University of Texas Medical Branch
Rheumatology
Fellowship Curriculum
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Rheumatology Fellowship Training Program at UTMB
Faculty and Personnel Roster

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The goal of the rheumatology fellowship training program at UTMB is to produce physicians who are clinically competent to practice rheumatology in all clinical settings. It is the expectation that fellows will develop habits of life-long learning that will contribute to knowledge, scholarship, and personal development. To achieve this goal, trainees will be expected to develop competency in the key areas of 1) medical knowledge, 2) patient care, 3) practice-based learning and improvement, 4) systems-based practice, 5) interpersonal and communication skills, and 6) professionalism. The expectations for each core competency, the means of acquisition, and the evaluation processes for each are outlined in the following sections.

I. Medical Knowledge

The subspecialty of rheumatology includes a wide array of autoimmune, inflammatory, and degenerative diseases 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.

Fellows will be expected to acquire adequate knowledge of normal and pathogenic processes of the immune system to 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 allied health professionals for the treatment of rheumatic diseases in order to manage the care of their patients effectively. Trainees will be expected to develop the cognitive skills necessary to apply this detailed knowledge to problem solving for diagnosis, treatment and research of the rheumatic diseases.

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

Fellows are thus expected to acquire knowledge of the essential areas outlined below with expanded specific topics found in Appendix 1.

**Basic Sciences**
- A. Anatomy and biology of musculoskeletal tissues
- B. Immunology
- C. Purine and uric acid metabolism
- D. Biomechanics of bones, joints, and muscles
- E. Neurobiology of Pain

**Clinical Sciences**
- A. Rheumatic Diseases
- B. Pediatric rheumatic diseases:
- C. Therapeutic modalities and strategies

**Diagnostic Testing**
- A. Laboratory tests.
- B. Diagnostic imaging techniques
- C. Synovial fluid analysis
- D. Test-performance characteristics

**Research Principles**
- A. Principles and methods of epidemiological research
- B. Principles of clinical research
- C. Evidence-based medicine: Data analysis, biostatistics, meta-analysis and medical informatics
- D. Laboratory techniques

**Medical Knowledge: Methods for Acquisition**

The fund of knowledge obtained through this curriculum should serve as the foundation for understanding the pathogenesis, diagnosis, and treatment of the rheumatic diseases. The methods and resources for acquiring the body of medical knowledge include, but are not limited to:

1) **Didactic teaching**
   - a) Weekly UTMB Fellowship Clinical Lecture Series
   - b) Weekly Allergy – Rheumatology Immunology Lecture Series
   - c) Weekly Radiology Conference
   - d) Weekly Journal club sessions
   - e) Weekly medical grand rounds
   - f) Monthly Rheumatology Pathology Conference
   - g) Monthly Texas Medical Center (TMC) rheumatology grand rounds in Houston.

2) **Independent & Directed Reading**
   - a) Standard Rheumatology Textbooks
   - b) Journal articles and participation in the weekly Journal Club
   - c) Internet based research and study including the ACR website
3) Clinical laboratory experience, including Dr. Silvia Pierangeli’s antiphospholipid laboratory

4) Research experience
   a) Participation in Departmental Research conferences
   b) Second year Fellowship research project

5) Attendance at regional and national meetings and conferences

Medical Knowledge: Performance Markers

The fellow is expected to know and apply basic and clinical science relevant to rheumatology and should demonstrate an analytic and investigatory approach to clinical situations.

Basic Science – The fellow should be able to demonstrate understanding of anatomy, basic immunology, cell biology and metabolism pertaining to the rheumatic diseases in both didactic and clinical settings.

Clinical Science – The fellow demonstrates understanding of pathogenesis, epidemiology, clinical expression, treatments and prognosis of the full range of rheumatic and musculoskeletal disease in both didactic and clinical settings.

Diagnostic Testing – The fellow displays an understanding of the biological and physical and basis of the range of diagnostic testing in rheumatology and the clinical test characteristics of these procedures.

Research Principles: The fellow should be able to:
   A. Demonstrate an understanding of the essential components of clinical study design, patient assessment and data analysis.
   B. Exhibit familiarity with the common experimental approaches used in laboratory, clinical and epidemiology research.
   C. Exhibit familiarity with the principles of the ethical conduct of research and the ability to apply these principles in the conduct of their own research during fellowship.

Medical Knowledge: Evaluation Methods

1) Quarterly Faculty performance rating – with regard to medical knowledge
2) Fellowship Lecture Evaluations
3) Resident & Student Evaluations
4) Formal oral or written exams including the national in-service examination done online
5) Mentor evaluation of trainee’s research performance
6) Documentation of educational activities & conference attendance in the Fellowship Portfolio
7) Evaluation Committee Yearly Review
Suggested Reading List and Web Links

1. Major textbooks of rheumatology
3. ACR Suggested Reading List for Rheumatology Fellows
   http://www.rheumatology.org/educ/training/readinglist/index.asp?aud=mem
4. Up-To-Date http://www.utdol.com
5. UTMB Fellowship Lectures on S: drive

II. Patient Care

The ability to provide quality patient care is the ultimate goal of clinical training in rheumatology. Fellows must obtain competence in patient care to the level expected of a new practitioner.

Definition
Patient Care is to provide service for patients 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 with a rheumatologic problem.

This may broadly be categorized under four components:
1) Information Gathering
   a) Obtaining the history
   b) Performing a careful physical examination
   c) Obtaining appropriate tests, including laboratory tests, imaging studies, and other testing as is appropriate for the suspected diagnosis.

2) Synthesis of Treatment Plan that includes informed medical decision making based on up-to-date scientific information and clinical judgment that also accounts for patient preferences and circumstances.

3) Implementation of Treatment
   a) Prescribing medications and rehabilitation
   b) Patient education and counseling
   c) Preventive medicine and proactive care
   d) Therapeutic aspiration and injection
   e) Utilization of allied health care professionals, including those from other disciplines

4) Reassessment and patient follow up
   a) Assessment of treatment response
   b) Recognition of treatment related adverse events
Patient Care: Methods for Acquisition
Learning the essentials of patient care is primarily acquired by caring for patients in the outpatient clinic as well as the inpatient (hospitalized) settings. These supervised experiences are the focus of clinical training where the trainee observes skilled clinician role models, and participates with the patient in the management of their rheumatologic problem.

Situations in which facets of patient care are taught and learned include:
1) Didactic teaching - conferences, lectures, or discussions
2) Clinical experience in a supervised, mentored clinical setting
3) Interactive case-based discussions
4) Independent reading - recommended textbooks, journal articles and internet based research and study
5) Attendance at regional and national clinical meetings and conferences
6) Preparation of patient care portfolios

Patient Care: Performance Markers
The fellow should be able to achieve competency in the following areas
1) Information Gathering
2) Synthesis of Treatment Plan
3) Implementation of Treatment
4) Reassessment and patient follow up
(See the expanded list of Performance Markers listed in detail that the fellow is expected to achieve in Appendix II)

Patient Care Evaluation Methods
1) Faculty performance rating – with regard to patient care
2) Evaluation committee
3) Chart review – for patient care, drug prescribing, or outcomes
4) Clinical evaluation exercise (mini-CEX)
5) 360 evaluations
6) Portfolio review

Suggested Reading List and Web Links
2. The American Board of Internal Medicine has published a series of trainee evaluation tools including guidelines and forms for a Mini-CEX and several professional associate rating forms that can be used to rate fellow performance. https://www.abim.org/resources/publications/index.shtm and https://www.abim.org/resources/publications/SSGENDER1.pdf

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

Definition

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

Essential Components

In addition to structured learning of the basic components of medical knowledge and patient care, the rheumatologist must evaluate their knowledge base and care delivery on an ongoing basis with the goal of continually improving that care.

This process includes the following components:

1) Independent learning-
The ability to access and critically appraise appropriate information systems and sources to improve understanding of underlying pathology, assess the accuracy of diagnoses, and gauge appropriateness of therapeutic interventions for the patient population they encounter.

2) Self-evaluation of performance-
The effective rheumatologist must engage in ongoing self-assessment activities. This includes the ability to continuously self-evaluate learning needs and to monitor practice behaviors and outcomes to ascertain whether clinical decisions and therapeutic interventions are effective, and adhere to accepted standards of care.

3) Incorporation of feedback into improvement of clinical activity
The ability to appropriately interpret results of clinical outcome studies, practice data, quality improvement measures, and faculty/peer feedback and evaluations and apply them to patient care and practice behavior.

Methods for Acquisition

1) Clinical experience in a supervised, mentored clinical setting
2) Independent reading - recommended textbooks, journal articles and internet based research and study
3) Faculty-facilitated group discussions and tutorials
4) Faculty role modeling
5) Interactive case-based discussions
6) Systematic chart review of their own patients
7) Preparation of patient care portfolios
8) Presentations to peers and lay audiences
9) Participation in individual or group quality improvement projects

Performance Markers
1) Independent learning - the fellow should be able to:

A. Utilize information technology to search, retrieve, and interpret medical information relevant to the care of patients with rheumatic disease from sources such as:
   1. Peer-reviewed clinical journal articles
   2. Clinical case reports
   3. Internet-based resources such as Up-To-Date
   4. Clinical performance guidelines published by the ACR and other groups
   5. Conversations with colleagues and peers
   6. CME activities including attendance at national and regional meetings

B. Critically evaluate and interpret the medical literature using knowledge of clinical study methodology, statistics and methods of health services research.

C. Apply learned concepts and conclusions from studies and case reports to the care of individual patients.

D. Facilitate the learning of students and other health care professionals.
   1 Self-evaluation of performance - the fellow should be able to use a systematic approach, such as a chart review, to analyze own practice and identify learning or practice improvement needs.
   2 Incorporation of feedback into improvement of clinical activity - the fellow should be able to:
      a. Demonstrate the ability to improve own practice based upon specific feedback and learned concepts.
      b. Assess the impact of practice improvements on the care of own patients.
      c. Implement global quality improvement measures in own practice.

Evaluation Methods
1) Faculty performance rating - with regard to demonstration of reflective learning in clinical venues.
2) Evaluation committee - review of trainee presentations, portfolio-based presentations, and journal article reviews related to practice-based learning and improvement.
3) Portfolio review - with respect to residents' narratives of critical incidences or other experiences (usually accompanied by reflection on the event), and practice improvement.

Suggested Reading List and Web Links
IV. Systems-based Practice

The increasing complexity and diversity of health care delivery systems presents both challenges and opportunities for the practice of rheumatology. Knowledge of the nature and variety of the external and internal systems that can impact clinical practice and the effective utilization of that knowledge to positively impact patient care is an essential skill. Trainee competence in such systems-based practice includes an understanding of how their own practices affect others, and knowing how to partner with others to improve health care.

Definition

Systems-based practice is behavior that 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

1) Systems: a concept of “systems thinking” in health care delivery

This includes an understanding of the limitations and opportunities of various types of rheumatology practices and delivery systems, practice management strategies, managed care and health insurance issues. It also comprises an ongoing analysis of the strengths and weaknesses of the local academic system, in both the inpatient and outpatient settings, and its impact on the health care delivery to rheumatic patients. In particular, efforts should be made to identify potentially correctable systematic weaknesses and medical errors due to systems failure and to develop strategies to rectify the problems (i.e. Quality Improvement projects).

2) Partners in health care delivery: the various providers and resources available to deliver optimal care

The principal partners in delivering health care to rheumatic patients include providers such as nurses, physiatrists, orthopedists and allied health professionals available within the local healthcare system. Partners also include outside volunteer agencies, both locally and nationally, such as the American College of Rheumatology, the Arthritis Foundation, the disease-specific foundations (Lupus, Scleroderma, Ankylosing Spondylitis, etc), the National Institute of Arthritis, Musculoskeletal and Skin Diseases (NIAMS) and pharmaceutical companies that have specific patient-related initiatives. Other agencies that 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).

3) Advocacy for the patient: the importance, opportunities and limits of patient advocacy

This advocacy might consist of assisting patients with applications for
Medicaid disability, completing preauthorization documents for the use of certain medications and appealing to HMOs with respect to denial of certain treatments, benefits and claims.

4) Cost-effective health care: the principles of cost allocation and resource management within the external (state, national) and local systems. This includes knowledge of the cost and availability of certain drugs (and unavailability of others) on the trainee’s hospital formulary, the mechanisms by which compensation (by CMS and other carriers) is dependent upon the delivery of various levels of service to patients and the methods in place for Quality Review of inpatient and outpatient practice patterns. The utilization of evidence based cost-conscious strategies for the diagnosis and treatment of patients with rheumatic diseases is paramount.

Methods for Acquisition
1) Clinical experience in a supervised, mentored clinical setting
2) Didactic teaching - conferences, lectures, or discussions that highlight particular systems-based practice issues, including multidisciplinary conferences related to individual patients
3) Faculty-facilitated group discussions and tutorials used to identify systematic problems in patient care delivery
4) Independent reading specifically related to systems-based practice issues.
5) Preparation of patient care portfolios.
    Appropriate portfolio entries might include:
    a. Documentation of instances of leadership in the multidisciplinary management of complicated patients, of utilization of outside resources for patient care, of patient advocacy.
    b. Participation in a project to modify the patient medical record system (electronic medical record or hard copy system).
    c. Participation in a program to improve triage system in ER for patients with acute rheumatic disease.
    d. Developing an outpatient system that would allow patients with acute rheumatic complaints appointments within 24 hrs.
    e. Outpatient records survey for compliance with evidence-based diagnostic or therapeutic guidelines and development of strategies to correct deficiencies, e.g. laboratory monitoring of patients on DMARDs, PPD testing before TNF antagonists.
6) Participation in individual or group quality improvement projects

Performance Markers
1) Systems: The fellow should be able to:

   A. Demonstrate knowledge about how different health care delivery systems affect the management of patients with rheumatic diseases.

   B. Practice management: be familiar with types of practice, equipment, insurance, economics, personnel, ethical aspects, quality assurance, and managed care issues relating to the practice of rheumatology.
C. Identify the strengths and weaknesses of the system in which they are training and practicing. They should also demonstrate the ability to develop strategies to overcome systematic problems they have identified, and/or QI projects to improve it.

D. Be familiar with the history of rheumatology, and national organizations such as the American College of Rheumatology, the Arthritis Foundation, and the Association of Rheumatology Health Professionals.

E. Understand the influence on rheumatology of the American Medical Association, Food and Drug Administration, CMS and other governmental agencies involved in health care legislation, and peer review organizations.

2) Partners: The fellow should be able to utilize multiple providers and resources as needed for optimal patient care.

A. Understand the rheumatologist’s role as well as when to consult other health professionals (physiatrist, nurse practitioner, visiting nurse, physical therapist, occupational therapist, podiatrist, social worker, vocational rehabilitation counselor, psychologist, others) in the outpatient and inpatient rehabilitation of patients with rheumatic diseases.

B. Demonstrate the ability to educate patients about outside resources which might be of assistance to their physical, emotional and financial well being. Examples of these external resources include the Arthritis Foundation self-help groups, Lupus Foundation support groups and pharmaceutical company initiated financial aid programs.

3) Advocacy

A. The rheumatology fellow should demonstrate the ability to act as effective advocates for quality care for their patients in a variety of needs, such as dealing with insurance companies and HMO’s, for preauthorizations for medications, filing disability claims, etc.

B. The fellow should demonstrate the ability to assist patients in dealing with health system complexities.

4) Cost effective care

A. The fellow should know the local costs of medications they prescribe, rheumatologic lab tests they order and commonly used diagnostic tests and procedures.

B. The fellow should demonstrate a commitment to the practice of appropriate evidence-based cost-conscious patient care.

Evaluation Methods
1) Faculty performance rating with the quarterly fellowship evaluation in regard to demonstration of effective systems-based performance markers.
   (An example would be an assessment of the trainee’s performance in
assembling and leading multidisciplinary health care teams in the management of inpatients (e.g. a complicated SLE patient) and outpatients (e.g. a severe rheumatoid arthritis patient). This might involve directing patient management with social work, physical and occupational therapists, rehabilitation medicine specialists, orthopedics, and/or geriatrics.)

2) Patient survey - with components that specifically address advocacy issues and cost effective health care delivery.
3) 360 evaluations
4) Portfolio review - for documentation of systems-based practice performance markers, including QI projects.
5) Formal written or oral exam – testing for knowledge about SBP issues

Suggested Reading List and Web Links

V. Interpersonal and Communications Skills

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

Definition:
Interpersonal and communication skills are those verbal and written abilities that result in the effective exchange of information and collaboration with patients, their families, and other health professionals.

Essential Components:
1) Gathering information:
Reliable and effective communication depends upon the availability of accurate and complete information obtained from patients, their family and the complete medical record. This requires the use of effective listening and communication skills.

2) Understanding and incorporating patient's perspective into care:
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 the physician’s treatment efforts.

3) Providing Information:
Communication regarding disease causation, diagnosis and treatment is only as effective as the ability of the recipient to understand the information. Effective explanation therefore requires that the physician communicate in a manner that is understandable to the listener.

4) Trust:
   Establishment of trust with patient and patient's family.

Methods of Acquisition
1) Clinical experience in a supervised, mentored clinical setting
2) Faculty role modeling
3) Independent reading
4) Faculty-facilitated group discussions and tutorials
5) Interactive case-based discussions
6) Systematic chart review of their own patients
7) Presentations to peers and lay audiences
8) Participation in quality assurance/improvement initiatives

Performance Markers
1) Gathering information - the fellow should be able to:
   A. Use effective verbal, nonverbal, listening, questioning and explanatory skills to obtain a complete and accurate history.
   B. Obtain properly informed consent.
2) Understanding and incorporating patient's perspective - the fellow should be able to:
   A. Reliably and accurately communicate the patient's and their family's views and concerns to others.
   B. Interact with patients in an empathic and understandable manner.
3) Providing information - the fellow should be able to:
   A. Write clear and effective consultations in the medical record and in letters to referring physicians.
   B. Work effectively with colleagues and peers as a member or leader of a health care team.
   C. Clearly explain benefits and risks of treatment.
   D. Display effective teaching skills to colleagues and patients.
4) Trust - the fellow should be able to:
   A. Create and maintain an effective therapeutic and ethically sound relationship with patients over time.

Evaluation Methods
1) Faculty performance rating with the quarterly evaluation with respect to communication skills and interpersonal relations
2) 360 Evaluations
3) Clinical evaluation exercise (CEX)
4) Fellowship lecture evaluations
5) Fellow Portfolio review

Suggested Reading List and Web Links
VI. Professionalism

Professionalism is one of the foundations of the practice of medicine and is frequently an inherent character trait in a well-rounded physician. By virtue of their prior medical school and internal medicine training, rheumatology fellows have already attained a substantial level of professionalism, which can be refined during the fellowship training period. The range of current therapies, including biologic agents, and the complexity of many severe or life threatening rheumatic diseases that require potentially toxic chemotherapeutic agents, place rheumatology trainees in close contact with referring providers, subspecialty consultants, allied health care providers, and hospital and health insurance administrators during the care of their patients. Trainees in many programs also interact with patients from a wide range of cultural and socioeconomic backgrounds. In addition, fellows are increasingly targeted by the pharmaceutical industry in an attempt to influence prescribing habits at an early phase of their careers. A substantial level of professionalism is thus required to maintain the balance required to be an effective rheumatologist.

Definition

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

Essential Components

1) 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.

2) Physician autonomy in medical decision making:

While an increasing array of bureaucratic, administrative and economic forces continue to limit physician autonomy, some degree of autonomy at the level of medical decision making must be preserved by the physician in order to maintain the primacy of interest.

3) Physician responsibility and accountability:

The practice of medicine incurs responsibility and accountability to:

- Patients
- Colleagues
- Society
- Self
4) Humanistic qualities and altruism
Physicians should provide compassionate care and serve all patients with respect to their cultural, emotional, spiritual and social needs.

5) Ethical behavior
This includes being trustworthy and cognizant of conflicts of interest. Integrity as a physician and consultant rheumatologist must pervade all of the components of professionalism.

Methods for Acquisition
Professionalism can be fostered throughout the fellowship training period beginning with an emphasis on the essential components of professionalism and the specific performance goals at the beginning of the fellowship.
1) Faculty role modeling. A culture of professionalism in the training environment is created by mentors, role model clinicians, and a resident culture that demonstrate the values of professionalism and a spirit of collegiality in placing the needs of patients first, maintaining a commitment to scholarship, helping colleagues meet their responsibilities, establishing a commitment to continuous quality improvement, and being responsive to society's healthcare needs. A commitment to professional ethics is demonstrated by establishing and maintaining a high standard of moral and ethical behavior within the clinical setting in the care of patients, in the education of residents, in conducting research, and in interacting with medical device and pharmaceutical companies and funding organizations.
2) Participation in professional activities. Trainees should be given the opportunity to participate in community service, professional organizations, and institutional committee activities.
3) Clinical experience in a supervised, mentored clinical setting - to provide experiential learning opportunities to observe and practice the key components of professionalism. Faculty can be encouraged to highlight pertinent professional issues with their fellows at the bedside, at weekly conferences, and in the outpatient clinic setting.
4) Didactic teaching - conferences, lectures, or discussions devoted to topics of professionalism. These might also include instructive case conferences using case scenarios to highlight professionalism and ethical issues.
5) Faculty-facilitated group discussions. Case vignettes or journal club discussions of issues of professionalism that provide the opportunity for frank discussions between faculty and trainees about these issues.
6) Independent reading. Reading assignments of peer reviewed publications and specialty organization publications from the AMA, ABIM, ACP, ACGME and web-based discussions on professionalism.

Performance Markers
By the end of their training, fellows should be able to demonstrate competency in the following areas:

1) Patient Primacy - the fellow should be able to:
   A. Demonstrate responsiveness to the needs of patients that supercedes self-interest.
   B. Demonstrate sensitivity and attention to the interests of own patients in
formulation of treatment plans.
C. Demonstrate the ability to provide autonomy to their patients to decide upon treatment once all treatment options and risks have been outlined for them.
D. Provide and obtain key elements of informed consent in an understandable manner for therapeutic interventions and clinical research endeavors.

2) Physician Autonomy - the fellow should be able to demonstrate independent medical decision-making skill.

3) Physician accountability and responsibility including:
   A. Demonstrates timeliness and reliability in clinical care of patients, including completion of medical records and in responding to patient calls and requests.
   B. Reliably follows through on duties and clinical tasks, including timely response to calls from colleagues. Exhibits regular attendance and active participation in divisional and departmental training activities and scholarly endeavors.
   C. Strives for excellence in care and scholarly activities as a rheumatologist.
   D. Works to maintain personal physical and emotional health and demonstrates an understanding of and ability to recognize physician impairment in self and colleagues.

4) Humanistic qualities and altruism: Qualities the fellow should demonstrate include:
   A. Demonstration of empathy and compassion in physician-patient interactions and with sensitivity to patient needs for comfort and encouragement.
   B. Courteous and respectful behavior in interactions with patients, staff and colleagues.
   C. Treating all patients with respect regardless of race, gender, ethnic, religious or socioeconomic background.
   D. Providing equitable care to all patients.
   E. Demonstrating culturally competent care, which is defined as the ability to deliver effective medical care to patients, regardless of cultural or language differences between the patient and the physician.

5) Ethical behavior Qualities the fellow should demonstrate include:
   A. Demonstrating a commitment to ethical principles relating to provision and withholding of clinical care, confidentiality of patient information and business practices.
   B. Being trustworthy in following through on clinical questions, laboratory results, and other patient care responsibilities.
   C. Recognizing and addressing actual and potential conflicts of interest including pharmaceutical industry involvement in their medical education and program funding and guarding against this influencing their current and future prescribing habits.
   D. Demonstrating integrity in reporting clinical and research findings to supervisors and colleagues.

Evaluation Methods

1) Faculty performance rating - with regard to demonstration of professional behavior
2) 360 evaluations – regarding professional attitudes and behavior. Fellows may also fill out self-evaluations in the sphere of professionalism and compare it to responses from others for self-reflection and self-improvement.

3) Portfolio review – which should include a section to include reflective entries on issues of professionalism such as difficult patient and peer encounters, conflicts of interest, and barriers to providing equitable care.

4) Patient feedback or survey results - with components that specifically address trainee’s professionalism.

Suggested Reading List and Web Links


6. “Advancing Education in Professionalism.” An educational resource developed by the ACGME to aid program directors in teaching and assessing professionalism located at http://www.acgme.org/outcome/implement/Profm_resource.pdf

7. The ACGME provides several assessment tools for the evaluation of professionalism at http://www.acgme.org/outcome/assess/profIndex.asp

8. The ACGME also has a comprehensive list of professionalism references available at http://www.acgme.org/outcome/comp/refProf1.asp

9. In 1995 the American Board of Internal Medicine published a monograph: Project Professionalism; it was last reprinted in 2001 and can be accessed at http://www.abim.org/pdf/profess.pdf


11. The Association of American Medical Colleges and National Board of Medical Examiners published the proceedings of a conference focusing on professionalism in undergraduate medical education in 2002: "Embedding Professionalism in Medical Education: Assessment as a tool for implementation." This can be accessed at http://www.nbme.org/PDF/NBME_AAMC_ProfessReport.pdf
VII) Clinical Rotations- UTMB Rheumatology Fellowship Program

The clinical rotations of the UTMB fellowship training program are described as follows including the goals and objectives for each with the core competencies that are expected to be achieved for each.

PC – Patient care
MK – Medical knowledge
PL – Practice-based learning and improvement
IC – Interpersonal and communication skills
PF – Professionalism
SP – Systems-based practice

The first and the second year fellowship yearly schedules are identical except for two key points: 1) The first year fellow is responsible for the Rheumatology Consultation Service for 10-11 months of the year, and 2) The second year fellow is expected to conduct research for the second year under the supervision of a selected mentor.

Rheumatology Consultation Service

The Rheumatology Consultation Service covers all of the UTMB Affiliated Hospitals. The first year Rheumatology Fellow is assigned to the consultation service for 10-11 months of the year (all months except for when electives are taken). The consult team may also include medical residents on elective as well as junior and senior medical students. All adult rheumatology consults are seen by the fellow or by a student or resident under the fellow’s supervision. The consult are then presented to faculty during rounds. Every patient is seen by faculty with the fellow and a differential diagnosis, evaluation plan, & final recommendations are made. Fellows are encouraged to review pertinent articles from the medical literature on each consult and to provide references regarding the diagnosis and treatment plans if possible. Consult Service teaching sessions occur de novo and during the year. The first year fellow will be the consult fellow for most of the first year except for weekends & vacations and when elective rotations are taken. Every other weekend the second year fellow will cover the consultation service. Fellows are required to have 1 day off of work and free from consult responsibility each week. Faculty attendings for the service include: Dr. Emilio Gonzalez, Dr. Brock Harper, Dr. Bahareh Rezazadeh, and Dr. Rashmi Maganti; additional faculty who may cover the service include Drs. Prashanth Sunkureddi and Rex McCallum.

The Goals and Objectives of Rheumatology consultation rotation are:

1) To allow trainees to enhance their knowledge of the pathophysiology, clinical features, diagnosis, and management of systemic rheumatic diseases in an inpatient setting under the supervision of a faculty physician (MK & PC).

2) To allow trainees to develop the skills necessary to practice as a Rheumatology Consultant including communicating recommendations to consulting physicians and developing appropriate diagnostic and
management plans that are appropriate for the patient (PC, MK, IC, PF, & SP).
3) To allow trainees to develop the medical knowledge, experience and communication skills for teaching the medical students, residents, & consulting physicians information about systemic rheumatic diseases (MK, IC, PF, & PL).
4) To allow trainees to learn joint aspiration and injection techniques under the supervision of faculty (PC).

**Fellowship Continuity Clinic**

Each fellow has his/her own half-day clinic where he/she sees 6-8 new or follow-up patients in a morning. Every patient is first seen by the fellow & then discussed with a faculty member who sees and examines the patient with the fellow. Patients assigned to the fellow become their patients for both years of training. This clinic provides a longitudinal experience of caring for patients with systemic rheumatic disease. The fellows are also responsible for answering patient phone calls and in assisting them in the completion of the paperwork and forms necessary to provide optimal outpatient medical care. The faculty supervisors for the fellows continuity clinic will be Dr. Emilio Gonzalez, Dr. Brock Harper, and Dr. Bahareh Rezazadeh. On occasions, Drs. Rashmi Maganti, Prashanth Sunkureddi, and Rex McCallum may serve as an alternative faculty when needed.

**The Goals and Objectives of Fellowship Continuity Clinic are:**

1) To allow trainees to enhance their knowledge of the pathophysiology, clinical features, diagnosis, and management of systemic rheumatic diseases in an outpatient setting under the supervision of a faculty physician (MK & PC).
2) To allow trainees to develop the skills necessary to practice as an outpatient Rheumatology Consultant including communicating recommendations to consulting physicians in written form by letter or the electronic medical record system (IC, PF, & SP).
3) To allow trainees to become competent in the longitudinal care of patients with systemic rheumatic diseases including experience in dealing with disease flares, co-morbid conditions, and side-effects with medications (PC, MK, & PL).
4) To allow trainees to enhance their interpersonal & communication skills with patients in dealing with the complex cultural, social, emotional, and economic burden of having a chronic and often serious disease such as rheumatoid arthritis, systemic lupus erythematosus, etc (IC).
5) To allow trainees to develop the practice-based skills necessary to manage patients in a cost-effective manner in an ever-changing environment of variable insurances & benefit plans (SP, PL).
6) To allow trainees to learn joint aspiration and injection techniques under the supervision of faculty (PC).

**General Rheumatology Preceptor Clinics**
Every Thursday & Friday mornings there are general rheumatology clinics where depending on available faculty (1-3) anywhere between 13 to 20 patients are scheduled. Eight to ten new patients are scheduled along with follow-up patients, and patients who are being followed up from in-patient consultations. Both fellows must attend these clinics. The clinics are also attended by the assigned full time rheumatology faculty and students, & residents on the consultation service. Every patient seen by the fellow is discussed with a faculty member who sees and examines the patient with the fellow. The fellow will see on average 2 to 3 new patients and 3 to 5 follow-up patients. Fellows may also be involved in instructing students and residents in the evaluation & management of patients. Faculty attendings for this clinic include: Dr. Emilio Gonzalez, Dr. Brock Harper, Dr. Bahareh Rezazadeh, and on occasions, Dr. Prashanth Sunkureddi. Dr. Rex McCallum may attend this clinic as well.

The Goals and Objectives of General Rheumatology Preceptor Clinics are:

1) To allow trainees to enhance their knowledge of the pathophysiology, clinical features, diagnosis, and management of systemic rheumatic diseases in an outpatient setting under the supervision of a faculty physician (MK & PC).

2) To allow trainees to develop the skills necessary to practice as an outpatient Rheumatology Consultant including communicating recommendations to consulting physicians in written form by letter or the electronic medical record system (IC, PF, & SP).

3) To allow trainees to develop the medical knowledge, experience and communication skills for teaching the medical students, residents, & consulting physicians information about systemic rheumatic diseases (MK, IC, PF, & PL).

4) To allow trainees to learn joint aspiration and injection techniques under the supervision of faculty (PC).

Texas Department of Criminal Justice Clinic

A clinic for offenders in the TDCJ system is given every Wednesday in the prison hospital. Both fellows must attend this clinic. Approximately 12 patients both new & follow-up are seen each month. The clinic is attended by all of the full time rheumatology faculty and students, & residents on the consultation service. Every patient seen by the fellow is discussed with a faculty member who sees and examines the patient with the fellow. Fellows may also be involved in instructing students and residents in the evaluation & management of patients. Faculty attendings for this clinic include: Dr. Brock Harper (main TDCJ attending), Dr. Emilio Gonzalez, and Dr. Bahareh Rezazadeh.

The Goals and Objectives of Texas Department of Criminal Justice Clinic are:

1) To allow trainees to enhance their knowledge of the pathophysiology, clinical features, diagnosis, and management of systemic rheumatic diseases in an outpatient setting under the supervision of a faculty physician (MK & PC).

2) To allow trainees to develop the skills necessary to practice as an outpatient Rheumatology Consultant including communicating
recommendations to consulting physicians in written form by letter or the electronic medical record system (IC, PF, & SP).

3) To allow trainees to develop the medical knowledge, experience and communication skills for teaching the medical students, residents, & consulting physicians information about systemic rheumatic diseases (MK, IC, PF, & PL).

4) To allow trainees to learn joint aspiration and injection techniques under the supervision of faculty (PC).

5) To allow trainees to learn how to manage patients with chronic disease in an institutionalized setting & how to develop system-based practice skills to provide the best care (SP, & IC).

Second Year Fellow Research

Each fellow is required to perform a research project under the mentoring of a faculty advisor in the second year of training. Fellows are expected to choose a mentor and a topic of research before the start of the second year. Faculty mentors may be any member of the Rheumatology faculty or of the Faculty of medicine at UTMB but must be approved by the Program Director. It is the expectation that research projects will be carried out that will allow the fellow to submit findings to the American College of Rheumatology Annual Meeting or to other Regional or National Meetings. The project should allow the trainee the opportunity for independent research with the guidance of the faculty mentor.

The Goals and Objectives of the Research Project:

1) To allow trainees to develop a research project under the supervision of a clinical or basic science mentor (MK).
2) To teach the trainee how to submit a research proposal through the Internal Review Committee (IRB) (MK, IC, & PF).
3) To teach the trainee how to conduct a research project (MK, PF, & IC).
4) To teach the trainee how to submit and present a completed project for presentation at a regional or national meeting of peers (MK, IC, & PF).

VIII) Conferences- Rheumatology Fellowship Training Program

The conferences of the UTMB fellowship training program are described as follows including the goals and objectives of each with the core competencies that are expected to be achieved for each.

PC – Patient care
MK – Medical knowledge
PL – Practice-based learning and improvement
IC – Interpersonal and communication skills
PF – Professionalism
SP – Systems-based practice

Allergy Immunology Weekly Conference
Every Thursday at 1:00 PM, the Allergy section of the Pulmonary Critical Care & Allergy Division at UTMB holds a basic immunology & allergy conference. Rheumatology fellows are invited to attend. The conference lectures cover information about basic immunology & provide a scientific understanding of the immune system necessary to practice rheumatology. Faculty members from Allergy & Rheumatology are present together with Allergy fellows & students rotating on these services.

The Goals and Objectives of the Allergy Immunology Conference are:
1) To allow trainees to develop knowledge of basic immunology (MK).
2) To allow trainees to learn the pathophysiology of autoimmune mediated injury (MK).
3) To allow trainees to develop the understanding of the scientific basis to support the current therapy of systemic rheumatic disease (MK, PL).

**Rheumatology Journal Club & Research Conference**

The journal club is held every Monday morning beginning at 9:30 AM. The Rheumatology Fellows are expected to select and present articles from the recent literature to review both basic science and clinical studies. The organization of this weekly exercise is under the direction of Dr. Silvia Pierangeli. Dr. Gonzalez, Dr. Harper, Dr. Silvia Pierangeli, Dr. Bahareh Rezazadeh, and occasionally Dr. Prashanth Sunkureddi are present and discuss the articles after presentation. The purpose of the conference is to teach the fellow how to evaluate the literature in a critical manner. Research protocol and design is also critiqued. The Fellows are required to attend as well as all students and residents rotating on the Rheumatology consultation service. The Fellows are also asked to assist the students & residents in selecting & discussing articles. Approximately once each quarter, the current research being conducted or planned in the Division of Rheumatology is discussed during the same time period. This provides the fellows with first hand experience as to how projects are planned, carried out, & how problems with research are resolved.

The Goals and Objectives of the Rheumatology Journal Club & Research Conference are:
1) To allow trainees to develop the skills to critically evaluate the medical literature and become aware of the latest recommendations regarding medical therapy (MK, & PL).
2) To allow trainees to develop the knowledge & communication skills to present the medical literature (MK, IC).
3) To allow trainees to learn the basics of research concepts including study design, statistical analysis, and interpretation of data (MK).

**Rheumatology Clinical Conference**

A series of clinical rheumatology lectures are given every Tuesday or Thursday at noon by the faculty, fellows, or invited speakers. The senior fellow is typically in charge of organizing this conference along with our fellowship coordinator, Ms. Lori Kocian These lectures cover all topics of clinical rheumatology including the diagnosis and management of all the major systemic rheumatic diseases and are
given to provide basic knowledge that the rheumatology fellows can use for further study to prepare for the ABIM certifying examination in Rheumatology. The Rheumatology Fellows are also asked to give a lecture every 6 to 8 weeks. The lectures given by the fellow can deal with specific rheumatology topics or be a review of a recent case to discuss the differential diagnosis, diagnostic evaluation or management of that patient. The conferences are attended by rheumatology fellows and faculty, research trainees and post-docs as well as the allergy fellows and students and residents rotating on the consult service.

The Goals and Objectives of the Rheumatology Clinical Conference are:

1) To allow trainees to develop knowledge of the clinical diseases in rheumatology (MK).
2) To allow trainees to develop the knowledge & communication skills to present rheumatology topics based upon a careful review of the medical literature (MK, IC, PL).
3) To allow trainees to develop the knowledge of management of systemic rheumatic disease (MK, & PL).
4) To allow trainees to develop knowledge of system based practices in rheumatology care (MK, & SP).

Radiology Conference

Every Friday at 1:00 PM, there is a rheumatology radiology conference conducted by Dr. Roy Riascos-Castaneda or collaborators in the Radiology Department. All radiographs that were ordered or requested in the previous week in clinic or the hospital are reviewed. The format is for the case to be presented as an unknown with the Rheumatology fellows & other students attending the conference describing the findings. Dr. Riascos then reviews the films & gives a final impression. The full time rheumatology faculty are also present to discuss the films and specifics cases involved. The purpose of the conference is to teach the Fellows how to interpret joint radiographs and to correlate the radiographic findings with clinical findings.

The Goals and Objectives of the Radiology Conference are:

1) To allow trainees to develop knowledge of the interpretation of radiographs of joints in clinical rheumatic diseases (MK).
2) To allow trainees to develop the knowledge & communication skills to discuss radiographic findings with radiologists and colleagues to improve patient care (MK, IC, PL).
3) To allow the trainees to have a better understanding of the pathology of systemic rheumatic disease by observation of radiographic damage in patients they have seen in clinic (MK, PC, & PL).

The Rheumatology - Nephrology Pathology Conference

Once a month there is a pathology conference conducted by the pathology department with Rheumatology and Nephrology faculty and fellows participating. The rheumatology faculty present can include Dr. Emilio Gonzalez, Dr. Brock Harper, and Dr. Bahareh Rezazadeh. Dr. Bob Beach, division chief of nephrology regularly attends as well as other nephrology faculty. The conference discusses
The second year fellow is required to meet with his/her research mentor at least once each week to discuss their project. The actual time is at the discretion of the faculty and fellow involved. The faculty mentor can be any member of the Department of Internal Medicine that is approved by the Rheumatology Fellowship program director.

The Goals and Objectives of the Research Mentor Conference:

5) To allow trainees to develop a research project under the supervision of a clinical or basic science mentor (MK).

6) To teach the trainee how to submit a research proposal through the Internal Review Committee (IRB) (MK, IC, & PF).

7) To teach the trainee how to conduct a research project (MK, PF, & IC).

8) To teach the trainee how to submit and present a completed project for presentation at a regional or national meeting of peers (MK, IC, & PF).

Medical Grand Rounds

The Department of Internal Medicine has medical grand rounds every Thursday morning at 8:00 AM. Experts in these lectures cover all topics of internal medicine. Fellows are encouraged but not required to attend.

General Clinical Research Center (GCRC) Lectures

UTMB requires that all fellows attend the GCRC lecture series that is considered part of the Core Educational Program at the University. It is expected that fellows will attend at least 75% of the lectures in two years. This is considered a requirement for all trainees in our institution and must be achieved to successfully complete training.

The Goals and Objectives of the GCRC Lectures are:

To allow trainees to develop knowledge of general topics important for all physicians.
Topics among others include the following:
1) Statistical Analysis
2) Research Design
3) Ethics
4) Government regulations regarding research (MK)
5) Patient rights

IX) Methods of Evaluation - Rheumatology Fellowship Training Program at UTMB

The methods of evaluation for Rheumatology Fellows will be as follows:

1) Quarterly Global Faculty Evaluations
2) Resident & Student evaluations
3) Evaluation by Nurses & Clinic Staff (360 evaluations)
4) Fellow Chart reviews
5) Fellow Portfolio Review
6) Fellow Lecture Evaluations
7) Fellow attendance log for each conference
8) CEX Examination
9) Fellowship Evaluation Committee Annual Summary

1) Evaluations

Evaluation of trainee competency will use the “360 degree” methods with evaluations from Faculty, Nurses, Office & Clinic Staff, Residents, Students, & patients.

1) Each Faculty in the Division of Rheumatology will evaluate each fellow on the 6 core competencies quarterly.
   • MK – Medical knowledge
   • PC – Patient care
   • PL – Practice-based learning and improvement
   • IC – Interpersonal and communication skills
   • PF – Professionalism
   • SP – Systems-based practice
2) Evaluation by the Nurses & clinical staff will occur every 6 months.
3) Evaluation by the students & residents occurs monthly.

2) Chart (Electronic Encounter) Review

The Program Director and assigned teaching faculty review every single patient encounter done by the fellow. This is actually required by our electronic medical record system. In other words, before the encounter can be “closed”, the attending must read and co-sign the encounter written up by the fellow. This system allows the attending to immediately assess the adequacy of documentation, & quality of the visit. It also allows the teaching faculty to provide immediate feedback to the fellow. This monitor system allows supervision of
whether the management and treatment plans are consistent with the documented history and physical examination findings (See the attached form in Appendix 3)

3) Fellowship Lecture Review

The lectures performed by each fellow for the Rheumatology Clinical Lectures will also be critiqued by the audience with an anonymous form that will address content, clarity, & presentation skills.

4) Fellowship Portfolio Review

Each Fellow will be required to develop a portfolio that will list activities that help document that the core competencies are being achieved at the expected level of experience.

- The Portfolio will contain many things including
  - A Patient Consultation Log
  - A Procedure Log
  - Presentations & Publications given or co-authored by fellow.
  - National & Regional Conference attendance
  - Continuous Quality Improvement activities
  - Evidence of Professionalism
  - Praise cards
  - Copies of CEX examination

The fellow must review his portfolio quarterly with the fellowship program director to assure that expected goals are being achieved in the core competencies.

5) Fellowship Attendance

Each fellow is expected to attend 90% of the rheumatology conferences that are given throughout the year.

6) CEX Examination

The CEX examination where the trainee performs a history and physical examination under the observation of a Faculty Physician will be performed by each fellow every 6 months. After performing the examination, the trainee will be expected to summarize the findings and provide an impression and differential diagnosis and evaluation and management plan. In our program, the attending faculty actually examines each and every patient evaluated by the fellow on an ongoing basis. Every patient is personally supervised by the attending in our clinics.

7) Fellowship Evaluation Committee

The fellowship evaluation committee consists of the training program director, the chief of rheumatology, and the entire rheumatology faculty. This committee meets annually, usually in June or July, and reviews the documentation and progress that each fellow has made to achieve the core
competencies. This committee also reviews the teaching curriculum every year. The committee’s final evaluation will be summarized and will be discussed with each fellow by the program director as part of the regular semi-annual evaluation process.

Appendix 1
Essential Topics of Medical Knowledge

Basic Sciences
A. Anatomy and biology of musculoskeletal tissues: for each tissue, understand 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, cellular basis of turnover and remodeling, hormonal and cytokine regulation
   4) Muscle and tendons
   5) Blood vessels

B. Immunology
   1) Anatomy and cellular elements of the immune system
      a) Lymphoid organs: gross and microscopic anatomy, structure and function
      b) Organization of the immune system: innate and adaptive immune systems
      c) Specific cells: for each cell type, understand the ontogeny, structure, phenotype, function, and major activation markers/receptors.
         (1) Lymphocytes: T cells and B cells (naive, memory, activated, regulatory)
         (2) Antigen presenting cells: dendritic cells, monocytes and macrophages
         (3) Natural killer cells
         (4) Neutrophils and eosinophils
         (5) 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, signal transduction, complement receptors, Fc receptors, toll receptors, adhesion molecules
      c) Molecular basis of T cell antigen recognition and activation.
      d) B cell receptors: structure, function, antigen binding, effector functions
      e) Antigens: types, structure, processing, presentation, and elimination. Superantigens: types, site of binding, and effects on immune system
      f) Major histocompatibility complex: structure, function, nomenclature, and immunogenetics
g) Major immune cell signaling pathways
h) Complement/Kinin systems: structure, function, and regulation
i) Acute phase reactants and enzymatic defenses
3) Cellular interactions and immunomodulation
   a) Cellular activation and regulation: for each cell type, understand
      mechanisms of activation and suppression of function (e.g. T cell:B
      cell interactions via CD28:CD80/86).
   b) Cytokines: for each cytokine, understand the origin, structure,
      effect, site of action, metabolism, regulation, and gene activation.
   c) Immune cell trafficking; adhesion molecules, chemokines
   d) Inflammatory mediators: for each mediator, understand the
      origin, structure, effect, site of action, metabolism, and
      regulation.
4) Immune responses
   a) Antibody-mediated: opsonization, complement fixation, and
      antibody dependent cellular cytotoxicity
   b) Cell-mediated: cells and effector mechanisms in cellular
      cytotoxicity and granuloma formation
   c) IgE-mediated: acute and late - phase reactions
   d) Mucosal immunity: interactions between gut and bronchial
      associated lymphoid tissue and secretory IgA
   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. Understand the
      collaboration among cells for control of the immune response.
   c) Idiotype networks: inhibition and stimulation
C. Purine and uric acid metabolism
   1) Purine: biochemistry, synthesis, and regulation
   2) Uric acid: origin, elimination, and physicochemical properties
   3) Crystals: factors affecting formation, induction of inflammation
   4) Purine pathway enzyme deficiencies and immunodeficiency: ADA,
      PNP
D. Biomechanics of bones, joints, and muscles: understand the principles of
   kinesiology of peripheral/axial joints and gait and how alterations in
   biomechanics contribute to musculoskeletal disorders.
E. Neurobiology of Pain
   1) Peripheral afferent nociceptive pathways
   2) Central processing of nociceptive information
   3) Mechanisms of action of drugs used for the treatment of neuropathic
      pain.
   4) Biopsychosocial model of pain
Clinical Sciences
A. Rheumatic Diseases
   For each disease, understand the epidemiology, genetics, natural history,
clinical expression including clinical subtypes, pathology, and disease pathogenesis.

1) Rheumatoid Arthritis.

2) Seronegative spondyloarthritides: ankylosing spondylitis, reactive arthritis, psoriatic arthritis, inflammatory bowel disease-associated arthritis, arthritis associated with acne and other skin diseases, SAPHO syndrome, and undifferentiated spondyloarthritis.

3) Lupus erythematosus: systemic, discoid, and drug-related; antiphospholipid antibody syndrome, including primary APLS

4) Scleroderma: diffuse and limited systemic sclerosis, localized syndromes, chemical/drug-related

5) Other systemic connective tissue diseases: eosinophilic fasciitis, eosinophilia-myalgia syndrome, Sjögren's syndrome, polymyositis and dermatomyositis, relapsing polychondritis, relapsing panniculitis, erythema nodosum, adult-onset Still’s disease, overlap syndromes including mixed connective tissue disease, undifferentiated connective tissue disease

6) Vasculitides: polyarteritis nodosa, Wegener’s granulomatosis and other ANCA-associated diseases, allergic granulomatosis of Churg-Strauss, temporal arteritis/polymyalgia rheumatica, Takayasu’s arteritis, systemic necrotizing vasculitis overlaps, Behcet’s disease, hypersensitivity and small vessel angiitis, cryoglobulinemia, Cogan’s syndrome

7) Infectious and reactive arthritides
   a) Infectious arthritides: bacterial (nongonococcal and gonococcal), mycobacterial, spirochetal (syphilis, Lyme), viral (HIV, hepatitis B, parvovirus, other), fungal, parasitic
   b) Whipple’s disease
   c) Reactive arthritides: acute rheumatic fever, arthritis associated with subacute bacterial endocarditis, intestinal bypass arthritis, post-dysenteric arthritides, postimmunization arthritis, other colitic-associated arthropathies

8) 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, hyperparathyroidism, hypoparathyroidism, hyperthyroidism, hypothyroidism, Cushing’s disease
   c) Hematologic-associated diseases: rheumatic syndromes associated with hemophilia, hemoglobinopathies, angioimmunoblastic lymphadenopathy, multiple myeloma

9) Bone and cartilage disorders
   a) Osteoarthritis - primary and secondary osteoarthritis, chondromalacia patellae
   b) Metabolic bone disease: osteoporosis, osteomalacia, bone disease related to renal disease
   c) Paget’s disease of bone
d) Avascular necrosis of bone: idiopathic, secondary causes, osteochondritis dissecans

e) Others: transient osteoporosis, hypertrophic osteoarthopathy, diffuse idiopathic skeletal hyperostosis, insufficiency fractures

10) Hereditary, congenital, and inborn errors of metabolism associated with rheumatic syndromes

a) Disorders of connective tissue: Marfan’s syndrome, osteogenesis imperfecta, Ehlers-Danlos syndromes, pseudoxanthoma elasticum, hypermobility syndrome, others

b) Mucopolysaccharidoses

c) Osteochondrodysplasias: multiple epiphyseal dysplasia, spondylepiphyseal dysplasia

d) Inborn errors of metabolism affecting connective tissue: homocystinuria, ochronosis

e) Storage disorders: Gaucher’s disease, Fabry’s disease, Farber’s lipogranulomatosis

f) Immunodeficiency: IgA deficiency, complement component deficiency, SCID and ADA deficiency, PNP deficiency, others

g) Autoinflammatory syndromes including familial Mediterranean fever, Muckle-Wells Syndrome, tumor necrosis factor receptor-associated periodic syndromes (TRAPS).

h) Others: hemachromatosis, hyperlipidemic arthropathy, myositis ossificans progressiva, Wilson’s disease, others

11) Nonarticular 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 illi, osteitis pubis, spondylololithesis/spondylysis, discitis

d) Regional musculoskeletal disorders: in addition to bursitis, tendinitis, or enthesitis occurring around each joint, the fellow should be familiar with other disorders occurring at each specific joint site (e.g., shoulder-rotator cuff tear, adhesive capsulitis, impingement syndrome; wrist ganglions; trigger fingers and Dupuytren’s contractures; knee synovial plicaes, internal derangements, cysts; hallux rigidus, heel pain, and metatarsalgia; TMJ syndromes; costochondritis.

e) Biomechanical/anatomic abnormalities associated with regional pain syndromes: scoliosis and kyphosis, leg length discrepancy, foot deformities

f) Overuse rheumatic syndromes: occupational, sports, recreational, performing artists

g) Sports medicine: injuries, strains, sprains, nutrition, female athlete, medication issues

h) Entrapment neuropathies: thoracic outlet syndrome, upper extremity entrapments, lower extremity entrapments

i) Other: reflex sympathetic dystrophy, erythromelalgia

12) Neoplasms and tumor-like lesions

a) Benign

(1) Joints: loose bodies, fatty and vascular lesions, synovial
ostechondromatosis, pigmented villonodular synovitis, ganglions
(2) Tendon sheaths: fibroma, giant cell tumor, nodular tenosynovitis
(3) Bone: osteoid osteoma, others

b) Malignant
(1) Primary: synovial sarcoma, others
(2) Secondary: leukemia, myeloma, metastatic malignant tumors
(3) Malignancy-associated rheumatic syndromes: carcinomatous polyarthritis, palmoplantar fasciitis, Sweet's syndrome

13) Muscle diseases
a) Inflammatory: polymyositis, dermatomyositis, inclusion body myositis
b) Metabolic
(1) Primary: glycogen storage diseases, lipid metabolic disorders, myoadenylate deaminase deficiency, mitochondrial myopathies
(2) Secondary: nutritional, toxic, endocrine disorders, electrolyte disorders, drug-induced
c) Muscular dystrophies
d) Myasthenia gravis

d) Myasthenia gravis

14) Miscellaneous rheumatic disorders
a) Amyloidosis: primary, secondary, hereditary
b) Raynaud’s disease
c) Charcot joint
d) Remitting seronegative symmetrical synovitis with pitting edema
e) Multicentric reticulohistiocytosis
f) Plant thorn synovitis
g) Intermittent arthritides: palindromic rheumatism, intermittent hydrarthrosis
h) Arthritic and rheumatic syndromes associated with: sarcoidosis, scurvy, pancreatic disease, chronic active hepatitis, primary biliary cirrhosis, drugs, and environmental agents
i) Rheumatic disease in the geriatric population
j) Rheumatic disease in the pregnant patient
k) Rheumatic syndromes in dialysis patients

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

1) Diagnose the rheumatic diseases that occur primarily in children, and know how they differ from the same, or similar, disease in adults.
   a) Systemic juvenile rheumatoid arthritis (Still’s Disease)
b) Pauciarticular juvenile rheumatoid arthritis
c) Polyarticular juvenile rheumatoid arthritis
d) Juvenile spondyloarthropathy
e) Juvenile dermatomyositis
f) Kawasaki Disease
g) Henoch-Schönlein Purpura
h) Acute rheumatic fever
i) Neonatal lupus syndrome
j) CINCA (NOMID)
k) PFAPA syndrome (periodic fever, aphthous stomatitis, pharyngitis, and adenitis)

2) Know the major sequelae or life-threatening complications of rheumatic diseases that occur primarily in children:
   a) Systemic onset JRA
      (1) Macrophage activation syndrome
      (2) Cardiac tamponade
   b) Pauciarticular JRA
      (1) Chronic uveitis
   c) Juvenile dermatomyositis
      (1) GI vasculitis
      (2) Calcinosis
   d) Kawasaki Disease
      (1) Aneurysms of coronary and other arteries
   e) Henoch-Schönlein Purpura
      (1) GI- intussusception, intestinal infarction
      (2) Renal - chronic nephritis
   f) Neonatal lupus syndrome
      (1) Congenital heart block
      (2) Thrombocytopenia

3) Know the appropriate treatments of the above childhood rheumatic disorders, and complications of treatment.

4) Recognize non-rheumatic disorders in children that can mimic rheumatic diseases:
   a) Infectious or post-infectious syndromes
      (1) Septic arthritis and osteomyelitis
      (2) Transient synovitis of the hip
      (3) Post-infectious arthritis and arthralgia
      (4) Post-viral myositis
   b) Orthopedic conditions
      (1) Legg-Calve-Perthes Disease and other avascular necrosis syndromes
      (2) Slipped capital femoral epiphysis
      (3) Spondylolysis and spondylolisthesis
      (4) Patellofemoral syndrome
   c) Non-rheumatic pain
      (1) Benign limb pains of childhood (“growing pains”)
      (2) Benign hypermobility syndrome
      (3) Pain amplification syndromes including reflex sympathetic dystrophy
   d) Neoplasms
      (1) Leukemia
      (2) Lymphoma
      (3) Primary bone tumors (especially osteosarcoma and Ewing’s sarcoma)
(4) Tumors metastatic to bone (especially neuroblastoma)

E) Bone and cartilage dysplasias, and inherited disorders of metabolism

5) Know aspects of rheumatic disease and treatments specific to children:
   a) Disease effects on growth
      (1) Accelerated or decelerated growth of limbs or digits affected by arthritis
      (2) Altered growth of mandible in TMJ arthritis
      (3) Short stature and failure to thrive
   b) Regular surveillance for uveitis in JRA
   c) Drugs
      (1) FDA approved drugs for childhood rheumatic diseases
      (2) Drug metabolism and dosing different from adults
   d) Child-specific side effects of chronic corticosteroid treatment
      (1) Growth retardation
      (2) Delay of puberty
   e) Physical and occupational therapy
      (1) Exercises
      (2) Splinting
   f) Psychosocial and developmental issues
      (1) Peer and sibling interaction
      (2) Family adjustment
      (3) School accommodations for disability
      (4) School and recreational activities
      (5) Transition to adulthood

C) Therapeutic modalities and strategies
   1) Pharmacology: for each medication, understand the dosing, pharmacokinetics, metabolism, mechanisms of action, side effects, drug interactions, compliance issues, costs, and use in specific patient populations, such as renal insufficiency and including fertile, lactating, and pregnant women.
      a) Nonsteroidal anti-inflammatory drugs
      b) Glucocorticoids: topical, intraarticular, systemic
      c) Systemic antirheumatic drugs: antimalarials, sulfasalazine, gold compounds, methotrexate, D-penicillamine
      d) Cytotoxic drugs: azathioprine, cyclophosphamide, chlorambucil
      e) Immunomodulatory drugs: cyclosporine, mycophenolate mofetil, tacrolimus
      f) Biologic agents
      g) Hypouricemic drugs: allopurinol, sulfinpyrazone, probenecid
      h) Antibiotic therapy for septic joints
      i) Narcotic and non-narcotic analgesics
      j) Tricyclics and other agents used for pain modulation
      k) Anticholinergics and non pharmacologic agents used for the treatment of sicca symptoms
      l) Others: apheresis, ionizing radiation
   2) Rehabilitation and disability issues
      a) Methods of rehabilitation: for each method, understand principles, mechanism of action, indications, precautions and contraindications, potential side effects, and costs.
      b) Importance of multidisciplinary approaches to rehabilitation and
pain control. Appropriate use of and referral/prescription to rehabilitation specialists and pain clinics.
c) Exercise: range of motion, strengthening, conditioning, and stretching
   (1) Rest and splinting
   (2) Modalities and hydrotherapy: ultrasound, TENS iontophoresis, spa therapy
   (3) Joint protection and energy conservation techniques
   (4) Adaptive equipment and assistive devices
   (5) Job site/home evaluation and adaptation
   (6) Footwear and orthotics
   (7) Acupuncture and other alternative modalities
   (8) Nutritional issues
d) Demonstrate understanding of specific rehabilitative techniques/modalities and what modification of these techniques are needed depending on the patient’s disease (e.g. osteoarthritis, myositis, etc.), location of symptoms (e.g. back, shoulder, etc) and other related issues.
e) Psychosocial aspects of disability: understand the impact that the following factors have on the overall therapy of a patient with rheumatic disease and demonstrate knowledge of what can be done to assist a patient in these areas.
   (1) Psychological and emotional factors including sexuality
   (2) Economic and vocational issues: vocational rehabilitation, costs of therapy and monitoring
   (3) Disability determination: impairment vs disability, evaluation and measurement, social security disability, workmen’s compensation, other
   (4) Compliance issues
3) Surgical management
   a) For each procedure, the fellow should possess a working knowledge of indications, preoperative evaluation and medication adjustments, contraindications, complications, postoperative management, and expected outcome.
      (1) Bone biopsy
      (2) Arthroscopy
      (3) Synovectomy of tendons and joints
      (4) Entrapment neuropathy release
      (5) Osteotomies: hip, knee
      (6) Arthrodesis: wrist, other
      (7) Spine surgery: radiculopathy, stenosis, and instability
      (8) Reconstructive surgery of hand and foot
      (9) Total joint replacement: hip, knee, shoulder, other
      (10) Specific surgical management problems:
          i Rheumatoid arthritis patient
          ii Infected joint: arthroscopy vs. arthrotomy
          iii Infected prosthetic joint
          iv Ankylosing spondylitis patient
          v Pediatric rheumatic disease patient
          vi Prevention and treatment of deep venous thrombosis
4) Complementary and alternative medical practices: diet, nutritional supplements, antimicrobials, acupuncture, chiropractic, topicals, homeopathic remedies, venoms, others

Diagnostic Testing
A) Laboratory tests: for each test, understand the biologic 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) Antinuclear antibodies and subtype specificities including anti-dsDNA, anti-Smith, anti-U1 RNP, anti-centromere antibodies, and anti-histone antibodies; and LE cell preparation
5) Antiribosomal P, anti-topoisomerase 1, and anti-synthase antibodies including anti-Jo-1
6) Anti-neutrophil cytoplasmic antibodies including specificities for neutrophil granule constituents [anti-PR3, anti-myeloperoxidase]
7) Antiphospholipid antibodies including RPR, lupus anticoagulant, anticardiolipin and beta-2-glycoprotein I antibodies
8) Antibodies to formed blood elements including direct and indirect Coombs testing, anti-platelet antibodies, anti-granulocyte antibodies
9) Assays for complement activity (CH50) and components of the complement cascade
10) Serum immunoglobulin levels, Serum protein electrophoresis and immunofixation electrophoresis
11) HLA typing
12) ASO and other streptococcal antibody tests
13) Serologic and PCR tests for Lyme disease, HIV, Hepatitis B, Hepatitis C, parvovirus and other infectious agents
14) Serum and urine measurements for uric acid
15) Iron studies including ferritin
16) Flow cytometry studies for analysis of lymphocyte subsets and function
17) Specific genetic testing

B) Diagnostic imaging techniques: understand the basic underlying principles and technical considerations in the use of plain radiographs, computed tomography, magnetic resonance imaging, ultrasonography and radionuclide scanning of bones, joints, and periarticular and vascular structures.

C) Synovial fluid analysis: cell count and differential, crystal identification, viscosity, protein, glucose, and other special stains/analyses

D) Test-performance characteristics: principles of sensitivity, specificity, and predictive value

Research Principles
A) Principles and methods of epidemiological research
   1) Definitions of incidence and prevalence
2) Basic biostatistics: including major methods of comparative analysis, types of error, likelihood ratios
3) Methods of health services research
   b) Measurement of health and functional status (HAQ, SF36, etc).
   c) Quality of life measurements/assessments
   d) Components of cost analysis (direct costs, QALY, etc.)
B) Principles of clinical research
   1) Major study designs & the limitations & biases associated with each design
   2) Diagnostic criteria and assessment of disease activity
      a) Objective assessments, e.g. tender joint count
      b) Composite indices (ACR composite, DAS, WOMAC, etc.)
      c) Damage and functional indices (e.g. HAQ)
   3) Clinical trials
      a) Major design types
      b) Definitions and uses of clinical trial Phases
      c) Roles of principal investigator, sponsors, study coordinators, monitors, IRB.
C) Evidence-based medicine: Data analysis, biostatistics, meta-analysis and medical informatics
D) Laboratory techniques
   1) Serologic: ELISA, RIA, RID, nephelometry, immunoblots, protein electrophoresis, circulating immune complex assays.
   2) Cellular: lymphocyte proliferation, flow cytometry.
   3) Histochemistry and immunofluorescence of biopsied tissues.
   4) Molecular: Northern, Southern and Western blot analysis polymerase chain reaction; gene sequencing; genomics techniques (SNP, RFLP analysis, microarray techniques)
   5) Hybridoma and monoclonal antibody production
   6) Transgenic and gene knock-out animals
E) Bioethics of clinical and basic research
F) Critical literature review
Appendix 2
Patient Care: Performance Markers
(Detailed Expectations)

Information Gathering - The fellow should be able to:
A) Understand principles and demonstrate competency in obtaining a clinical history, relevant review of systems, and assessing functional status of patients with rheumatic disease symptoms.

B) Understand principles and demonstrate competency in performing and interpreting the examination of the structure and function of all axial and peripheral joints, periarticular structures, peripheral nerves and muscles. Additionally, the fellow should be able to identify extraarticular findings that are associated with specific rheumatic diseases.

C) Understand the indications for and costs of ordering laboratory tests, procedures to establish a diagnosis of rheumatologic disease and of different therapies used in the management of these diseases.

D) Understand the principles and interpretation of results of synovial fluid analysis and become proficient in the examination and interpretation of synovial fluid under conventional and polarized light microscopy from patients with a variety of rheumatic diseases.

E) Demonstrate understanding and competency in the assessment and interpretation of:
   1) Radiographs of normal and diseased joints, bones, periarticular structures and prosthetic joints
   2) Bone densitometry

F) Apply the principles of clinical epidemiology to day-to-day clinical decision making, demonstrating understanding and competency in the indications for and the interpretation of results from laboratory tests and procedures to establish a diagnosis of a rheumatologic disease, including:
   1) Arthrography, ultrasonography, computed tomography, magnetic resonance imaging of joints, bones and periarticular structures
   2) Radionuclide scans of bones and joints
   3) Arteriograms (conventional and MRI/MRA) for patients with suspected or confirmed vasculitis
   4) Computed tomography of lungs and paranasal sinuses
   5) Magnetic resonance imaging of the central nervous system (brain and spinal cord)
   6) Electromyograms and nerve conduction studies
   7) Biopsy specimens including histochemistry and immunofluorescence of tissues relevant to the diagnosis of rheumatic diseases: skin, synovium, muscle, nerve, bone (e.g. metabolic bone disease), minor salivary gland, artery, kidney and lung
   8) Specific laboratory tests (including, but not limited to) erythrocyte sedimentation rate, C-reactive protein, other acute phase response
proteins (e.g. ferritin), rheumatoid factor, anti-cyclical citrullinated peptides, antinuclear antibodies, anti dsDNA, anti SSA (anti-Ro), anti SSB (anti-La), anti-U1RNP, anti-Sm, anti-topoisomerase I (Scl-70), anti-Jo-1, anti-PM-Scl, antihistone antibodies, antineutrophil cytoplasmic antibodies (including anti-myeloperoxidase and antiproteinase-3), cryoglobulins, complement component levels, CH50, serum protein electrophoresis, serum immunoglobulin levels, LE preparation, RPR, lupus anticoagulant assays, anticardiolipin and other antiphospholipid antibodies, HLA typing (e.g. HLA-B27), ASO and other streptococcal antibody tests, Lyme serologies, serum and urine uric acid levels, circulating immune complexes, lymphocyte subset and function data, anticyclic antibodies (e.g. Coombs’ test, neutrophil antibodies and anti-platelet antibodies)

9) Arthroscopy
10) Schirmer’s and rose Bengal tests; parotid scans and salivary flow studies

Synthesis of Treatment Plan - The fellow should be able to:
A) Demonstrate the ability to 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.

B) Demonstrate the ability to 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, rehabilitative medicine, and, when necessary, surgical or other consultation.

C) The fellow should be able to explain the rationale and the risks/benefits for the treatment plan.

Implementation of Treatment - The fellow should be able to:
A) Demonstrate a working knowledge of clinical pharmacology: for each medication, understand the dosing, pharmacokinetics, metabolism, mechanisms of action, side effects, drug interactions, compliance issues, costs, and use in patients including fertile, lactating, and pregnant women.
   1) Nonsteroidal anti-inflammatory drugs and adequate gastroprotection
   2) Glucocorticoids: topical, intraarticular, systemic
   3) Disease modifying antirheumatic drugs:
      a) historical agents such as gold compounds and penicillamine
      b) oral agents: methotrexate, antimalarials, sulfasalazine, leflunomide, tetracyclines, auranofin
      c) parenteral biological response modifiers including inhibitors of TNF, IL-1 and other cytokines and immune based therapies such as CTLA4lg, anti-CD20
   4) Cytotoxic drugs: azathioprine, cyclophosphamide, chlorambucil,
   5) Immunomodulators: cyclosporine, FK-506, mycophenolate mofetil
   6) Hypouricemic drugs: allopurinol, sulfinpyrazone, probenecid
   7) Antibiotic therapy for septic arthritis, Lyme disease
B) Demonstrate a working knowledge of experimental therapies: plasmapheresis, intravenous immunoglobulin, myeloablative therapy and immune reconstitution including stem cell transplantation

C) Understand the indications for and demonstrate competence in arthrocentesis. The fellow should understand the anatomy, precautions (including OSHA requirements) and potential sequelae of arthrocentesis and demonstrate competency in obtaining synovial fluid from diarthrodial joints, bursae and tenosynovial structures with adequate informed consent.

D) Understand pain assessment and pain management:
   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
      d) Investigational uses of approved drugs such as gabapentin

E) Understand changes required in patient management should the rheumatology patient become pregnant; this should include pre-pregnancy counseling about ramifications of becoming pregnant on the disease process, the use of medications before and during pregnancy and in the postpartum period.

F) Demonstrate the ability 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.

G) Understand indications for surgical and orthopedic consultation in acute and chronic rheumatic diseases.

H) Pre- and Post-operative Management of the Surgical Patient:
   1) Understand indications for surgical and orthopedic consultation in acute and chronic rheumatic diseases.
   2) Understand perioperative evaluation, appropriate referral and medication adjustments.
   3) Rehabilitation of the rheumatic disease patient after a surgical or orthopedic procedure, as well as aspects of postoperative medical management pertaining to the rheumatologic condition.

I) Understand complementary and unconventional medical practices: diet, nutritional supplements, antimicrobials, acupuncture, topical therapeutic agents, homeopathic remedies, venoms, and others.

J) Reassessment and patient follow up - The fellow should be able to demonstrate the ability to reassess the patient over time, including recognition of treatment related adverse events, and alter the treatment plan accordingly.
# Appendix 3

## UTMB Fellowship Chart Review

<table>
<thead>
<tr>
<th>Fellow ____________________</th>
<th>Reviewer ____________</th>
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<tbody>
<tr>
<td>Date of Visit_______________</td>
<td>Patient UH:_____________</td>
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<table>
<thead>
<tr>
<th>Description</th>
<th>Y</th>
<th>N</th>
<th>N/A</th>
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<tbody>
<tr>
<td>Medical Record is legible for reviewers.</td>
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<tr>
<td>Visit exam coincides with chief complaint (H &amp; P).</td>
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<td>Medication list recorded</td>
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<tr>
<td>Previous pertinent lab or x-ray results recorded</td>
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<tr>
<td>Diagnosis consistent with findings.</td>
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<tr>
<td>Plan of action/treatment consistent with diagnosis.</td>
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<tr>
<td>Appropriate labs and studies ordered</td>
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<tr>
<td>Documentation that instruction/education given to patient/family or other organization.</td>
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<tr>
<td>Patient instructed on safe effective use of medication.</td>
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<tr>
<td>Procedure note has indication listed.</td>
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<tr>
<td>Procedure note has consent noted</td>
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Reviewer Comments: