patient identification number
3. Date of ultrasound examination
4. Indication for the test
5. Body region scanned
6. Summary of examination findings
7. Final diagnosis
8. Complications
9. Supervisor signature

Achievement of the minimum number of procedures alone is not sufficient; the mentor must also determine that the trainee is ready to perform without direct supervision.

c. Practice-based Learning and Improvement (PBLI): (Definition: Practice-based learning and improvement involves the investigation 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.)

Goal: Incorporate evidence based medicine and performance improvement principles into the use of US.

Objective: Fellows should use current literature to assess the results of MSK-US on their patients, and assess their own quality of care, and participate in system improvements related to their patient care or educational processes. This is especially critical for US, as the technology of the devices is constantly improving, and hence the optimal use of US will evolve over time.

Methods of acquisition:
US experience in a mentored setting.
Independent literature search.
Case based discussions
Journal Club presentations

Evaluation methods:
Evaluation by mentors.
Reflective learning; self evaluation

d. Systems-based Practice: (Definition: Systems-based practice reflects an understanding of and responsiveness of the larger context and systems of health care, as well as the ability to call effectively on other resources in the system to provide optional health care.)

Goal: Understand the role of musculoskeletal US within the larger context of health care.

Objectives: Integrate the practice of US into the fellow’s own patient care, and use the results to coordinate care with other specialties. Understand cost and utilization issues as they relate to US.

Methods of acquisition:
Bedside mentoring
Evaluation methods:
Evaluation by mentors.

e. **Interpersonal and Communication Skills** (Definition: Skills that result in the effective information exchange and collaboration with patients, their families and other health professionals.)

Goal: Communicate the indications, limitations, and results of study effectively to patients and other health care professionals.

Objective 1: Communicate the indications, method, and realistic expectations of benefits of US to patients using terminology that they can understand, setting the patient at ease and giving realistic expectations for the possible benefits.

Objective 2: Communicate in the written medical record the results of US testing.

Objective 3 (optional): Communicate new and interesting findings to other health care providers by scholarly presentation or publication. The use of US as part of research projects done by fellows will be encouraged. Data from such projects will be presented at national meetings and published in peer-reviewed literature.

Methods of acquisition:
- Bedside teaching
- Recording results in the written medical record with assistance of mentor
- Participation in case based conferences
- Submission of scholarly manuscripts for publication (optional)

Evaluation methods:
- Mentor observation of verbal and written communication
- 360 degree feedback from patients
- Staff evaluation of conference participation

f. **Professionalism:** (Definition: Professionalism is manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to patients of diverse backgrounds.)

Goal: Apply MSK-US using ethical standards

Objectives: The fellow should recognize and be able to discuss the essential ethical components in the application of MSK US:

- Primacy of patient interest
- Physician autonomy in medical decision making
- Physician accountability and responsibility
- Humanistic qualities and altruism
Ethical behavior
Recognition of real and perceived conflicts of interest

Methods of acquisition:
Bedside teaching, faculty role modeling
Participation in case based conferences

Evaluation:
Mentor observation of verbal and written communication
360 degree feedback from patients
Staff evaluation of conference participation
Staff evaluation of demonstrated responsibility in record-keeping.

References


Appendix A:

Fellow Evaluation Checklist - Diagnostic Musculoskeletal Ultrasound

**Medical Knowledge:**

- _____ Demonstrate to faulty mentor understanding of the principles of US

**Patient care:**

- _____ Minimum of 20 supervised MSK US examinations performed and recorded in log book

  Individual areas for which a minimum of five US examinations have been performed AND for which at least the last of which is rated in the log book as “qualified to perform independently.” Evaluation factors include the ability to demonstrate all related normal anatomy, deviations from normal, and verbalize the indications, limitations, and utility of US at the given site. For each site, the trainee must record at least one comprehensive standard scan.

  - ____Hand and fingers
  - ____Wrist
  - ____Elbow
  - ____Shoulder
  - ____Hip
  - ____Knee
  - ____Ankle and heel
  - ____Forefoot and toes

**Practice-based Learning and Improvement (PBLI):**

- _____ During at least one quarterly education meeting, the faculty will comment on fellows ability to use current literature to assess the results of US on their patients, and assess their own quality of care, and participate in system improvements related to their patient care or educational processes.

  (date) Comment: ( )

**Systems Based Practice**

During at least one quarterly education meeting, the faculty will comment on fellows ability to integrate the practice of US into the fellows own patient care, and use the results to coordinate care with other specialties.

(date) Comment: ( )
Interpersonal and Communication Skills

_____ During at least one quarterly education meeting, the faculty will comment on fellows ability to communicate the indications, method, and realistic expectations of benefits of US to patients using terminology that they can understand, setting the patient at ease and giving realistic expectations for the possible benefits.

(date) Comment: ( )

Professionalism:

_____ During at least one quarterly education meeting, the faculty will comment on fellows ability to discuss the essential ethical components in the application of US:

(date) Comment: ( )
VA RHEUMATOLOGY TELE-RHEUMATOLOGY (SCAN-ECHO) CURRICULUM AND OBJECTIVES FOR FELLOWS

A. Background:
SCAN Echo (Specialty Care Access Networks-Extension for Community Healthcare Outcomes) is an innovative VA based healthcare program that is designed to provide care for patients in rural and medically underserved areas. Using telehealth (typically clinical videoconferencing and telephone lines), healthcare specialists provide clinical advice to treating primary care physicians in remote clinics. The Rheumatology SCAN-Echo offers an opportunity to provide rapid and remote treatment for patients with various inflammatory arthritis such as gout, rheumatoid arthritis (RA), and spondyloarthropathies. This remote health access system can improve patients’ access to healthcare with less cost and inconvenience for both patients and providers.

It is designed to increase primary care provider knowledge, competencies and professional training hours in a specific specialty area. The specialist team coaches the primary care provider to become a local expert. The specialist and other members of the SCAN-ECHO team make recommendations for a treatment plan with the PCP and also provide short, topical didactic presentation.

B. Structure and Objectives of the Training Elective:

1. The Training Elective: The principal goal of the Rheumatology SCAN-ECHO elective is for Rheumatology fellows to gain exposure to the growing field of telemedicine. Fellows will join the rheumatology team which will run under the direction of Dr. Susan Lee (Associate Professor, Director of VA SCAN Echo elective), VA biologics pharmacist, and administrative staff. An average of 1-3 rheumatology cases will be presented at each conference.

2. As part of the training elective, each fellow is expected to participate in biweekly (every 2 weeks) teleconferences with the primary care providers, and participate in discussion of the cases, with a focus on the differential, diagnostic work up and treatment recommendations paying specific attention to the evidence behind these recommendations. Additionally, fellows are expected to provide 5-10 minute informal didactics pertinent to the case being presented.

3. Teleconferences are held once every other week for one hour.

4. This will be a 3 month elective rotation, although those fellows with a deeper interest based on their career plans, will be encouraged and allowed to spend additional time as their schedules permit.

C. Didactic Topics
Fellows can choose any topics pertinent to cases or choose a topic from following competency areas.
1. Rheumatoid Arthritis
2. Seronegative Spondyloarthropathies: Ankylosing Spondylitis, Psoriatic Arthritis, IBD associated spondyloarthropathy, Reactive Arthritis
3. Lupus: systemic, discoid, and drug-related; APLS
4. Scleroderma
5. Other systemic Connective Tissue Diseases: Sjogrens, Overlap syndromes, Stills Disease, etc
7. Infectious and Reactive Arthritides, Gout, Crystal Arthritis
8. Nonarticular/Regional musculoskeletal Disorders: fibromyalgia, axial, regional, sports med, RSD, etc
9. Muscle Diseases: myositis, myopathies
10. Miscellaneous rheumatic disorders: amyloid, rsspe
11. Indications for surgery
12. Diagnostic testing (Antibody testing, synovial fluid analysis)
13. Pharmacology: NSAIDs, steroids, DMARDs, biologics, TCA, cytotoxic, immunomodulators, hypouricemics
14. Rehab and Disability Issues
15. The Rheumatologic exam and history, utility of disease activity measures.

D. Evaluation and Feedback
The Fellows will be formally evaluated by Dr. Susan Lee after completion of the elective. Conversely the Fellows will evaluate, in writing, the elective experience and the performance of all involved faculty.
Rheumatology Mini-Clinical Evaluation Exercise (CEX)

Evaluator: _______________________  Facility:  O VAMC  O UCSD MC
Date:_____________________________  O @6months  O @18months
Rheumatology Fellow: ____________________________
Patient Problem/Dx: ____________________________________________

Setting:  O Ambulatory  O In-patient  O ED  O Other __________
Patient:  Age: ________  Sex: _____  O New  O Follow-up
Complexity:  O Low  O Moderate  O High
Focus:  O Data Gathering  O Diagnosis  O Therapy  O Counseling

1. History Taking  (O Not Observed)

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2. Physical Examination Skills  (O Not Observed)

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3. Professionalism

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4. Clinical Judgment  (O Not Observed)

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5. Counseling Skills  (O Not Observed)

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6. Organization/Efficiency  (O Not Observed)

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7. Overall Clinical Competence (O Not Observed)

1 2 3 4 5 6 7 8 9
Satisfactory Satisfactory Superior

Mini-CEX Time: Observing _____ Mins  Providing Feedback: _____ Mins

Evaluator Satisfaction with Mini-CEX

LOW 1 2 3 4 5 6 7 8 9 HIGH

Rheumatology Fellow Satisfaction with Mini-CEX

LOW 1 2 3 4 5 6 7 8 9 HIGH

Comments:
________________________________________________________________________
________________________________________________________________________

Fellow Signature  Evaluator Signature

DESCRIPTORS OF COMPETENCIES DEMONSTRATED DURING THE MINI-CEX

COMPETENCE Descriptor of Satisfactory Trainee

History Taking: Facilitates patient’s telling of story; effectively uses questions/directions to obtain accurate, adequate information needed; responds appropriately to affect, non-verbal cues.

Physical Examination Skills: Follows efficient, logical sequence; balances screening/diagnostic steps for problem; informs patient; sensitive to patient’s comfort, modesty.

Professionalism: Shows respect, compassion, empathy, establishes trust; attends to patient’s needs of comfort, modesty, confidentiality, information.

Clinical Judgment: Selectively orders/perform appropriate diagnostic studies, considers risks, benefits.

Communication Skills Explores patient’s perspective, jargon free, open and honest.
empathetic, agrees management plan/therapy with patient.

Organization/Efficiency: Prioritizes; is timely; succinct.

Overall Clinical Competence: Demonstrates satisfactory clinical judgment, synthesis, caring, effectiveness. Efficiency, appropriate use of resources, balances risks and benefits, awareness of own limitations.

Note 1: Reprinted with permission from the American Board of Internal Medicine, www.abim.org.


NOTES:
Fatigue Policy of Rheumatology Fellowship Program Curriculum
(This is given to all fellows at orientation)
1. Faculty and fellows are educated to recognize the signs of fatigue, starting with new Fellow Orientation.
2. The training program, at the level of both Chief Fellow and Program Director, will adjust schedules as necessary to mitigate excessive service demands and/or fatigue; and monitor the demands of at-home call and adjust schedules as necessary to mitigate excessive service demands and/or fatigue. Fellows are informed of this on arrival and orientation to the program. The Chief Fellow and Program Director are charged to monitor the need for and ensure the provision of back up support systems when patient care responsibilities are unusually difficult or prolonged.
3. Policies and procedures have been developed to prevent and counteract the potential negative effects of fatigue. First, if a fellow feels fatigued and unable to drive home, he/she will be reimbursed the expense of a taxi/cab home and back to the assigned institution to retrieve their vehicle. Second, if any fellow feels they are too fatigued to drive home and elects to take a cab home, the Office of Graduate Medical Education will reimburse any fellow for cab fare. The fellow will also be reimbursed for cab fare to return the following day to retrieve their vehicle.
4. Fellows and faculty members must demonstrate an understanding and acceptance of their personal role in the following: assurance of the safety and welfare of patients entrusted to their care; provision of patient- and family-centered care; assurance of their fitness for management of their time before, during, and after clinical assignments; recognition of impairment, including illness and fatigue, in themselves and in their peers; attention to lifelong learning; the monitoring of their patient care performance improvement indicators; and, honest and accurate reporting of duty hours, patient outcomes, and clinical experience data.
5. Division policy, communicated to fellows at orientation, is that all fellows and faculty members must demonstrate responsiveness to patient needs that supersedes self-interest. Physicians must recognize that under certain circumstances, the best interests of the patient may be served by transitioning that patient’s care to another qualified and rested provider.
6. Alertness Management/Fatigue Mitigation: The program educates all faculty members and fellows to recognize the signs of fatigue and sleep deprivation, and it educates all faculty members and fellows in alertness management and fatigue mitigation processes; and the program has a fatigue mitigation process to manage the potential negative effects of fatigue on patient care and learning, such as naps and back-up call schedules. The program has a process to ensure continuity of patient care in the event that a fellow may be unable to perform his/her patient care duties. The sponsoring institution provides sleep facilities and safe transportation options for fellows who may be too fatigued to safely return home.

UCSD Graduate Medical Education Office Website Information on Discipline, Probation, Stress and Fatigue, and other personal and interpersonal information
issues. In addition to the information and materials outlined in this Rheumatology Fellowship Curriculum and Training Manual, additional guidance of policy and procedures, including stress monitoring and discipline and other policies on interpersonal interaction issues at the Institutional level can be accessed by going to the UCSD GME Home Page.

UCSD GME home page link: [http://meded.ucsd.edu/gme/](http://meded.ucsd.edu/gme/)

House Officer Document Link
[http://meded.ucsd.edu/assets/6/File/housestaff/HOPPD.pdf](http://meded.ucsd.edu/assets/6/File/housestaff/HOPPD.pdf)

Term and Conditions of Fellowship Appointment
[http://meded.ucsd.edu/assets/6/File/Terms_and_Conditions.pdf](http://meded.ucsd.edu/assets/6/File/Terms_and_Conditions.pdf)
Final Appendix Material:

-- ACR Detailed Core Curriculum and Core Competencies (for reference purposes)
--Milestones forms used to evaluate fellows in clinic and consult service
ACR Curriculum and Core Competencies for Rheumatology Fellowship (formulated 2015)

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, distinguish the embryology, development, biochemistry and metabolism, structure, function, and classification
   1. Connective tissue cells and components: fibroblasts, collagens, proteoglycans, elastin, matrix glycoproteins
   2. Joints and ligaments: diarthrodial joints, intervertebral discs, synovium, cartilage
   3. Bone: development, structure, turnover and remodeling (including the role of osteoclasts, osteoblasts, osteocytes, as well as hormonal and cytokine regulation)
   4. Muscle and tendons
   5. Vasculature and endothelium
   6. Skin

B. Immunology

1. Lymphoid organs: gross and microscopic anatomy, structure and function
2. Organization of the immune system: innate and adaptive immune systems
3. Specific cells: for each cell type, the ontogeny, structure, phenotype, function, and major activation markers/receptors
   i. Lymphocytes: T cells and B cells (naive, memory, activated, regulatory, innate lymphoid cells)
   ii. Antigen presenting cells: dendritic cells, monocytes and macrophages
   iii. Natural killer cells
   iv. Neutrophils and eosinophils
   v. Other cells: NKT cells, mast cells, endothelial cells, platelets, fibroblasts

2. Immune and inflammatory mechanisms
   a. Antibody structure and genetic basis of antibody diversity
   b. Receptor/ligand interactions: activating and inhibiting receptors, complement receptors, Fc receptors, adhesion molecules
   c. Toll-like (TLR) and other pattern recognition receptors (PRR)
   d. Molecular basis of T cell antigen recognition and activation
   e. B cell receptors: structure, function, antigen binding, effector functions
   f. Antigens: types, structure, processing, presentation, and elimination
   g. Major histocompatibility complex: structure, function, nomenclature, and immunogenetics
   h. Major immune cell signaling pathways
   i. Complement/Kinin systems: structure, function, and regulation
   j. Acute phase reactants and enzymatic defenses
k. Intracellular signal transduction
l. Inflammasome, neutrophil extracellular traps (NETosis)

3. Cellular interactions and immunomodulation
a. Cellular activation and regulation: mechanisms of activation and suppression of function (e.g. T cell and B cell interactions via CD28:CD80/86)
b. Cytokines: origin, structure, effect, site of action, metabolism, regulation, and gene activation
c. Immune cell trafficking; adhesion molecules, chemokines
d. Inflammatory mediators: origin, structure, effect, site of action, metabolism, and regulation

4. Immune responses
a. Antibody-mediated: opsonization, complement fixation, and antibody dependent cellular cytoxicity
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. Innate immune responses: natural killer cells, pattern recognition, interaction with adaptive responses
f. 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. Idiotypic 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
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
2. Central processing of nociceptive information
3. 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. Seronegative spondyloarthritides: ankylosing spondylitis, reactive spondyloarthritis/arthritis, psoriatic arthritis, inflammatory bowel disease-associated arthritis, arthritis associated with acne and other skin diseases, synovitis, acne, pustulosis, hyperostosis, and osteitis (SAPHO) syndrome, and undifferentiated spondyloarthritis.
3. Lupus erythematosus: systemic, discoid, and drug-related; anti-phospholipid antibody syndrome
4. Primary anti-phospholipid syndrome
5. Scleroderma: diffuse and limited cutaneous systemic sclerosis, localized scleroderma, chemical/drug-related, other fibrosing skin disorders (eosinophilic fasciitis, eosinophilia-myalgia syndrome, nephrogenic systemic fibrosis, scleromyxedema, scleredema of Buschke)
6. Other systemic autoimmune diseases: Sjögren syndrome, mixed connective tissue disease,
undifferentiated connective tissue disease, and overlap syndromes
7. Other inflammatory diseases: relapsing polychondritis, panniculitis (lobular or septal (erythema nodosum)), adult-onset Still’s disease
8. Vasculitides: giant cell arteritis/polymyalgia rheumatica, Takayasu’s arteritis, polyarteritis nodosa, ANCA-associated vasculitis such as granulomatosis with polyangitis (GPA, formerly Wegener’s granulomatosis), eosinophilic granulomatosis with polyangitis (EGPA, formerly Churg-Strauss syndrome) and microscopic polyangiitis, anti-glomerular basement membrane disease, cryoglobulinemia, Immunoglobulin A vasculitis (formerly Henoch-Schönlein purpura), hypocomplementemic urticarial vasculitis, Behçet’s disease, Cogan’s syndrome, cutaneous leukocytoclastic angiitis, primary central nervous system vasculitis, isolated aortitis, vasculitis from systemic disorders, infections, drugs, malignancies, and overlap necrotizing vasculitis.
9. Infectious
a. Infectious arthritides: bacterial (non-gonococcal and gonococcal), mycobacterial, spirochetal (syphilis, Lyme), viral (HIV, hepatitis B, hepatitis C, parvovirus, chikungunya, dengue), fungal, parasitic
b. Whipple’s disease
10. Reactive arthritides: acute rheumatic fever, arthritis associated with subacute bacterial endocarditis, intestinal bypass arthritis, post-dysenteric arthritides, post-immunization arthritis, other colitis-associated arthropathies,
11. Metabolic, endocrine, and hematologic disease associated rheumatic disorders
a. Crystal-associated diseases: monosodium urate monohydrate (gout), calcium pyrophosphate dihydrate deposition disease, basic calcium phosphate (hydroxyapatite), calcium oxalate
b. Endocrine-associated diseases: rheumatic syndromes associated with diabetes mellitus, acromegaly, parathyroid disease, thyroid disease, Cushing disease
c. Hematologic-associated diseases: rheumatic syndromes associated with hemophilia, hemoglobinopathies, angioimmunoblastic lymphadenopathy or lymphoma, multiple myeloma, hemophagocytic lymphohistiocytosis/macrophage activation syndrome
12. Bone a. b. c. d. e. and cartilage disorders
Osteoarthritis - primary and secondary osteoarthritis
Metabolic bone disease: low bone mass, osteoporosis, osteomalacia, bone disease related to renal disease
Paget’s disease of bone
Avascular necrosis of bone: idiopathic, secondary causes, osteochondritis dissecans
Others: transient osteoporosis, hypertrophic osteoarthropathy, diffuse idiopathic skeletal hyperostosis
13. 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’s disease, Fabry’s disease,
f. Immunodeficiency: IgA deficiency, complement component deficiency, SCID and ADA deficiency, PNP deficiency, others

g. Autoinflammatory syndromes: familial Mediterranean fever, hyperimmunoglobulinemia D syndrome, tumor necrosis factor receptor-associated periodic syndromes (TRAPS), periodic fever, aphthous stomatitis, pharyngitis, adenitis syndrome (PFAPA), Blau syndrome, Behçet’s syndrome, Schnitzler syndrome, systemic juvenile idiopathic arthritis (SJIA), and cryopyrin associated periodic syndrome (CAPS) including Muckle-Wells syndrome, and familial cold autoinflammatory syndrome
h. Others: hemochromatosis, hyperlipidemic arthropathy, myositis ossificans progressiva, Wilson’s disease, others
14. 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 illii, 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-ganglions, De Quervain’s tenosynovitis; trigger fingers/stenosing tenosynovitis, Dupuytren’s contractures; knee-synovial plica syndrome, internal derangements, popliteal cyst; foot/ankle-plantar fasciitis, Achilles tendinitis, Morton’s neuroma; other-temporomandibular joint syndromes; 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

15. 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: fibroma, giant cell tumor, nodular tenosynovitis

b. Malignant

i. Primary: synovial sarcoma, osteoid sarcoma, chondrosarcoma

ii. Secondary: leukemia, myeloma, metastatic malignant tumors

iii. Malignancy-associated rheumatic syndromes: carcinomatous polyarthritis, palmoplantar fasciitis, Sweet’s syndrome, paraneoplastic presentations of rheumatic diseases

16. Muscle diseases

a. Acquired muscle diseases

i. Autoimmune

(1) Polymyositis

(2) Dermatomyositis

(3) Myositis with other connective tissue diseases

(4) Immune-mediated necrotizing myositis

(5) Others (ocular/orbital myositis, focal/nodular myositis, eosinophilic myositis, granulomatous myositis)

(6) Inclusion body myositis

ii. Endocrine disorders

iii. Drugs/Toxins

iv. Others (critical illness myopathy, infections, amyloid, paraneoplastic)

b. Inherited muscle diseases

i. Metabolic myopathies

(1) Glycogen storage diseases (2) Lipid metabolism disorders (3) Mitochondrial myopathies

ii. Muscular dystrophies

iii. Muscle channelopathies

iv. Myasthenia gravis

17. Rheumatic diseases in special populations

a. Geriatric population

b. Pregnant women

c. Dialysis patients

d. Transplant patients

18. Miscellaneous rheumatic disorders

a. Amyloidosis: primary, secondary, hereditary

b. Primary Raynaud phenomenon

c. IgG4-related disease

d. Retroperitoneal fibrosis
e. Charcot joint
f. Remitting seronegative symmetrical synovitis with pitting edema (RS3PE)
g. Multicentric reticulohistiocytosis
h. Sarcoidosis
i. Intermittent arthritides: palindromic rheumatism, intermittent hydrarthrosis
j. Arthritic and rheumatic syndromes associated with: plant thorn synovitis, scurvy, pancreatic disease, primary biliary cirrhosis, drugs, and environmental agents

B. Pediatric rheumatic diseases

Some rheumatic diseases are can share similar aspects of pathogenesis, presentation, clinical course, and treatment in adults and children. 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. A supplementary section, providing more detailed information is provided in Appendix E.

1. Rheumatic diseases that occur primarily in children: diagnosis and recognition of how they both differ from the same or share similar aspects with disease in adults.
   a. Juvenile idiopathic arthritis (JIA)
      i. Systemic Onset
      ii. Oligoarticular
      iii. Polyarthritis (RF positive, RF negative)
      iv. Enthesitis-related
      v. Psoriatic arthritis
   b. Juvenile dermatomyositis
   c. Kawasaki Disease
   d. IgA Vasculitis (formerly known as Henoch-Schonlein Purpura, HSP)
   e. Acute rheumatic fever
   f. Neonatal lupus syndrome
   g. Autoinflammatory syndromes: familial Mediterranean fever (FMF), hyperimmunoglobulinemia D syndrome (HIDS), tumor necrosis factor receptor-associated periodic syndromes (TRAPS), periodic fever, aphthous stomatitis, pharyngitis, adenitis syndrome (PFAPA), deficiency of interleukin-1 receptor agonist (DIRA), Mageed syndrome, chronic recurrent multifocal osteomyelitis (CRMO), pyogenic sterile arthritis, pyoderma gangrenosum and acne syndrome (PAPA), Schnitzler syndrome, Blau syndrome (NOD2/CARD15), chronic atypical neutrophilic dermatosis with lipodystrophy and elevated temperature (CANDLE) syndrome, Behçet’s syndrome, systemic juvenile idiopathic arthritis (SJIA), and cryopyrin associated periodic syndrome (CAPS) including Muckle-Wells syndrome, familial cold autoinflammatory syndrome, and neonatal-onset multisystemic inflammatory disease (NOMID)

2. Major sequelae and life-threatening complications of rheumatic diseases that occur primarily in children:
   a. Systemic onset JIA
      i. Hemophagocytic lymphohistiocytosis/Macrophage activation syndrome
      ii. Cardiac tamponade
   b. Pauciarticular JIA
      i. Chronic uveitis
   c. Juvenile dermatomyositis i. GIvasculitis
      ii. Calcinosi
   d. Joint contractures d. Kawasaki Disease
      i. Aneurysms of coronary and other arteries
   e. IgA Vasculitis (formerly known as Henoch-Schonlein Purpura, HSP)
      i. GI- intussusception, intestinal infarction
      ii. Renal - chronic nephritis
   f. Neonatal lupus syndrome
   i. Congenital heart block
   ii. Thrombocytopenia

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
   iv. Post-viral myositis
b. Orthopedic conditions
   i. Legg-Calve-Perthes disease and other avascular necrosis syndromes
   ii. Slipped capital femoral epiphysis
   iii. Spondylolysis and spondylolisthesis
   iv. Patellofemoral syndrome
c. Non-rheumatic pain
   i. Benign limb pains of childhood (“growing pains”)
   ii. Benign hypermobility syndrome
d. Neoplasms
   i. Leukemia
   ii. Lymphoma
   iii. Primary bone tumors (especially osteosarcoma and Ewing’s sarcoma)
   iv. Tumors metastatic to bone (especially neuroblastoma)
e. Bone and cartilage dysplasias, and inherited disorders of metabolism (Marfan syndrome, osteogenesis imperfecta, Ehlers-Danlos syndrome, pseudoxanthoma elasticum, hypermobility syndrome)

5. Non-articularrheumatism
a. Fibromyalgia
b. Pain amplification syndromes
c. Complex regional pain syndrome

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
   ii. Altered growth of mandible in TMJ arthritis
   iii. Short stature and failure to thrive
b. Regular surveillance for uveitis in JIA
c. Drugs
   i. FDA approved drugs for childhood rheumatic diseases
   ii. Pediatric dosing and special considerations in terms of pharmacokinetics and drug metabolism
d. Child-specific side effects of chronic glucocorticoid treatment
   i. Growth retardation
   ii. Delay of puberty
c. Physical and occupational therapy
   i. Exercises
   ii. Splinting
d. Psychosocial and developmental issues
   i. Peer and sibling interaction
   ii. Family adjustment
   iii. School accommodations for disability
   iv. School and recreational activities
g. Transition to adulthood
   i. Transition of care

C. Therapeutic modalities and strategies
1. Pharmacology: for each medication, 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
   a. Nonsteroidal anti-inflammatory drugs
   b. Glucocorticoids: topical, intra-articular, systemic
c. Systemic anti-rheumatic drugs
   i. DMARDs, small molecules: anti-malarials, sulfasalazine, methotrexate, leflunomide, azathioprine, cyclophosphamide, mycophenolate, calcineurin inhibitors, JAK kinase inhibitors, phosphodiesterase
inhibitors
ii. Biologic agents: interleukin inhibitors (1, 6, 12, 17, 23), tumor necrosis factor inhibitors, T cell co-stimulatory inhibitors, anti-B cell therapy
iii. Historical agents such as gold compounds
d. Urate lowering therapy:
i. Xanthine oxidase inhibitors: allopurinol, febuxostat
ii. Uricosuric: probenecid
iii. Uricase agents: pegylated uricase, rasburicase
e. Bone disorder medications
i. Bisphosphonates: alendronate, risedronate, ibandronate, zoledronic acid
ii. Anabolic agents: teriparatide
iii. RANKL inhibition: denosumab
iv. Hormonal therapy: estrogen, selective estrogen receptor modulators, calcitonin
v. Calcium and Vitamin D
f. Vasodilators
i. Calcium channel blockers
ii. Topical nitrates
iii. Prostacyclin analogs
iv. Endothelin receptor antagonists
v. Phosphodiesterase 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, pregabalin, muscle relaxants
k. Anti-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) Phoresis (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
   2. Rheumatoid factors, cryoglobulins, and circulating immune complexes
   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-RNA polymerase III and LE cell preparation
   5. Myositis-specific (anti-Jo-1 and other anti-synthetases, anti-Mi-2, anti-SRP, anti-HMGCR [200/100], anti-TIF1-gamma [p155/140], anti-MJ [NXp-2], anti-CADM-140 [MDA-5], anti-SAE) and myositis-associated (anti-U1RNP, anti-Ku, anti-PM-Scl) antibodies
   6. Other disease-associated auto-antibodies: anti-mitochondrial, anti-smooth muscle, anti-neuronal
   7. Anti-neutrophil cytoplasmic antibodies (anti-proteinase 3, anti-myeloperoxidase)
   8. Anti-phospholipid antibodies including RPR, lupus anticoagulant, anti-cardiolipin and beta-2-glycoprotein I
   9. Antibodies to formed blood elements including direct and indirect Coombs testing, anti-platelet antibodies, anti-granulocyte antibodies
   10. Assays for complement activity (CH50) and components of the complement cascade
   11. Serum immunoglobulin levels, serum protein electrophoresis and immunofixation electrophoresis
   12. HLA typing
   13. ASO and other streptococcal antibody tests
   14. Serologic and PCR tests for Lyme disease, HIV, Hepatitis B, Hepatitis C, parvovirus, chikungunya and other infectious agents
   15. Serum and urine measurements for uric acid
   16. Iron studies including ferritin
   17. Flow cytometry studies for analysis of lymphocyte subsets and function
   18. 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, crystal identification, viscosity, and other special stains/analyses

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 research 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 and control group
      b. Choice of appropriate controls
      c. Replication of results to assure reliability and validity
   3. Laboratory techniques commonly used in research related to rheumatic 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 technique
e. Hybridoma and monoclonal antibody production
f. Mouse models: transgenic, knock-out/knock-in, chimeras
4. Statistical methods and reporting
a. ANOVA, ANCOVA
b. Statistical significance and sample size
c. Data management, entry, security
B. Clinical Research: the principles of research involving patients in order to answer clinically relevant questions, recognizing the limitations and biases of each
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. Design
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. Data management, entry, security
C. Epidemiological and health services research: Fellows should recognize how research is done with regard to the ways in which advances in medical knowledge lead to optimal management of local and global populations.
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, CDAl, SLEDAI, BASDAI, PASI, and others)
   c. Composite indices (e.g. BILAG, ACR Composite)
3. Quality improvement science
   a. Plan-Do-Study-Act (PDSA) cycle
   b. Team leadership skills
4. Comparative effectiveness research
   a. Systematic review
   b. Cost analysis (direct costs, QALY)
D. Research Ethics
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. Data management
   a. Confidentiality
   b. Documentation
5. Data security
E. Critical literature review
1. Evidence based medicine principles
2. Critical appraisal of the literature

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:
- Obtain an accurate and comprehensive but relevant clinical history, including review of all available records.
- Perform a thorough and relevant review of systems, and assess functional status of patients with rheumatic disease symptoms.
- Perform and interpret a comprehensive, accurate physical examination, using common and advanced techniques, where applicable.
- Perform and interpret the examination of all axial and peripheral joints, peri- articular structures, peripheral nerves and muscles.
- Identify extra-articular findings that are associated with specific rheumatic diseases.
- Recognize the indications for and costs of ordering laboratory tests and procedures to establish a diagnosis of rheumatic disease.
- Recognize the indications for and costs of different therapies used in the management of rheumatic diseases.
- 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
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

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.

therapy for septic joints

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

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.

III. Practice-based learning and improvement

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.

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.

IV. Systems-based practice

**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.

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.

V. Interpersonal and communication 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.

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
VI. Professionalism

**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.
## Faculty Evaluation of Fellow
### Rotation: Clinic

### Patient Care

<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Curricular Milestone</th>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gathers and synthesizes essential and accurate information to define each patient's rheumatologic clinical problem(s) (PC1) (ICS3)</td>
<td>Clinic notes contain complete patient history (PC1.1)</td>
<td>Documents elements necessary to fulfill CMS guidelines for billing purposes</td>
<td>Obtains detailed history for regional joint disorders and specific joints/spinal levels. Obtain detailed history for systemic inflammatory diseases</td>
<td>Organizes scenarios into rational progression of events emphasizing more important points</td>
<td>Develops/learns lines of questioning allowing more precise history and promoting patient comfort and interaction.</td>
<td>Able to teach obtaining history to others, emphasizing important nuances (e.g. severity of stiffness as important as time for RA patients).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curricular Milestone</th>
<th>Trainee is able to synthesize history and studies to form a differential diagnosis (PC2.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question Trainee is able to synthesize history and studies to form a differential diagnosis</td>
<td>Able to determine if a focal or systemic problem; inflammatory vs noninflammatory</td>
</tr>
<tr>
<td></td>
<td>Knows the meaning of classification criteria for RA, SLE and other conditions. Able to diagnose RA, SLE and OA.</td>
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<td></td>
<td>Consistently develops differential diagnosis of specific joint findings (e.g. discern spondyloarthropathy from RA)</td>
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<td></td>
<td>Regularly identifies relative importance of history and exam findings. Discerns when information is discordant and redefine the differential diagnosis.</td>
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<tr>
<td></td>
<td>Consistently able to discern non-rheumatologic problems in patients with rheumatologic diseases and develop thorough weighted differentials.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curricular Milestone</th>
<th>Is an independent learner in the management of patient care (reads and applies the pertaining literature) (PC3.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manages patients with progressive responsibility and independence. (PC3)</td>
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</tr>
<tr>
<td>Question</td>
<td>Is an independent learner in the management of patient care (reads and applies the pertaining literature)</td>
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<tr>
<td></td>
<td>Cannot advance beyond the need for direct supervision in the delivery of patient care</td>
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<td></td>
<td>Cannot manage patients who require urgent or emergency care</td>
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<td></td>
<td>Does not assume responsibility for patient management decisions</td>
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<tr>
<td></td>
<td>Requires direct supervision to ensure patient safety and quality care and in management of common rheumatologic diseases.</td>
</tr>
<tr>
<td></td>
<td>Unable to manage complex inpatients or patients requiring intensive care</td>
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<td></td>
<td>Requires indirect supervision to ensure patient safety and quality care</td>
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<td></td>
<td>Provides appropriate preventive care and able to provide comprehensive care for single or multiple diagnoses.</td>
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<td></td>
<td>Independently reviews pertinent literature regarding complex patients in urgent/ICU setting</td>
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<td></td>
<td>Independently manages patients across inpatient, outpatient, and ambulatory clinical settings with a broad spectrum of clinical disorders, including undifferentiated syndromes</td>
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<td></td>
<td>Seeks additional guidance and/or consultation as appropriate</td>
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<td></td>
<td>Thoroughly reviews literature and appropriate studies to effectively supervise management decisions</td>
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<tr>
<td></td>
<td>Effectively manages unusual, rare, or complex disorders in all appropriate clinical settings and practices evidence based medicine</td>
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</table>

<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Demonstrates skill in performing and interpreting invasive procedures. (PC4a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular Milestone</td>
<td>Performs arthrocentesis of peripheral joints (PC4a.1)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Question</th>
<th>Performs arthrocentesis of peripheral joints</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Critical Deficiencies</td>
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<td>Basic Competence</td>
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<td></td>
<td>Advanced Competence</td>
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<td></td>
<td>Ready for unsupervised practice</td>
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<td></td>
<td>Aspirational</td>
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<tr>
<td></td>
<td>Unable to recognize landmarks or indicators for arthrocentesis of peripheral joints.</td>
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<td></td>
<td>Does not know or discuss procedure indications, processes, or potential risks with patients</td>
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<td></td>
<td>Possesses sufficient technical skill for safe completion of basic knee and shoulder arthrocentesis with appropriate supervision</td>
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<tr>
<td></td>
<td>Posesses basic technical skill for the completion arthrocentesis of peripheral joints with appropriate supervision (including knees, ankle, wrist)</td>
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<tr>
<td></td>
<td>Consistently demonstrates technical skill to successfully and safely perform arthrocentesis of peripheral joints (including knees, ankle, wrist, elbow and CMC)</td>
</tr>
<tr>
<td></td>
<td>Demonstrates expertise to teach and supervise others in the performance of arthrocentesis of peripheral joints</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Demonstrates skill in performing and interpreting non-invasive procedures and/or testing. (PC4b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular Milestone</td>
<td>Musculoskeletal pain assessment and management (PC4b.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
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<tr>
<td>Question</td>
<td>Attempts to perform or interpret noninvasive procedures and/or testing without sufficient skill or supervision</td>
<td>Perform/document peripheral joint exam for range of motion, swelling, tenderness; spinal exam for motion and radicular abnormalities</td>
<td>Identify effusions, synovial proliferation, specific patter of joint involvement, vasculitis signs/symptoms and extra articular findings of rheumatologic disorders</td>
<td>Consistently recognizes appropriate patients, indications, limitations, and associated risks in utilization of noninvasive procedures and/or testing</td>
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</tr>
<tr>
<td>Musculoskeletal pain assessment and management</td>
<td>Begin the physical examination with peripheral joint exam for range of motion, swelling, tenderness; spinal exam for motion and radicular abnormalities.</td>
<td>Describe nature of skin rashes</td>
<td>Identify effusions, synovial proliferation, specific pattern of joint involvement, vasculitis signs/symptoms and extra articular findings of rheumatologic disorders</td>
<td>Consistently recognizes appropriate patients, indications, limitations, and associated risks in utilization of noninvasive procedures and/or testing</td>
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<tr>
<td>Perform/document peripheral joint exam for range of motion, swelling, tenderness; spinal exam for motion and radicular abnormalities</td>
<td>Describe nature of skin rashes</td>
<td>Identify effusions, synovial proliferation, specific pattern of joint involvement, vasculitis signs/symptoms and extra articular findings of rheumatologic disorders</td>
<td>Consistently recognizes appropriate patients, indications, limitations, and associated risks in utilization of noninvasive procedures and/or testing</td>
<td>Demonstrates skill to independently perform and interpret complex non-invasive procedures and/or testing</td>
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<td>Describe nature of skin rashes</td>
<td>Identify effusions, synovial proliferation, specific pattern of joint involvement, vasculitis signs/symptoms and extra articular findings of rheumatologic disorders</td>
<td>Consistently recognizes appropriate patients, indications, limitations, and associated risks in utilization of noninvasive procedures and/or testing</td>
<td>Demonstrates skill to independently perform and interpret complex non-invasive procedures and/or testing</td>
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<tr>
<td>Identify effusions, synovial proliferation, specific pattern of joint involvement, vasculitis signs/symptoms and extra articular findings of rheumatologic disorders</td>
<td>Consistently recognizes appropriate patients, indications, limitations, and associated risks in utilization of noninvasive procedures and/or testing</td>
<td>Demonstrates skill to independently perform and interpret complex non-invasive procedures and/or testing</td>
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<tr>
<td>Consistently recognizes appropriate patients, indications, limitations, and associated risks in utilization of noninvasive procedures and/or testing</td>
<td>Demonstrates skill to independently perform and interpret complex non-invasive procedures and/or testing</td>
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</tbody>
</table>

**Reportable Milestone** Demonstrates skill in performing and interpreting non-invasive procedures and/or testing. (PC4b)

**Curricular Milestone** Interpretation of radiographs of normal and diseased joints, bones, periarticular structures and prosthetic joint (PC4b.2)

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question Interpretation of radiographs of normal and diseased joints, bones, periarticular structures and prosthetic joint</td>
<td>Unable to understand basic imaging principles and technical considerations in use of imaging (plain radiographs, CT, MRI, ultrasound, and DEXA of joints)</td>
<td>Able to understand basic imaging principles in use of imaging (plain radiographs, CT, MRI, ultrasound, and DEXA of joints) in order to guide diagnosis and management</td>
<td>Usually able to understand basic imaging principles and describe/interpret pertinent radiographic finding (plain radiographs, CT, MRI, ultrasound, and DEXA of joints, peri-articular and vascular exam)</td>
<td>Consistently able to understand basic imaging principles and describe/interpret pertinent radiographic finding (plain radiographs, CT, MRI, ultrasound, and DEXA of joints, peri-articular and vascular exam)</td>
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<td>Understands when to order imaging studies and how to apply them to patient care plan</td>
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</tbody>
</table>

**Reportable Milestone** Demonstrates skill in performing and interpreting non-invasive procedures and/or testing. (PC4b)

**Curricular Milestone** Examination and interpretation of synovial fluid under conventional and polarized light microscopy (PC4b.3)

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Examination and interpretation of synovial fluid under conventional and polarized light microscopy</td>
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<tr>
<td></td>
<td>Unable to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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<td></td>
<td>Unable to identify crystals (MSU/CPPD)</td>
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<tr>
<td></td>
<td>Able to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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<td></td>
<td>Able to identify crystals (MSU/CPPD) with supervision</td>
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<tr>
<td></td>
<td>Usually able to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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<tr>
<td></td>
<td>Able to identify crystals (MSU/CPPD) independently</td>
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<tr>
<td></td>
<td>Consistently interprets synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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<td>Consistently identifies crystals (MSU/CPPD)</td>
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<td></td>
<td>Usually able to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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<td>Able to identify crystals (MSU/CPPD) independently</td>
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<td>Consistently interprets synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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<tr>
<td></td>
<td>Consistently identifies crystals (MSU/CPPD)</td>
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<tr>
<td></td>
<td>Can teach others to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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<tr>
<td></td>
<td>Can teach others to identify crystals (MSU/CPPD)</td>
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<thead>
<tr>
<th>Reportable Milestone</th>
<th>Requests and provides consultative care. (PC5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular Milestone</td>
<td>Provides Rheumatologic consultative care (PC5.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question: Provides Rheumatologic consultative care</td>
<td>Is unresponsive to questions or concerns of others when acting as a consultant or utilizing consultant services</td>
<td>Inconsistently manages patients as a consultant to other physicians/health care teams</td>
<td>Provides consultation services for patients with clinical problems requiring basic risk assessment</td>
<td>Provides consultation services for patients with very complex clinical problems requiring extensive risk assessment</td>
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<table>
<thead>
<tr>
<th>Medical Knowledge</th>
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<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Possesses Clinical Knowledge (MK1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular Milestone</td>
<td>Demonstrates understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of the full range of rheumatic and musculoskeletal disease (MK1.1)</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Critical Deficiencies</th>
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</thead>
<tbody>
<tr>
<td>Question: Demonstrates understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of the full range of rheumatic and musculoskeletal disease</td>
<td>Lacks understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of major rheumatic and musculoskeletal diseases</td>
<td>Possesses insufficient understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of major rheumatic and musculoskeletal diseases</td>
<td>Possesses understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of major rheumatic and musculoskeletal diseases</td>
<td>Has advanced understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of major as well as rare rheumatic and musculoskeletal diseases</td>
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<td></td>
<td>Able to teach pathogenesis, epidemiology, clinical expression, treatments and prognosis of major as well as rare rheumatic and musculoskeletal diseases.</td>
</tr>
<tr>
<td>Reportable Milestone</td>
<td>Knowledge of diagnostic testing and procedures. (MK2)</td>
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<tr>
<td>Curricular Milestone</td>
<td>Knows when to order specific workup and appropriate imaging (MK2.1)</td>
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<tr>
<td><strong>Question</strong></td>
<td>Knows when to order specific workup and appropriate imaging</td>
<td></td>
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</tr>
<tr>
<td><strong>Critical Deficiencies</strong></td>
<td>Does not know when to order specific diagnostic tests or imaging for procedures</td>
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</tr>
<tr>
<td><strong>Basic Competence</strong></td>
<td>Knows when to order specific diagnostic tests or imaging for procedures</td>
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<tr>
<td><strong>Advanced Competence</strong></td>
<td>Develops differential diagnosis of imaging findings. Distinguish inflammatory vs non-inflammatory findings</td>
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<tr>
<td><strong>Ready for unsupervised practice</strong></td>
<td>Understands how to perform quantitative assessment for RA, OA and spondylitis on plain radiography.</td>
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<tr>
<td><strong>Aspirational</strong></td>
<td>Able to teach others salient features of differential diagnosis of imaging findings.</td>
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<thead>
<tr>
<th>Reportable Milestone</th>
<th>Knowledge of diagnostic testing and procedures. (MK2)</th>
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</thead>
<tbody>
<tr>
<td>Curricular Milestone</td>
<td>Understands the biologic rationale for basic serologic test (ANA, RF) acute phase reactants (ESR, CRP) and joint fluid analysis (MK2.2)</td>
</tr>
<tr>
<td><strong>Question</strong></td>
<td>Understands the biologic rationale for basic serologic test (ANA, RF) acute phase reactants (ESR, CRP) and joint fluid analysis</td>
</tr>
<tr>
<td><strong>Critical Deficiencies</strong></td>
<td>Has specific reasons for ordering any laboratory test</td>
</tr>
<tr>
<td><strong>Basic Competence</strong></td>
<td>Understands the nature of RF, anti-CCP, ANA, acute phase reactants</td>
</tr>
<tr>
<td><strong>Advanced Competence</strong></td>
<td>Understands the nature of ANA subsets, cryoglobulins, complement assays and other tests ordered</td>
</tr>
<tr>
<td><strong>Ready for unsupervised practice</strong></td>
<td>Understands the predictive values of tests as ordered</td>
</tr>
<tr>
<td><strong>Aspirational</strong></td>
<td>Reviews testing to assure validity (e.g. be able to reasonably review findings with pathologist)</td>
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</tbody>
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<table>
<thead>
<tr>
<th>System-Based Practice</th>
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<tbody>
<tr>
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<td><strong>Curricular Milestone</strong></td>
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<tr>
<td><strong>Aspirational</strong></td>
</tr>
<tr>
<td>Question</td>
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<tr>
<td><strong>Responsive to nurses’, physical therapists’ and injection nurses’ pages</strong></td>
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<tr>
<td><strong>Understands importance of cost effective care and works towards improved quality and delivery of care for patients</strong></td>
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</table>

**Reportable Milestone** Identifies forces that impact the cost of health care, and advocates for, and practices cost-effective care. (SBP2, SBP3)

**Curricular Milestone** Understands importance of cost effective care and works towards improved quality and delivery of care for patients

**Reportable Milestone** Transitions patients effectively within and across health delivery systems. (SBP4)

**Curricular Milestone** Manages transitions of care and communicates effective across delivery systems and within different health systems (SBP4.1)
<table>
<thead>
<tr>
<th>Question</th>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
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<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manages transitions of care and communicates effective across delivery systems and within different health systems</td>
<td>Disregards need for communication at time of transition</td>
<td>Inconsistently utilizes available resources to coordinate and ensure safe and effective patient care within and across delivery systems</td>
<td>Recognizes the importance of communication during times of transition</td>
<td>Appropriately utilizes available resources to coordinate care and manage conflicts to ensure safe and effective patient care within and across delivery systems</td>
<td>Coordinates care within and across health delivery systems to optimize patient safety, increase efficiency, and ensure high-quality patient outcomes</td>
</tr>
<tr>
<td>Manages transitions of care and communicates effective across delivery systems and within different health systems</td>
<td>Does not respond to requests of caregivers in other delivery systems</td>
<td>Provides incomplete written and verbal care plans during times of transition</td>
<td>Communicates with future caregivers but demonstrates lapses in pertinent or timely information</td>
<td>Actively communicates with past and future caregivers to ensure continuity of care</td>
<td>Role-models and teaches effective transitions of care</td>
</tr>
<tr>
<td></td>
<td>Written and verbal care plans during times of transition are absent</td>
<td>Provides inefficient transitions of care that lead to unnecessary expense or risk to a patient (e.g., duplication of tests, readmission)</td>
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</table>

**Practice-Based Learning and Improvement**

**Reportable Milestone** Monitors practice with a goal for improvement. (PBLI1)

**Curricular Milestone** Is an independent learner: reads on patient’s disorders and disease history (maintains a learning portfolio) (PBLI1.1)

<table>
<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>Is an independent learner: reads on patient’s disorders and disease history (maintains a learning portfolio)</td>
<td>Lacks ability/drive to read about patient disorders and look up evidence-based data to help guide management</td>
<td>Occasionally reads about patient disorders and looks up evidence-based data to help guide management</td>
<td>Consistently reviews and utilizes current literature to guide diagnostic/therapeutic decisions</td>
<td>Demonstrates strong understanding of current literature and consistently uses it to guide diagnostic/therapeutic decisions</td>
<td>Teaches others how to use current literature to guide diagnostic/therapeutic decisions</td>
</tr>
</tbody>
</table>

**Reportable Milestone** Learns and improves via feedback. (PBLI3) (PBL2)

**Curricular Milestone** Incorporates formative evaluation feedback provided by attending to improve patient care (PBLI3.1)
### Question Incorporates formative evaluation feedback provided by attending to improve patient care

- Never solicits feedback. Actively resists feedback from others.
- Rarely seeks feedback and does not incorporate feedback.
- Responds to unsolicited feedback in a defensive fashion.
- Temporarily adjusts performance based on feedback.
- Solicits feedback only from supervisors and inconsistently incorporates feedback.
- Is open to unsolicited feedback.
- Inconsistently incorporates feedback.
- Solicits feedback from all members of the interprofessional team and patients.
- Welcomes unsolicited feedback and consistently incorporates it into practice.
- Performance continuously reflects incorporation of solicited and unsolicited feedback.
- Role-models ability to reconcile disparate or conflicting feedback.

### Reportable Milestone
**Learns and improves at the point of care. (PBLI4)**

### Curricular Milestone
**Learns and utilizes resources and medical literature (PBLI4.1)**

<table>
<thead>
<tr>
<th>Question</th>
<th>Lears and utilizes resources and medical literature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Deficiencies</strong></td>
<td>Fails to acknowledge uncertainty and reverts to a reflexive patterned response even when inaccurate.</td>
</tr>
<tr>
<td><strong>Basic Competence</strong></td>
<td>Rarely reconsiders an approach to a problem, asks for help, or seeks new information. Can translate medical information needs into well-formed clinical questions with assistance. Unfamiliar with strengths and weaknesses of the medical literature. Accepts the findings of clinical research studies without critical appraisal.</td>
</tr>
<tr>
<td><strong>Advanced Competence</strong></td>
<td>Inconsistently reconsiders an approach to a problem, asks for help, or seeks new information. Can translate medical information needs into well-formed clinical questions independently. With assistance, appraises clinical research reports based on accepted criteria.</td>
</tr>
<tr>
<td><strong>Read for unsupervised practice</strong></td>
<td>Analyzes research data, synthesizes practice guidelines and appropriately incorporates new information into clinical practice; Effectively utilizes health information technology. Routinely reconsiders an approach to a problem and translates new medical information needs into well-formed clinical questions.</td>
</tr>
<tr>
<td><strong>Aspirational</strong></td>
<td>Role-models how to appraise clinical research reports based on accepted criteria. Has a systematic approach to track and pursue emerging clinical questions.</td>
</tr>
</tbody>
</table>

### Professionalism

<table>
<thead>
<tr>
<th>Question</th>
<th>Has professional and respectful interactions with patients, caregivers and members of the interprofessional team. (PROF1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Critical Deficiencies</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Basic Competence</strong></td>
<td></td>
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<tr>
<td><strong>Advanced Competence</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Ready for unsupervised practice</strong></td>
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<tr>
<td><strong>Aspirational</strong></td>
<td></td>
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<tr>
<td>Question</td>
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</tr>
<tr>
<td>Has professional and respectful interactions with patients, caregivers and members of the interprofessional team.</td>
<td>Disrespectful in interactions with patients, caregivers, and members of the interprofessional team.</td>
</tr>
<tr>
<td></td>
<td>Sacrifices patient needs in favor of own self-interest.</td>
</tr>
<tr>
<td></td>
<td>Does not demonstrate empathy, compassion, and respect for patients and caregivers.</td>
</tr>
</tbody>
</table>

**Reportable Milestone** Accepts responsibility and follows through on tasks and results of patient test(s) (PROF2)

**Curricular Milestone**

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is consistently unreliable in completing patient care responsibilities or assigned administrative tasks.</td>
<td>Completes most assigned tasks in a timely manner but may need reminders or other support.</td>
<td>Completes administrative and patient care tasks in a timely manner in accordance with local practice and/or policy.</td>
<td>Prioritizes multiple competing demands in order to complete tasks and responsibilities in a timely and effective manner.</td>
<td>Role-models prioritizing many competing demands in order to complete tasks and responsibilities in a timely and effective manner.</td>
</tr>
<tr>
<td>Shuns responsibilities expected of a physician professional.</td>
<td>Accepts professional responsibility only when assigned or mandatory.</td>
<td>Willingly assumes professional responsibility regardless of the situation.</td>
<td>Assists others to improve their ability to prioritize many competing tasks.</td>
<td></td>
</tr>
</tbody>
</table>

**Reportable Milestone** Responds each patient’s unique characteristics and needs. (PROF3)

**Curricular Milestone**
<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Question</th>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exhibits integrity and ethical behavior in professional conduct. (PROF4)</strong></td>
<td>Responds each patient's unique characteristics and needs.</td>
<td>Is insensitive to differences related to personal characteristics and needs in the patient/caregiver encounter</td>
<td>Is sensitive to and has basic awareness of differences related to personal characteristics and needs in the patient/caregiver encounter</td>
<td>Seeks to fully understand each patient's personal characteristics and needs</td>
<td>Recognizes and accounts for the personal characteristics and needs of the patient</td>
<td>Role-models professional interactions to navigate and negotiate differences related to a patient's unique characteristics or needs</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Curricular Milestone</th>
<th>Question</th>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Exhibits integrity and ethical behavior in professional conduct.</strong></td>
<td></td>
<td>Dishonest in clinical interactions, documentation, research, or scholarly activity</td>
<td>Honest in clinical interactions, documentation, research, and scholarly activity</td>
<td>Honest and forthright in clinical interactions, documentation, research, and scholarly activity</td>
<td>Demonstrates integrity, honesty, and accountability to patients, society, and the profession</td>
<td>Assists others in adhering to ethical principles and behaviors, including integrity, honesty, and professional responsibility</td>
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<tr>
<td></td>
<td></td>
<td>Refuses to be accountable for personal actions</td>
<td>Requires oversight for professional actions related to the subspecialty</td>
<td>Demonstrates accountability for the care of patients</td>
<td>Actively manages challenging ethical dilemmas and conflicts of interest</td>
<td>Role-models integrity, honesty, accountability, and professional conduct in all aspects of professional life</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Does not adhere to basic ethical principles</td>
<td>Has a basic understanding of ethical principles, formal policies, and procedures and does not intentionally disregard them</td>
<td>Consistently attempts to recognize and manage conflicts of interest</td>
<td>Regularly reflects on personal professional conduct</td>
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<td>Blatantly disregards formal policies or procedures.</td>
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<td></td>
<td>Fails to recognize conflicts of interest</td>
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</tbody>
</table>

| Interpersonal Communication Skills | Reportable Milestone | Communicates effectively with patients and caregivers. (ICS1) |
### Curricular Milestone: Communicates effectively with patients and caregivers (ICS1)

<table>
<thead>
<tr>
<th>Question</th>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ignores patient preferences for plan of care</td>
<td>Engages patients in discussions of care plans and respects patient preferences when offered by the patient, but does not actively solicit preferences</td>
<td>Engages patients in shared decision-making in uncomplicated conversations</td>
<td>Identifies and incorporates patient preference in shared decision-making in complex patient care conversations.</td>
<td>Role-models effective communication and development of therapeutic relationships in both routine and challenging situations</td>
</tr>
<tr>
<td></td>
<td>Makes no attempt to engage patient in shared decision-making</td>
<td>Defers difficult or ambiguous conversations to others</td>
<td>Requires assistance facilitating discussions in difficult or ambiguous conversations</td>
<td>Quickly establishes a therapeutic relationship with patients and caregivers, including persons of different socioeconomic and cultural backgrounds.</td>
<td>Models cross-cultural communication and establishes therapeutic relationships with persons of diverse socioeconomic and cultural backgrounds</td>
</tr>
</tbody>
</table>

### Reportable Milestone: Communicates effectively in interprofessional teams (ICS2)

### Curricular Milestone: Trainee maintains positive professional relationships with colleagues and staff (ICS2.1)

<table>
<thead>
<tr>
<th>Question</th>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Utilizes communication strategies that hamper collaboration and teamwork</td>
<td>Uses unidirectional communication that fails to utilize the wisdom of the team</td>
<td>Inconsistently engages in collaborative communication with appropriate members of the team</td>
<td>Consistently and actively engages in collaborative communication with all members of the team through verbal, non-verbal, and written communication.</td>
<td>Role models and teaches collaborative communication with the team to enhance patient care, even in challenging settings and with conflicting team member opinions</td>
</tr>
<tr>
<td></td>
<td>Verbal and/or non-verbal behaviors disrupt effective collaboration with team members</td>
<td>Inconsistently employs verbal, non-verbal, and written communication strategies that facilitate collaborative care</td>
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</table>

**Update 6/30/15**
<table>
<thead>
<tr>
<th>Patient Care</th>
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</thead>
<tbody>
<tr>
<td><strong>Reportable Milestone</strong></td>
<td><strong>Curricular Milestone</strong></td>
<td><strong>Critical Deficiencies</strong></td>
<td><strong>Basic Competence</strong></td>
<td><strong>Advanced Competence</strong></td>
<td><strong>Ready for unsupervised practice</strong></td>
</tr>
<tr>
<td>Gathers and synthesizes essential and accurate information to define each patient's rheumatologic clinical problem(s) (PC1) (ICS3)</td>
<td>Clinic notes contain complete patient history (PC1.1)</td>
<td>Documents elements necessary to fulfill CMS guidelines for billing purposes</td>
<td>Obtains detailed history for regional joint disorders and specific joints/spinal levels.</td>
<td>Organizes scenarios into rational progression of events emphasizing more important points</td>
<td>Develops/learns lines of questioning allowing more precise history and promoting patient comfort and interaction.</td>
</tr>
<tr>
<td><strong>Reportable Milestone</strong></td>
<td>Develops and achieves comprehensive management plan for each patient. (PC2)</td>
<td>Trainee is able to synthesize history and studies to form a differential diagnosis (PC2.1)</td>
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</tr>
<tr>
<td>Trainee is able to synthesize history and studies to form a differential diagnosis</td>
<td>Able to determine if a focal or systemic problem; inflammatory vs noninflammatory</td>
<td>Knows the meaning of classification criteria for RA, SLE and other conditions.</td>
<td>Consistently develops differential diagnosis of specific joint findings (e.g. discern spondyloarthritis from RA)</td>
<td>Regularly identifies relative importance of history and exam findings.</td>
<td>Consistently able to discern non-rheumatologic problems in patients with rheumatologic diseases and develop thorough weighted differentials.</td>
</tr>
<tr>
<td><strong>Reportable Milestone</strong></td>
<td>Manages patients with progressive responsibility and independence. (PC3)</td>
<td>Is an independent learner in the management of patient care (reads and applies the pertaining literature) (PC3.1)</td>
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<tr>
<td>Question</td>
<td>Critical Deficiencies</td>
<td>Basic Competence</td>
<td>Advanced Competence</td>
<td>Ready for unsupervised practice</td>
<td>Aspirational</td>
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</tr>
<tr>
<td><strong>Question Is an independent learner in the management of patient care (reads and applies the pertaining literature)</strong></td>
<td>Cannot advance beyond the need for direct supervision in the delivery of patient care.</td>
<td>Requires direct supervision to ensure patient safety and quality care.</td>
<td>Requires indirect supervision to ensure patient safety and quality care.</td>
<td>Independently manages patients across inpatient, outpatient, and ambulatory clinical settings with a broad spectrum of clinical disorders, including undifferentiated syndromes.</td>
<td>Effectively manages unusual, rare, or complex disorders in all appropriate clinical settings and practices evidence based medicine.</td>
</tr>
<tr>
<td></td>
<td>Cannot manage patients who require urgent or emergency care.</td>
<td>Provides appropriate preventive care and able to provide comprehensive care for single or multiple diagnoses.</td>
<td>Independently reviews pertinent literature regarding complex patients in urgent/ICU setting.</td>
<td>Seeks additional guidance and/or consultation as appropriate.</td>
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</tr>
<tr>
<td></td>
<td>Does not assume responsibility for patient management decisions.</td>
<td></td>
<td>Thoroughly reviews literature and appropriate studies to effectively supervise management decisions.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Reportable Milestone</strong></th>
<th><strong>Demonstrates skill in performing and interpreting invasive procedures. (PC4a)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curricular Milestone</strong></td>
<td><strong>Performs arthrocentesis of peripheral joints (PC4a.1)</strong></td>
</tr>
<tr>
<td><strong>Question</strong></td>
<td><strong>Performs arthrocentesis of peripheral joints</strong></td>
</tr>
<tr>
<td><strong>Critical Deficiencies</strong></td>
<td>Unable to recognize landmarks or indicators for arthrocentesis of peripheral joints.</td>
</tr>
<tr>
<td></td>
<td>Does not know or discuss procedure indications, processes, or potential risks with patients.</td>
</tr>
<tr>
<td><strong>Basic Competence</strong></td>
<td>Possesses sufficient technical skill for safe completion of basic knee and shoulder arthrocentesis with appropriate supervision.</td>
</tr>
<tr>
<td><strong>Advanced Competence</strong></td>
<td>Possesses basic technical skill for the completion arthrocentesis of peripheral joints with appropriate supervision (including knees, ankle, and wrist).</td>
</tr>
<tr>
<td><strong>Ready for unsupervised practice</strong></td>
<td>Consistently demonstrates technical skill to successfully and safely perform arthrocentesis of peripheral joints (including knees, ankle, wrist, elbow and CMC).</td>
</tr>
<tr>
<td><strong>Aspirational</strong></td>
<td>Demonstrates expertise to teach and supervise others in the performance of arthrocentesis of peripheral joints.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Reportable Milestone</strong></th>
<th><strong>Demonstrates skill in performing and interpreting non-invasive procedures and/or testing. (PC4b)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curricular Milestone</strong></td>
<td><strong>Musculoskeletal pain assessment and management (PC4b.1)</strong></td>
</tr>
<tr>
<td><strong>Critical Deficiencies</strong></td>
<td>Unable to recognize landmarks or indicators for musculoskeletal pain assessment and management.</td>
</tr>
<tr>
<td><strong>Basic Competence</strong></td>
<td>Possesses sufficient technical skill for the completion arthrocentesis of peripheral joints with appropriate supervision (including knees, ankle, and wrist).</td>
</tr>
<tr>
<td><strong>Advanced Competence</strong></td>
<td>Consistently demonstrates technical skill to successfully and safely perform arthrocentesis of peripheral joints (including knees, ankle, wrist, elbow and CMC).</td>
</tr>
<tr>
<td><strong>Ready for unsupervised practice</strong></td>
<td>Demonstrates expertise to teach and supervise others in the performance of arthrocentesis of peripheral joints.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Question</th>
<th>Attempts to perform or interpret noninvasive procedures and/or testing without sufficient skill or supervision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Musculoskeletal pain assessment and management</td>
<td>Perform/document peripheral joint exam for range of motion, swelling, tenderness; spinal exam for motion and radicular abnormalities; Describe nature of skin rashes</td>
</tr>
<tr>
<td></td>
<td>Identify effusions, synovial proliferation, specific pattern of joint involvement, vasculitis signs/symptoms and extra articular findings of rheumatologic disorders</td>
</tr>
<tr>
<td></td>
<td>Consistently recognizes appropriate patients, indications, limitations, and associated risks in utilization of noninvasive procedures and/or testing</td>
</tr>
<tr>
<td></td>
<td>Consistently performs and interprets noninvasive procedures and/or testing in a safe and effective manner</td>
</tr>
<tr>
<td></td>
<td>Demonstrates skill to independently perform and interpret complex noninvasive procedures and/or testing</td>
</tr>
<tr>
<td></td>
<td>Able to teach physical examination skills to others</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Demonstrates skill in performing and interpreting non-invasive procedures and/or testing. (PC4b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular Milestone</td>
<td>Interpretation of radiographs of normal and diseased joints, bones, periarticular structures and prosthesis joints (PC4b.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Interpretation of radiographs of normal and diseased joints, bones, periarticular structures and prosthesis joint</td>
<td>Unable to understand basic imaging principles and technical considerations in use of imaging (plain radiographs, CT, MRI, ultrasound, and DEXA of joints)</td>
<td>Able to understand basic imaging principles in use of imaging (plain radiographs, CT, MRI, ultrasound, and DEXA of joints) in order to guide diagnosis and management</td>
<td>Usually able to understand basic imaging principles and describe/interpret pertinent radiographic finding (plain radiographs, CT, MRI, ultrasound, and DEXA of joints, peri-articular and vascular exam)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Demonstrates skill in performing and interpreting non-invasive procedures and/or testing. (PC4b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curricular Milestone</td>
<td>Examination and interpretation of synovial fluid under conventional and polarized light microscopy (PC4b.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
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<tbody>
<tr>
<td>Question</td>
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<tr>
<td>Question</td>
<td>Unable to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
<td>Able to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
<td>Usually able to interpret synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
<td>Consistently interprets synovial fluid analysis, including cell count, differential viscosity, protein, glucose and special strains</td>
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</tr>
<tr>
<td>Examination and interpretation of synovial fluid under conventional and polarized light microscopy</td>
<td>Unable to identify crystals (MSU/CPPD)</td>
<td>Able to identify crystals (MSU/CPPD) with supervision</td>
<td>Able to identify crystals (MSU/CPPD) independently</td>
<td>Consistently identifies crystals (MSU/CPPD)</td>
</tr>
<tr>
<td>Reportable Milestone</td>
<td>Requests and provides consultative care. (PC5)</td>
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</tr>
<tr>
<td>Curricular Milestone</td>
<td>Provides Rheumatologic consultative care (PC5.1)</td>
<td></td>
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<tr>
<td>Critical Deficiencies</td>
<td>Basic Competence</td>
<td>Advanced Competence</td>
<td>Ready for unsupervised practice</td>
<td>Aspirational</td>
</tr>
<tr>
<td>Question</td>
<td>Provides Rheumatologic consultative care</td>
<td>Is unresponsive to questions or concerns of others when acting as a consultant or utilizing consultant services</td>
<td>Inconsistently manages patients as a consultant to other physicians/health care teams</td>
<td>Provides consultation services for patients with clinical problems requiring basic risk assessment</td>
</tr>
<tr>
<td>Medical Knowledge</td>
<td></td>
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</tr>
<tr>
<td>Reportable Milestone</td>
<td>Possesses Clinical Knowledge (MK1)</td>
<td></td>
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<tr>
<td>Curricular Milestone</td>
<td>Demonstrates understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of the full range of rheumatic and musculoskeletal disease (MK1.1)</td>
<td></td>
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<tr>
<td>Critical Deficiencies</td>
<td>Basic Competence</td>
<td>Advanced Competence</td>
<td>Ready for unsupervised practice</td>
<td>Aspirational</td>
</tr>
<tr>
<td>Question</td>
<td>Demonstrates understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of the full range of rheumatic and musculoskeletal disease</td>
<td>Lacks understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of major rheumatic and musculoskeletal diseases</td>
<td>Possesses insufficient understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of major rheumatic and musculoskeletal diseases</td>
<td>Possesses understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of major rheumatic and musculoskeletal diseases</td>
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<tr>
<td>Medical Knowledge</td>
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<tr>
<td>Reportable Milestone</td>
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<tr>
<td>Curricular Milestone</td>
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<tr>
<td>Reportable Milestone</td>
<td>Knowledge of diagnostic testing and procedures. (MK2)</td>
<td>Curricular Milestone</td>
<td>Knows when to order specific workup and appropriate imaging (MK2.1)</td>
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<tr>
<td>Critical Deficiencies</td>
<td>Basic Competence</td>
<td>Advanced Competence</td>
<td>Ready for unsupervised practice</td>
<td>Aspirational</td>
</tr>
<tr>
<td>Question Knows when to order specific diagnostic tests or imaging for procedures</td>
<td>Knows when to order specific diagnostic tests or imaging for procedures</td>
<td>Develops differential diagnosis of imaging findings. Distinguish inflammatory vs non-inflammatory findings</td>
<td>Understands how to perform quantitative assessment for RA, OA and spondylitis on plain radiography.</td>
<td>Able to teach others salient features of differential diagnosis of imaging findings.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Knowledge of diagnostic testing and procedures. (MK2)</th>
<th>Curricular Milestone</th>
<th>Understands the biologic rationale for basic serologic test (ANA, RF) acute phase reactants (ESR, CRP) and joint fluid analysis (MK2.2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical Deficiencies</td>
<td>Basic Competence</td>
<td>Advanced Competence</td>
<td>Ready for unsupervised practice</td>
</tr>
<tr>
<td>Question Understands the biologic rationale for basic serologic test (ANA, RF) acute phase reactants (ESR, CRP) and joint fluid analysis</td>
<td>Understands the nature of RF, anti-CCP, ANA, acute phase reactants</td>
<td>Understands the nature of ANA subsets, cryoglobulins, complement assays and other tests ordered</td>
<td>Understands the predictive values of tests as ordered</td>
</tr>
<tr>
<td>Has specific reasons for ordering any laboratory test</td>
<td>Understands the principles of laboratory monitoring. Reviews all studies ordered</td>
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</tr>
</tbody>
</table>

<p>| System-Based Practice |
|----------------------|-----------------------------------------------------|----------------------|---------------------------------------------------------------|
| Reportable Milestone | Identifies forces that impact the cost of health care, and advocates for, and practices cost-effective care. (SBP2, SBP3) | Curricular Milestone | Understands importance of cost effective care and works towards improved quality and delivery of care for patients |
| Critical Deficiencies | Basic Competence | Advanced Competence | Ready for unsupervised practice | Aspirational |
| | | | | |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>Transitions patients effectively within and across health delivery systems. (SBP4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Curricular Milestone</strong></td>
<td>Manages transitions of care and communicates effective across delivery systems and within different health systems (SBP4.1)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disregards need for communication at time of transition</td>
<td>Inconsistently utilizes available resources to coordinate and ensure safe and effective patient care within and across delivery systems</td>
<td>Recognizes the importance of communication during times of transition</td>
<td>Appropriately utilizes available resources to coordinate care and manage conflicts to ensure safe and effective patient care within and across delivery systems</td>
<td>Coordinates care within and across health delivery systems to optimize patient safety, increase efficiency, and ensure high-quality patient outcomes</td>
</tr>
<tr>
<td>Does not respond to requests of caregivers in other delivery systems</td>
<td>Provides incomplete written and verbal care plans during times of transition</td>
<td>Communicates with future caregivers but demonstrates lapses in pertinent or timely information</td>
<td>Actively communicates with past and future caregivers to ensure continuity of care</td>
<td>Role-models and teaches effective transitions of care</td>
</tr>
<tr>
<td>Written and verbal care plans during times of transition are absent</td>
<td>Provides inefficient transitions of care that lead to unnecessary expense or risk to a patient (e.g., duplication of tests, readmission)</td>
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</tbody>
</table>

**Reportable Milestone**

- **Manages transitions of care and communicates effective across delivery systems**
- **Transitions patients effectively within and across health delivery systems. (SBP4)**

**Milestone Details**

- **SBP4.1**
  - Effective care
  - Communication
  - Transitions
  - Quality improvement

**SBP4**

- Patient safety
- Efficiency
- Standard care
- Quality improvement

**SBP3**

- Patient safety
- Efficiency
- Standard care
- Quality improvement

**SBP2**

- Patient safety
- Efficiency
- Standard care
- Quality improvement

**SBP1**

- Patient safety
- Efficiency
- Standard care
- Quality improvement
## Practice-Based Learning and Improvement

<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Curricular Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitors practice with a goal for improvement. (PBLI1)</td>
<td>Is an independent learner: reads on patient’s disorders and disease history (maintains a learning portfolio) (PBLI1.1)</td>
</tr>
</tbody>
</table>

### Critical Deficiencies

**Question Is an independent learner: reads on patient's disorders and disease history (maintains a learning portfolio)**

- Lacks ability/drive to read about patient disorders and look up evidence-based data to help guide management

### Basic Competence

- Occasionally reads about patient disorders and looks up evidence-based data to help guide management

### Advanced Competence

- Consistently reviews and utilizes current literature to guide diagnostic/therapeutic decisions

### Ready for unsupervised practice

- Demonstrates strong understanding of current literature and consistently uses it to guide diagnostic/therapeutic decisions

### Aspirational

- Teaches others how to use current literature to guide diagnostic/therapeutic decisions

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<table>
<thead>
<tr>
<th>Reportable Milestone</th>
<th>Curricular Milestone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learns and improves via feedback. (PBLI3) (PBL2)</td>
<td>Incorporates formative evaluation feedback provided by attending to improve patient care (PBLI3.1)</td>
</tr>
</tbody>
</table>

### Critical Deficiencies

**Question Incorporates formative evaluation feedback provided by attending to improve patient care**

- Never solicits feedback
- Actively resists feedback from others

### Basic Competence

- Rarely seeks feedback and does not incorporate feedback
- Responds to unsolicited feedback in a defensive fashion
- Temporarily adjusts performance based on feedback

### Advanced Competence

- Solicits feedback only from supervisors and inconsistently incorporates feedback
- Is open to unsolicited feedback
- Inconsistently incorporates feedback

### Ready for unsupervised practice

- Solicits feedback from all members of the interprofessional team and patients
- Welcomes unsolicited feedback and consistently incorporates it into practice

### Aspirational

- Performance continuously reflects incorporation of solicited and unsolicited feedback
- Role-models ability to reconcile disparate or conflicting feedback

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<table>
<thead>
<tr>
<th>Reportable Milestone</th>
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</thead>
<tbody>
<tr>
<td>Learns and improves at the point of care. (PBLI4)</td>
<td>Learns and utilizes resources and medical literature (PBLI4.1)</td>
</tr>
</tbody>
</table>

### Critical Deficiencies

### Basic Competence

### Advanced Competence

### Ready for unsupervised practice

### Aspirational
<table>
<thead>
<tr>
<th>Question</th>
<th>Learning and utilizing resources and medical literature</th>
<th>Fails to acknowledge uncertainty and reverts to a reflexive patterned response even when inaccurate</th>
<th>Rarely reconsiders an approach to a problem, asks for help, or seeks new information</th>
<th>Inconsistently reconsiders an approach to a problem, asks for help, or seeks new information</th>
<th>Analyzes research data, synthesizes practice guidelines and appropriately incorporates new information into clinical practice; Effectively utilizes health information technology.</th>
<th>Role-models how to appraise clinical research reports based on accepted criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Can translate medical information needs into well-formed clinical questions with assistance</td>
<td>Unfamiliar with strengths and weaknesses of the medical literature</td>
<td>Accepts the findings of clinical research studies without critical appraisal</td>
<td>Routinely reconsiders an approach to a problem and translates new medical information needs into well-formed clinical questions</td>
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<tr>
<td>Professionalism</td>
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<tr>
<td>Reportable Milestone</td>
<td>Has professional and respectful interactions with patients, caregivers and members of the interprofessional team. (PROF1)</td>
<td></td>
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<td>Has a systematic approach to track and pursue emerging clinical questions</td>
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<tr>
<td>Curricular Milestone</td>
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<td>Question</td>
<td>Has professional and respectful interactions with patients, caregivers and members of the interprofessional team.</td>
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<td></td>
<td>Inconsistently demonstrates empathy, compassion, and respect for patients and caregivers</td>
<td>Consistently respectful in interactions with patients, caregivers, and members of the interprofessional team, even in challenging situations</td>
<td>Demonstrates empathy, compassion, and respect to patients and caregivers in all situations</td>
<td>Role-models compassion, empathy, and respect for patients and caregivers</td>
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<td>Inconsistently demonstrates responsiveness to patients’ and caregivers’ needs in an appropriate fashion</td>
<td>Is available and responsive to needs and concerns of patients, caregivers, and members of the interprofessional team</td>
<td>Anticipates, advocates for, and actively works to meet the needs of patients and caregivers</td>
<td>Advocacy for patient and caregivers</td>
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<td></td>
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<td>Inconsistently considers patient privacy and autonomy</td>
<td>Emphasizes patient privacy and autonomy in all interactions</td>
<td>Aware of physician and colleague self-care and wellness</td>
<td>Fosters collegiality that promotes a high-functioning interprofessional team</td>
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<tr>
<td>Reportable Milestone</td>
<td>Accepts responsibility and follows through on tasks and results of patient test(s) (PROF2)</td>
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<tr>
<td>Curricular Milestone</td>
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<tr>
<td>Question Accepts responsibility and follows through on tasks and results of patient test(s)</td>
<td>Is consistently unreliable in completing patient care responsibilities or assigned administrative tasks</td>
<td>Completes most assigned tasks in a timely manner but may need reminders or other support</td>
<td>Completes administrative and patient care tasks in a timely manner in accordance with local practice and/or policy</td>
<td>Prioritizes multiple competing demands in order to complete tasks and responsibilities in a timely and effective manner</td>
<td>Role-models prioritizing many competing demands in order to complete tasks and responsibilities in a timely and effective manner</td>
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<tr>
<td></td>
<td>Shuns responsibilities expected of a physician professional</td>
<td>Accepts professional responsibility only when assigned or mandatory</td>
<td></td>
<td>Willingly assumes professional responsibility regardless of the situation</td>
<td>Assists others to improve their ability to prioritize many competing tasks</td>
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<tr>
<td>Reportable Milestone Responds each patient’s unique characteristics and needs. (PROF3)</td>
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<td>Advanced Competence</td>
<td>Ready for unsupervised practice</td>
<td>Aspirational</td>
<td></td>
</tr>
<tr>
<td>Question Responds each patient’s unique characteristics and needs.</td>
<td>Is insensitive to differences related to personal characteristics and needs in the patient/caregiver encounter</td>
<td>Is sensitive to and has basic awareness of differences related to personal characteristics and needs in the patient/caregiver encounter</td>
<td>Seeks to fully understand each patient’s personal characteristics and needs</td>
<td>Recognizes and accounts for the personal characteristics and needs of the patient</td>
<td>Role-models professional interactions to navigate and negotiate differences related to a patient’s unique characteristics or needs</td>
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</tr>
<tr>
<td></td>
<td>Is unwilling to modify care plan to account for a patient’s unique characteristics and needs</td>
<td></td>
<td>Modifies care plan to account for a patient’s unique characteristics and needs with partial success; e.g.) completes FMLA; engages with social worker when appropriate</td>
<td>Appropriately modifies care plan to account for a patient’s unique characteristics and needs</td>
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<tr>
<td>Reportable Milestone Exhibits integrity and ethical behavior in professional conduct. (PROF4)</td>
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<td>Curricular Milestone</td>
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<tr>
<td>Question</td>
<td>Dishonest in clinical interactions, documentation, research, or scholarly activity</td>
<td>Honest in clinical interactions, documentation, research, and scholarly activity</td>
<td>Honest and forthright in clinical interactions, documentation, research, and scholarly activity</td>
<td>Demonstrates integrity, honesty, and accountability to patients, society, and the profession</td>
<td>Assists others in adhering to ethical principles and behaviors, including integrity, honesty, and professional responsibility</td>
<td>Role-models integrity, honesty, accountability, and professional conduct in all aspects of professional life</td>
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<tr>
<td>Exhibits integrity and ethical behavior in professional conduct.</td>
<td>Refuses to be accountable for personal actions</td>
<td>Requires oversight for professional actions related to the subspecialty</td>
<td>Demonstrates accountability for the care of patients</td>
<td>Actively manages challenging ethical dilemmas and conflicts of interest</td>
<td>Identifies and manages conflicts of interest</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does not adhere to basic ethical principles</td>
<td>Has a basic understanding of ethical principles, formal policies, and procedures and does not intentionally disregard them</td>
<td>Consistently attempts to recognize and manage conflicts of interest</td>
<td>Regularly reflects on personal professional conduct</td>
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<tr>
<td></td>
<td>Blatantly disregards formal policies or procedures.</td>
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<tr>
<td></td>
<td>Fails to recognize conflicts of interest</td>
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</tbody>
</table>

Interpersonal Communication Skills

Reportable Milestone **Communicates effectively with patients and caregivers. (ICS1)**

Curricular Milestone **Communicates effectively with patients and caregivers. (ICS1)**

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question <strong>Communicates effectively with patients and caregivers.</strong></td>
<td>Ignores patient preferences for plan of care</td>
<td>Engages patients in discussions of care plans and respects patient preferences when offered by the patient, but does not actively solicit preferences</td>
<td>Engages patients in shared decision-making in uncomplicated conversations</td>
<td>Identifies and incorporates patient preference in shared decision-making in complex patient care conversations.</td>
</tr>
<tr>
<td></td>
<td>Makes no attempt to engage patient in shared decision-making</td>
<td>Defer difficult or ambiguous conversations to others</td>
<td>Requires assistance facilitating discussions in difficult or ambiguous conversations</td>
<td>Quickly establishes a therapeutic relationship with patients and caregivers, including persons of different socioeconomic and cultural backgrounds</td>
</tr>
<tr>
<td></td>
<td>Routinely engages in antagonistic or counter-therapeutic relationships with patients and caregivers</td>
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</tbody>
</table>

Reportable Milestone **Communicates effectively in interprofessional teams. (ICS2)**

Curricular Milestone **Trainee maintains positive professional relationships with colleagues and staff (ICS2.1)**

<table>
<thead>
<tr>
<th>Critical Deficiencies</th>
<th>Basic Competence</th>
<th>Advanced Competence</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>Role-models effective communication and development of therapeutic relationships in both routine and challenging situations</td>
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<td></td>
<td>Models cross-cultural communication and establishes therapeutic relationships with persons of diverse socioeconomic and cultural backgrounds</td>
</tr>
<tr>
<td><strong>Question</strong>: Trainee maintains positive professional relationships with colleagues and staff</td>
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<tr>
<td>Utilizes communication strategies that hamper collaboration and teamwork</td>
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<tr>
<td>Verbal and/or non-verbal behaviors disrupt effective collaboration with team members</td>
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<tr>
<td>Uses unidirectional communication that fails to utilize the wisdom of the team</td>
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<tr>
<td>Consistently engages in collaborative communication with all members of the team through verbal, non-verbal, and written communication.</td>
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<tr>
<td>Inconsistently engages in collaborative communication with appropriate members of the team</td>
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</tr>
<tr>
<td>Inconsistently employs verbal, non-verbal, and written communication strategies that facilitate collaborative care</td>
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</tr>
<tr>
<td>Consistently and actively engages in collaborative communication with all members of the team</td>
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<tr>
<td>Role models and teaches collaborative communication with the team to enhance patient care, even in challenging settings and with conflicting team member opinions</td>
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</tbody>
</table>

**Update 6/30/15**