

Curriculum

**Rheumatology Fellowship
MetroHealth Medical Center
Case Western Reserve University**

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**Curriculum of the Rheumatology Fellowship
MetroHealth Medical Center
Case Western Reserve University**

I. Introduction, Goals and Objectives

The MetroHealth Medical Center Rheumatology Fellowship is a 2-year, ACGME-accredited training program affiliated with Case Western Reserve University. Board eligibility in internal medicine, following successful completion of an IM residency is a prerequisite. The overall **goals** of the Rheumatology training program are:

- To provide the trainee with an appropriate background to establish a successful career in clinical rheumatology or research;
- To provide the educational opportunities and clinical experience sufficient to enable the trainee to successfully obtain board certification in the subspecialty of rheumatology;
- To expose the trainee to training in basic science and clinical research, enabling him or her to establish a career in research

These goals are achieved by incorporating the following program **objectives**:

- Provision of a broad, comprehensive experience in ambulatory and inpatient rheumatology practice, including both consultation and continuity care;
- A concentrated exposure to ancillary disciplines of importance to the clinical rheumatologist, including orthopedics, rehabilitation medicine, pediatric rheumatology and geriatric medicine;
- Direct involvement in a mentored research experience;
- Participation, organization, and presentation by the fellow in a broad range of regularly scheduled didactic and clinical conferences

A key educational aspect throughout this training program involves fostering and promoting the fellow's ability to achieve success in **six general competency areas**:

- Patient care skills
- Medical knowledge
- Interpersonal and communication skills
- Professionalism
- Practice based learning and improvement
- Systems based practice

Attention to these areas is emphasized during every rotation of the training program. For example, patient care skills, communication, professionalism, and systems-based practice are important aspects of exceptional ambulatory care and are encouraged and monitored during the outpatient clinics. Interpersonal and communication skills, professionalism, and systems-based practice are important aspects of inpatient consultation. Medical knowledge and practice-based learning are a critical component of weekly didactic conferences. Professionalism and medical knowledge are necessary for a successful research experience. The fellow's mastery of

competence in each of these important areas is evaluated following each rotation of the training program, and at semi-annual intervals, as outlined in detail below.

This curriculum has been organized by the academic rheumatology faculty members, whose experience in the practice and teaching of rheumatology ranges from three to over forty years, and each of whom has varied clinical and research interests. Ancillary teaching activities have been developed in cooperation with directors of the other relevant training programs. Each of the individual rotations (described in detail below) is discussed with the trainee prior to participation; the goals and objectives are reviewed, and expectations and the basis of evaluation are included in this discussion. The entire curriculum is reviewed and revised as necessary at semiannual meetings of the curriculum committee, which includes fellow representation. Any substantive modifications of the program must be reviewed and discussed with all faculty members and reviewed in detail with the all trainees.

This training program adheres to guidelines formulated in the "Next Accreditation System" (NAS), introduced by the ACGME in July 2013. (Nasca TJ, Philbert I, Brigham T, Flynn TC. The Next GME accreditation system-rationale and benefits. *N Engl J Med* 2012;366:1051-6). Some major elements of the NAS include the establishment of a clinical competency committee (CCC), charged with development and assessment of entrustable professional activities (EPAs) for each or the fellows, and semiannual evaluation of progress in the achievement of specific milestones relative to the 6 general competencies for each of the fellows; and the establishment of a program evaluation committee (PEC), charged with semiannual review, evaluation, and modification of the Rheumatology Fellowship Training Program.

II. General description of the training program

Facilities

- 742 bed acute care hospital.
- Subacute, comprehensive inpatient rehabilitation hospital.
- Level 1 trauma Center.
- Dedicated, comprehensive, multi-specialty ambulatory Geriatric Care Center
- (located 1 mile from main campus).
- Inpatient chronic rehabilitation facility (adjacent to main campus).
- Free-standing, dedicated 7-story research building, including facilities for basic research, epidemiology and biostatistics, health-care research, translational medicine, educational classrooms, library and conference center.
- Appropriate ancillary facilities include a comprehensive imaging center with road
- musculoskeletal imaging capabilities; clinical, anatomic and research pathology;
- and comprehensive laboratory services, including immunology.

Patient Characteristics

The academic Medical Center serves a large urban population that is culturally, racially, ethnically, and socio-economically diverse. In terms of clinical care provided directly by fellows, there is no distinction between insured and uninsured patients.

Patient age and gender: Male and female pediatric and adult patients, ages 18 to > 90.

Racial mix: Approximately 50% African-American, 25% Caucasian, 15% Hispanic, 10% Asian/other.

Disease Mix

In both the ambulatory and inpatient settings, a wide variety of rheumatologic and musculoskeletal disorders is seen, both in consultation, and for continuing management. A partial list of disorders evaluated and managed by rheumatology fellows includes:

- Rheumatoid arthritis
- Connective tissue diseases (lupus, scleroderma, polymyositis/dermatomyositis, Sjögren's syndrome)
- Ankylosing spondylitis and related spondyloarthropathies (reactive arthritis, inflammatory bowel disease-associated arthropathy, psoriatic spondyloarthropathy)
- Psoriasis and psoriatic arthritis
- Osteoarthritis
- Gout and other metabolic arthropathies (hemochromatosis, ochronosis, etc.)
- Arthropathies associated with endocrine disorders
- Hereditary musculoskeletal disorders
- Traumatic musculoskeletal disorders
- Soft tissue rheumatic diseases, both local and systemic
- Vasculitis, both cutaneous and systemic
- Metabolic bone diseases

Teaching Methods

- All patient encounters, in both ambulatory and inpatient settings, are directly discussed with, supervised by, and reviewed with an attending physician. All aspects of the patient encounter are included in this discussion, including the medical history, physical examination, review of laboratory and imaging studies, formulation of a differential diagnosis, approaches for further evaluation, and plans for treatment and follow up. This teaching opportunity represents a one-on-one interaction between the fellow and the attending faculty member, for every patient encounter;
- Fellows routinely participate in didactic teaching sessions and conferences supervised by individual faculty members, including:
 - a 3-month "core curriculum" lecture series at the beginning of the training program;
 - weekly journal clubs;
 - bi-monthly musculoskeletal radiology conferences;
 - bi-monthly reviews of appropriate musculoskeletal pathology;
 - monthly clinical, case-based conferences;
 - basic science/research conferences;
 - general medicine conferences including weekly morbidity and mortality conferences, and weekly medical grand rounds;
- Fellows are encouraged and required to prepare and present at some of the above conferences (journal clubs, clinical case conferences, research conferences). Although this teaching opportunity requires independent learning, the fellow receives

- suggestions, guidance, and supervision by an attending faculty member in the conduct of this activity;
- Independent learning by the fellows is encouraged and facilitated by the availability of a rheumatology division library, multiple educational resources provided to all residents including online resources such as "M.D. Consult," "Up-to-Date," a variety of rheumatologic journals, the most recent additions of several major textbooks of rheumatology and immunology, and complimentary use of medical library resources, such as journal retrieval;
 - Each fellow is required to conduct a "Continuing Quality Improvement" project during the course of training. The fellow is directly supervised in this activity by the Program Director or a designated faculty member

Procedures/Synovial Fluid Analysis

During the course of the ambulatory experience, the fellow will have the opportunity to carry out multiple procedures, including aspiration and injection of joints and soft tissues. Initially the fellow will observe such procedures, and subsequently will be closely supervised during independent performance of these procedures. The fellow will maintain a log of all such procedures in an electronic "Portfolio". The information recorded will include: date of procedure; patient age, gender, and medical record identification number; site of procedure; indication; patient diagnosis; immediate outcome of procedure; complications; and name of supervising attending physician. A list of the expected type and number of procedures is included as "**Appendix D**" to this curriculum.

Synovial fluid analyses will also be independently conducted by the fellow, following training by a faculty physician. A dedicated microscope with polarized light microscopy capability is available for this purpose. The fellow will maintain a record of each synovial fluid analysis in his/her electronic portfolio, including the following information: patient medical record number, date, site of aspiration, volume of fluid obtained, gross description of fluid including color, clarity, and viscosity, results of light microscopic and polarized light microscopic observation, diagnosis, and results of pertinent laboratory findings, such as Gram stain, culture, white and red blood cell counts, protein, and glucose.

Methods of Evaluation

- At the end of each quarter, the fellow is evaluated, specifically noting their performance in the six general competencies, using an on-line evaluation form: "Myevaluations.com." This evaluation is available to the fellow and is reviewed with the fellow directly;
- Semiannually, the fellow receives a direct face-to-face oral and written evaluation of overall performance, including achievement of specific goals and objectives of each rotation and improvement in the six general competencies, by the rheumatology training program director. The program director will review the fellow's individual progress in achievement of 23 specific milestones, directly related to the six general competencies. These milestone assessments will be compiled by the clinical competency committee, prior to the semiannual evaluation. The fellow's performance and competence in the ambulatory clinics is also specifically and directly reviewed. Particular areas for further improvement are identified, future plans, goals, and

objectives are reviewed, and the fellow has the opportunity to provide direct feedback concerning each of the individual rotations, and all educational aspects of the program in aggregate;

- Each fellow is evaluated at least annually during the performance of a mini-CEX, conducted by an individual faculty member;
- Each fellow is evaluated semi-annually in a "360°" format, involving blinded evaluations from patients, students and residents, peers, nurses and other ancillary health providers. These 360° evaluations are conducted in the ambulatory setting, and the multiple available assessments will be discussed with the fellow by the Program Director;
- Each fellow is required to take an annual "In-training Examination," established and conducted by the American College of Rheumatology. The results of this examination are also directly reviewed with each fellow by the program director;
- Participation in conferences (sign-in sheets and online attendance list) and performance of procedures (online procedure log) and joint fluid analyses (online log) are monitored and reviewed separately with each fellow by the Program Director on an annual basis;
- The preparation and presentation of conferences and CQI projects is reviewed with, supervised by, and evaluated by an individual faculty member following each activity;
- The design, progress, and achievement of a successful research activity is closely mentored by an individual faculty member, and evaluated in direct face-to-face communication

III. Description of Clinical Rotations (see also Appendix A)

The goals and objectives of each individual rotation and training experience are enumerated below. These are reviewed with the fellow at the beginning of each rotation. The above general competencies are important aspects of each experience, and they are each individually evaluated during and at the conclusion of each rotation.

Ambulatory Arthritis Clinics

Goals:

- To introduce the trainee to the comprehensive evaluation and management of ambulatory patients with a broad range of rheumatic diseases.
- To enable of the training to obtain confidence in the efficient yet thorough assessment of patients with multiple rheumatic disease symptoms.
- To foster the fellow's appreciation of problem-based learning and improvement as an important component of all ambulatory encounters
- To permit each fellow to establish a stable ambulatory practice of 150 to 200 patients with multiple complex rheumatic diseases, for whom the fellow provides ongoing, comprehensive care.

Objectives: As a result of this experience, the rheumatology fellow will be able to:

- Gain experience in the efficient and cost-effective evaluation of ambulatory patients who present for initial evaluation. (**Medical knowledge, Practice based learning and improvement**);

- Exercise diligence and compassion in the ongoing management of outpatients with chronic rheumatic diseases. **(Patient care skills, Interpersonal and communication skills, professionalism);**
- Demonstrate skill in the performance of a rheumatologic history and examination on inpatients referred for consultation. **(Patient care skills, medical knowledge, professionalism);**
- Develop an appropriate plan for diagnostic testing and treatment of both inpatients seen in consultation and outpatients followed in the continuity clinics. **(Practice based learning and improvement, systems-based practice);**
- Become competent in the performance of multiple musculoskeletal procedures including aspiration and injection of diarthrodial joints and soft tissues. **(Patient care skills, professionalism)**

Description of the ambulatory clinic experience

Each first-year fellow will participate in four general Arthritis Clinics each week, and each second-year fellow will participate in a minimum of 2-3 such clinics each week. Each clinic session is 3 - 4 hours in length and is supervised by one or two rheumatology faculty members. Initially the fellow will see three to four patients at each session. With additional experience, the fellow will continue to see two to three new patients at each session, along with three to five follow-up patients for a total of six to eight patients. There is no separate "continuity" clinic. The fact that the rheumatology fellow sees both new and follow-up patients at each session reflects the real-world experience of rheumatologists in practice, who typically see a mix of new and follow-up patients on a daily basis. For each patient encounter, the fellow will carry out an appropriate history and examination and then present the patient to a faculty attending. At this time laboratory results, x-rays and other diagnostic studies are reviewed. The fellow will be encouraged to formulate a plan for further evaluation and treatment, and this is discussed with the faculty attending physician. The fellow will have autonomy in scheduling the patient for follow-up. The fellow will be responsible for follow-up of laboratory and x-ray findings. The details of all ambulatory encounters, including follow-up phone calls and/or correspondence, will be recorded in the electronic medical record. When a patient returns for follow-up, the fellow will be encouraged to review and discuss the patient with an attending physician who is already familiar with the patient from previous visits, to facilitate continuity of care.

At his/her discretion, the fellow may opt to provide not only rheumatologic care but total management for patients seen in the arthritis and lupus clinics. This will be most appropriate for patients who do not already have a primary care physician. In addition to rheumatologic and continuity care, the fellow will gain experience in several specific areas during this ambulatory experience, including when to refer patients for ancillary services such as physical therapy, orthopedic consultation, etc.; when to initiate complex therapy such as immunosuppressive or biologic agents; the relative cost of various available therapies; and social issues that impact patients with chronic diseases.

The fellow's performance in the ambulatory clinics is evaluated in three ways:

- A mini-CEX is conducted at least annually during a new patient encounter, with direct observation by an individual faculty member;
- 360° evaluations are collected from patients, students, peers, nurses, and other ancillary personnel on a semiannual basis;

- The fellow receives direct, face-to-face and written feedback concerning their performance in the ambulatory clinic at a semi-annual meeting with the Program Director

The Lupus Clinic

Goals:

- To introduce the fellow to the complexity of patients with potentially severe, multi-system disease;
- To enable the fellow to conduct a complete, comprehensive and thorough history and physical examination of patients with multiple symptoms and multisystem pathology;
- To illustrate the importance of patient communication and close regular follow up in the successful management of patients with complex multisystem disease;

Objectives: As a result of this ambulatory experience, the rheumatology fellow will be able to:

- Rapidly, yet carefully evaluate complex patients with numerous symptoms, and multiorgan disease. (**Patient care skills, Medical knowledge**);
- Use appropriate, medical resources in an efficient manner to achieve successful patient diagnostic evaluation and long-term management. (**Medical knowledge, Practice based learning and improvement, Patient care skills**);
- Establish effective patient communication that leads to productive long-term follow-up and successful outcomes. (**Interpersonal communication, Professionalism**);
- Appreciate the importance of multidisciplinary care, involving other health professionals such as nephrologists and dermatologists, in the long-term evaluation and management of patients. (**Systems based practice, professionalism**);

Description of the Lupus Clinic:

The Lupus Clinic meets weekly and is supervised by at least two faculty members. All fellows participate in the Lupus clinic, throughout their two years of training. Because of the potential severity of Lupus, this is an open clinic; patients are permitted to be seen in the clinic on an urgent basis, without prior appointment. Therefore, the fellow is obliged to see new patients on referral, scheduled follow-up patients, and urgent patients as necessary. Although every patient encounter in this clinic is reviewed with and discussed with an attending physician, the fellow serves as the "primary physician" for these patients, and therefore has considerable autonomy and responsibility for overall patient management. This level of responsibility considerably enhances their patient-based learning and professionalism.

Dermatologists are available for immediate consultation. Literature and resources from the local chapter of the Lupus Foundation are available in the clinic area.

Fellows receive evaluation for this clinic experience in a manner identical to that noted above for the general arthritis clinics.

Inpatient Consultation Service

Goals:

- To introduce the fellow to the importance of inpatient consultation as a major responsibility in rheumatologic subspecialty practice;
- To enable the fellow to obtain skill and confidence in the musculoskeletal evaluation of hospitalized patients;
- To promote effective communication, professionalism, and practice-based learning as a critical component of the interaction between rheumatologists and other physicians.

Objectives: As a result of the inpatient consultation experience, the fellow will be able to:

- Conduct a focused yet thorough history and physical examination on a hospitalized patient with multiple medical problems. (**Patient care skills, medical knowledge**);
- Utilize the inpatient electronic medical record and electronic radiology retrieval system to obtain appropriate data to facilitate patient evaluation. (**Systems based practice, professionalism**);
- Access appropriate evidence based medical literature relevant to differential diagnosis, evaluation, and current therapy for complex rheumatic diseases. (**Practice based learning and improvement**);
- Interact successfully with physicians, residents, nurses, and other ancillary health professionals during the inpatient evaluation and management of rheumatic diseases. (**Interpersonal communication, professionalism**).

Description of the Inpatient Consultation Experience

The "on-service" rheumatology fellow will have a major role in the conduct of the inpatient consultation service, including organizing the inpatient attending rounds, which are conducted daily, Monday through Friday, and on the weekends as necessary. During the initial months, the fellow will see all inpatient consultations personally, perform an initial history and physical examination, and review the pertinent laboratory results and x-rays. The fellow will then present the patient to the monthly attending rheumatologist during the daily inpatient rounds. The fellow will be responsible for preparing the initial consultation note and for following the patient during the hospitalization. With increasing experience, the rheumatology fellow may elect to assign the initial evaluation of an inpatient consultation to a rotating medical resident or medical student. In such instances, the rheumatology fellow will nevertheless be responsible for briefly seeing the patient prior to presentation at the formal daily inpatient rounds.

To facilitate the logistics of responding to inpatient consultations, the rheumatology fellow will carry the rheumatology service beeper Monday through Friday and for up to two weekends of each month. According to Department of Medicine Policy, all inpatient consultations must be seen and evaluated within twenty-four hours, unless alternate arrangements are indicated by the referring physician. Thus, the fellow will occasionally be responsible for seeing consultations on weekends; the fellow will then have the option of presenting the patient to the attending physician by either telephone or in person at the bedside. Finally, the rheumatology fellow will have the opportunity to follow in-patients with chronic rheumatic diseases in the ambulatory rheumatology clinic following discharge.

In addition to inpatient consultations, the rheumatology fellow will be responsible for carrying out urgent consultations requested from various outpatient clinics on the hospital campus and from the Emergency Department. In these situations, he/she will discuss or see the patient with the faculty attending and render a decision regarding immediate evaluation, treatment and follow-up. As a result of this experience, the fellow will learn which patients need to be seen urgently and which patients can be "triaged" for follow-up in an arthritis clinic on a timely basis. The fellow will maintain an electronic log of all rheumatology consultations. The following information will be recorded: date of consultation; patient age, gender, and medical record number; hospital unit; admitting diagnosis; consult diagnosis; plans for follow-up; attending physician; rheumatology faculty consultant; and any special comments.

Conferences – Teaching (see also Appendix B)

As indicated above, a large number of conferences are conducted on a regular basis. Attendance at these conferences is required of all rheumatology division faculty and rheumatology fellows. Attendance is documented by sign-in sheets and is recorded in each fellow's personal electronic portfolio, which is reviewed with the Program Director semi-annually. Weekly conferences include:

- Musculoskeletal radiology. The rheumatology fellow may select interesting or informative x-rays of patients recently seen on the inpatient and outpatient services and may elect to add additional relevant x-rays from the rheumatology teaching file for presentation and discussion with other fellows and rotating trainees;
- Journal club. A rheumatology fellow or attending physician will present recent rheumatologic articles of exceptional current interest for group discussion;
- Medical resident/student presentation. Each rotating resident and student on the rheumatology service is obliged to prepare a 20-30-minute presentation focusing on a rheumatologic topic of their own interest. A brief outline with references is supplied to all attendees. These informal conferences provide an opportunity for fellows, trainees and faculty to engage in discussion regarding contemporary rheumatologic issues of importance.

Other regular conferences include:

- Regional "Westside rheumatology" clinical conference (monthly). These conferences will be organized by the previous month consult fellow and attending physician and will focus on recent interesting and illustrative clinical cases.
- Cleveland Society of Rheumatology "City-wide Conferences." Fellows and faculty from all three Cleveland training programs and practicing rheumatologists from the northeast Ohio area gather to review challenging clinical cases or to hear a lecture from a visiting professor at these meetings, which are conducted 2-4 times each year.
- Pathology conference (every 2 months). With one of our specialty pathologists (e.g. a dermatopathologist, nephropathologist, neuropathologist, etc.), we will review histologic material from recent cases seen on the inpatient and outpatient services. This session will take place in the Pathology Department, where a multi-head microscope is available for teaching purposes.

- Musculoskeletal radiology conference (every 2 months). This conference will review two or three interesting cases and will be conducted in collaboration with the musculoskeletal radiology section of the Department of Radiology;
- Immunology lecture series (monthly). This conference series is arranged and conducted at the Cleveland clinic, and all fellows are encouraged to attend;
- Morbidity and mortality clinic conference (monthly);
- Rheumatology division meeting (bimonthly). All faculty and the rheumatology fellows attend this meeting to discuss a variety of topics, including future educational activities, logistic issues affecting the division such as vacation schedules, equipment needs etc., interesting patients, and evaluations of rotating residents and students.

At one meeting semi-annually, the rheumatology fellows will be excused so that the division faculty can discuss their evaluation, including progress in achieving important goals of each rotation and performance in the six general competencies. The Rheumatology Program Director will review these evaluations with each rheumatology fellow and solicit feedback.

Many of these sessions are planned, scheduled and organized by the “off-service” rheumatology fellow, in collaboration with the monthly attending physician. As the fellow’s experience increases, he/she will have greater autonomy in organizing the activities for these didactic sessions, but the rheumatology fellow will always have the opportunity to review the schedule for each session with the attending physician. The second-year rheumatology fellows will organize the bimonthly musculoskeletal pathology and musculoskeletal radiology conferences. In addition, the second-year fellows will prepare a monthly calendar which includes all educational activities.

"**Appendix A**" provides a table illustrating the weekly activity schedule of the arthritis clinics, Lupus clinic, inpatient consultation rounds and regularly scheduled conferences.

IV. Research Experience.

Goals:

- To provide “protected time,” technical support, and mentoring sufficient to enable the fellow to conduct and complete a research project;
- To assist the fellow in preparation of an abstract for presentation or a manuscript for publication

Objectives: At the end of this rotation the fellow will be able to:

- Appreciate important characteristics of a rigorous clinical investigation, such as valid study design; value of randomization, blinding, and use of control populations; application of appropriate statistical measures; and potential sources of bias. (**Medical knowledge, Professionalism**);
- Understand the theoretical background, technical aspects, and appropriate use of several important clinical and laboratory procedures, such as electrophoresis, immunodiffusion, direct and indirect immunofluorescence, ELISA, immunoprecipitation, polymerase chain reaction, immunoblotting, FACS analysis, cell culture and the basics of safe laboratory practices. (**Medical knowledge**);

- To understand and participate in the process of presentation and publication of a research project, including compilation and organization of data, statistical analysis, review of pertinent literature and preparation of a final abstract and/or manuscript for submission. **(Medical knowledge, Professionalism, Systems based practice)**

Description of the Research Experience:

The only required clinical activities of the fellow during the designated research rotations will involve attending the Lupus Clinic and 2 or 3 arthritis clinics each week and participating in the Friday morning didactic teaching sessions. Thus, the fellow will have considerable time to plan and conduct one or more research projects. The fellow will have two months of protected time for research during the first year of fellowship, and a minimum of two months of protected time during the second year. The details of the required research experience are outlined in the Research Curriculum and Policy for Rheumatology Fellows. Other aspects of this research rotation will include the following:

- Depending upon the nature of the project, arrangements will be made to provide laboratory space, equipment and supplies for “wet bench research;”
- Appropriate collaborations will be sought to promote the success of the research project. For example, expertise in study design and statistical methods is available from the Department of Epidemiology and Biostatistics located on the MetroHealth Campus. In addition, numerous investigators in the Department of Medicine and other departments;
- at MetroHealth Medical Center have laboratory space in the Rammelkamp Research Building and are available to provide technical help, loan of equipment or supplies and discussion of experimental methods;
- Existing collaborations with investigators at the Cleveland Clinic and the University Hospitals of Cleveland can be taken advantage of to provide technical advice, patient referrals, and laboratory supplies or shared use of resources;
- For clinical projects, the fellow will be able to take advantage of the MetroHealth General Clinical Research Center. This institutional resource provides nursing, clerical, laboratory, pharmaceutical and logistics support for many of the investigator-initiated and pharmaceutical-sponsored clinical studies that are conducted at MetroHealth Medical Center. As part of their training the fellows will become CREC-certified

All efforts will be made to ensure that the fellow’s choice of research project(s) will lead to the acquisition of data that can be presented at a scientific meeting or prepared as a manuscript for publication. The fellow’s mentor will supervise the tempo of the research with these objectives in mind. The completion of a project and preparation of a relevant abstract or manuscript is considered an important and vital aspect of the research process, and it is expected that each fellow will complete at least one such research activity during the course of training. It is assumed that the fellow will be the first author on any abstract or publication and will have primary responsibility for preparation of slides, figures, graphs, posters and all portions of a manuscript. Depending on the fellow’s interest and the nature of the research project, the fellow will have the opportunity to extend his/her research activities for up to 6 months during the second year of training.

V. Required ancillary rotations.

Required Rotation 1: Vasculitis

Goals: The goals of the Vasculitis experience are:

- To expose the rheumatology fellow to a large population of tertiary care rheumatology patients, namely vasculitis.
- To enable the fellow to gain experience in a tertiary care center on both the consultative and ambulatory rheumatology practice.

Description of the Vasculitis experience:

This rotation for all 2nd year fellows will consist of a 4-week rotation on the vasculitis service at the Cleveland Clinic. This experience will involve evaluating patients in the ambulatory clinic for a variety of vasculitic disorders and seeing patients in consultation in the hospital. The rotation is supervised by several rheumatologists with expertise in vasculitic disorders.

Required Rotation 2: Community Health Rheumatology

Goals: The goals of the community health rheumatology experience are:

- To expose the rheumatology fellow to a unique and complementary outpatient experience, reflecting “real world” outpatient rheumatologic care;
- To enable the fellow to gain experience in a community-based ambulatory rheumatology practice.

Objectives: As a result of this experience, the rheumatology fellow will be able to:

- Understand the pace, logistics and nuances of a community rheumatology practice. **(Practice based learning and improvement, Systems based practice)**
- Appreciate the importance of focused evaluation and timely communication for outpatient referrals in a community practice setting. **(Interpersonal and communication skills, Professionalism)**

Description of the community rheumatology experience

The fellow will spend 3 half-clinics each week in the office of a rheumatologist practicing in the community (satellite clinics). The fellow will see follow-up patients and new patients under the direct supervision of the rheumatologist, with whom he/she will review the history and physical findings and discuss approaches for evaluation and treatment. Procedures may be carried out at the discretion and under the guidance of the rheumatologist.

Required Rotation 3: Rehabilitation Medicine

Goals: The goals of this rotation will be:

- To expose the rheumatology fellow to the broad range of activities, functions, and benefits of a busy, comprehensive outpatient rehabilitation service;
- To enable the fellow to understand the value of a multidisciplinary, subacute inpatient rehabilitation facility for patients with chronic disabling musculoskeletal disorders;
- To illustrate the important role played by ancillary health professionals, such as physical, occupational, cognitive and speech therapists in successful long-term rehabilitation.

Objectives: As a result of this rotation the rheumatology fellow will be able to:

- Understand the goals, therapeutic modalities and anticipated outcomes of an inpatient rehabilitation hospitalization. **(Medical knowledge, Practice based learning and improvement);**
- Observe the responses to therapy and progress of both inpatients and outpatients undergoing rehabilitation for a wide variety of musculoskeletal and neurologic conditions. **(Patient care skills, Practice based learning and improvement);**
- Develop an awareness of the importance of multiple healthcare providers and other resources in an overall plan for rehabilitation of patients with chronic musculoskeletal disorders. **(Systems based practice, Professionalism);**
- Select and counsel patients who are most appropriate for inpatient or outpatient rehabilitation therapy. **(Practice based learning and improvement, Interpersonal and communication skills)**

Description of the rehabilitation medicine rotation.

This 4-week rotation, available to either 1st or 2nd year fellows, will involve participation in the daily outpatient musculoskeletal clinics. The fellow will see both new and follow-up patients under the direct supervision of an attending PM&R physician. During these sessions the rheumatology fellow will carry out injection procedures, interact with ancillary health personnel including physical therapists and occupational therapists, and attend ambulatory rehabilitation conferences. A more detailed description of the goals, activities, and expectations of the inpatient and ambulatory rotations is included in the Appendix.

During the course of this rehabilitation rotation the rheumatology fellow will continue to participate in the Lupus Clinic and 2-3 arthritis clinics each week and will attend the Friday morning didactic sessions. At the end of this rotation the fellow will be evaluated by the PM&R physicians and the fellow will meet with the Rheumatology Program Director to provide feedback concerning the educational value of all aspects of the inpatient and outpatient rehabilitation rotations.

Required Rotation 4: Pediatric Rheumatology

Goals: The goals of the pediatric rheumatology experience are:

- To provide the rheumatology fellow within opportunity to conduct an appropriate diagnostic evaluation in children with rheumatic disease symptoms;
- To enable the rheumatology fellow to become comfortable with diagnosis, treatment, and follow up of children with rheumatic diseases;

Objectives: At the end of this experience, the rheumatology fellow will be able to:

- Conduct an appropriate history, examination and evaluation of the pediatric patient with a rheumatologic illness. (**Interpersonal and communication skills, Patient care skills**);
- Review important aspects of rheumatologic treatment, specifically related to the pediatric patient. (**Medical knowledge, Practice based learning and improvement**)

Description of the pediatric rheumatology rotation

This rotation will involve 2-3 ambulatory clinics each week. The fellow will spend one session in the pediatric rheumatology clinic at MetroHealth each week with Dr. Hulya Bukulmez, and 1-2 sessions at the Beachwood satellite office, with either Dr. Bukulmez or Dr. Nora Singer. Additional time will be available each week for inpatient rounds and pediatric rheumatology consultations. The fellow will be introduced to specific, unique aspects of pediatric evaluation and treatment during the course of this outpatient and inpatient experience. The fellow will also have the opportunity to attend pediatric rheumatology conferences and journal clubs. The fellow may be able to follow certain patients in the pediatric rheumatology clinic under the supervision of a pediatric rheumatologist following the completion of this one-month rotation. The fellow will be able to discuss research activities and opportunities with our 2 pediatric rheumatologists, according to his/her particular interests.

VI. Elective experiences

During the second year of the rheumatology training program, the fellow will be able to participate in 1-3 elective rotations, depending upon their clinical and research schedule. The **goals** of these rotations will be:

- To refine the fellow's clinical and/or research skills;
- To provide additional opportunities to extend the rheumatology fellow's range of knowledge and experience;
- To expose the rheumatology fellow to a more in-depth experience in various ancillary musculoskeletal disorders.

Objectives: As a result of these rotations the fellow will be able to:

- Extend his/her research experience to complete a desired project or to obtain sufficient additional data to prepare a proposal for independent funding to launch an academic career. (**Medical knowledge**);
- Acquire an enriched experience in rheumatology-related areas of practice, such as office orthopedics, rehabilitation medicine, geriatric medicine or musculoskeletal imaging. (**Medical knowledge, Practice based learning and improvement**);
- Obtain an in-depth clinical experience in pediatric rheumatology relative to the evaluation and management of both inpatients and outpatients. (**Medical knowledge, Practice based learning and improvement**);
- Explore the logistics of private rheumatologic practice by participating in additional community-based outpatient and consultation experiences. (**Systems based practice, Professionalism**)

Description of elective rotations:

The following is a brief description of potential rotations that can be elected by the rheumatology fellow during the second year.

- **Musculoskeletal radiology.** The fellow may elect to take a one-month rotation in the musculoskeletal radiology department at either Metrohealth Medical Center, the Cleveland Clinic or University Hospital, each of which offers extensive training experience in this subspecialty. Evaluation of MRIs, CT scans, ultrasound, and other imaging techniques will be emphasized. The fellow will also participate in a range of musculoskeletal radiology conferences and may apply for a Ultrasound Sonar Grant.
- **Metabolic bone disease.** The fellow may elect to take a 4-week rotation on the Cleveland Clinic metabolic bone service. This comprehensive program involves evaluation and treatment of patients with a broad range of metabolic bone disorders, including patients with complex and clinically refractory diseases. There is a regularly scheduled series of conferences.
- **Orthopedics.** The rheumatology fellow will participate in each of the four orthopedic specialty clinics (trauma/joint reconstruction, hand, spine, and pediatrics) for at least one session each week. An orthopedic faculty member, an orthopedic chief resident, and at least one additional orthopedic resident will normally be present at each of these sessions. The rheumatology fellow will be responsible for initially evaluating three to six patients. These patients will be presented to the faculty attending or chief resident; x-rays will then be reviewed and decisions regarding management will be discussed. The fellow will have the opportunity to directly observe minor orthopedic procedures in these clinics and, according to personal interest/aptitude, may wish to participate in such office procedures.

Appendix A: Schedule

Schedule of weekly activities:

	Monday	Tuesday	Wednesday	Thursday	Friday
8:00	Arthritis clinic	Lupus clinic	Arthritis clinic	Arthritis clinic	Didactics
9:00	..	..	..	..	..
10:00	..	..	..	..	..
11:00	..	..	..	..	..
12:00		M & M		Grand rounds	
1:00	Arthritis clinic	Lupus clinic	Arthritis clinic	Arthritis clinic	F2 clinic
2:00	..	..	..
3:00	..	..	..		Inpt. Rounds
4:00	Inpt. Rounds	Inpt. Rounds	Inpt. Rounds	Inpt. Rounds	..
5:00					

Notes regarding schedule:

1. Fellow responsibilities:

- a. F1, “on-service”: Morning clinics, organization of daily attending rounds, 1st on-call, preparation of weekend coverage schedule.
- b. F1, “off-service”: Afternoon clinics, 2nd on call, organization and distribution (email) of Friday didactic schedule. Organization of medical student/resident teaching activities (introduction to the service, MS exam, interpretation of laboratory tests, use of ancillary services and DME, etc.) – shared with F2.
- c. F2: Research, teaching in the Lupus clinic, Friday PM and 1 or 2 additional clinics, required rotations & elective rotations.

2. Annual schedule:

- a. First year fellows have 4 clinics per week for all 12 months:
 - 4 months of consult “on service”
 - 6 months of teaching
 - 2 months of research
 - 2 months of core rheumatology
 - 1 elective in 1st year (still 4 clinics per week) PMR
- b. Second year fellows have 2-3 clinics per month depending on rotation:
 - 1-month CRSP (statistics) (2 clinics/week)
 - 2 months of consults (3 clinics/week, mornings)
 - 2-3 months research (2 clinics/week) or month of Ortho elective
 - (required month) Vasculitis (2 clinics/week)
 - (required month) Community rheumatology (2 clinics/week)
 - (required month) Pediatric rheumatology (2 clinics/week)- can overlap with radiology if desirable
 - 2 months of core rheumatology (3 clinics/week)

- ***Vacation: 2 weeks each ½ year, scheduled 6 months in advance to avoid overlap, not taken while on-service.
3. **Attending rounds:** Ordinarily to begin at 4:00 - 4:30 on Monday through Friday, although exact timing of these rounds will be arranged at a daily morning meeting between the on-service fellow and the consult attending. Off service fellows are encouraged to participate if possible.
 4. **Clinic schedules:** One-hour new appointments, ½ hour follow-up appointments, 8 AM to 11:30 AM and 1 PM to 4 PM. In the event of no-shows, fellows are expected to see faculty patients, with consent. Second year fellows may overbook, may add urgent patients, have "flexible" scheduling, and are encouraged to include students for teaching.
 5. **Pagers:** The rheumatology service pager will be carried by the on-service first year fellow on the inpatient service, except for two weekends per month, when it will be carried by the off-service first-year fellow or a second-year fellow. The 1st and 2nd year fellows will meet at the beginning of each month, to coordinate this coverage and create a monthly service schedule, which will be made available to all fellows and faculty. The "Doctor-of-the-Day" pager will carried by the 2nd year fellows, according to a monthly arranged schedule.
 6. **Calendars:** A monthly calendar will be prepared by a second-year fellow and the rheumatology division practice support specialist. This calendar will list attending physicians, consult fellows, doctor of the day fellow, and fellows on-call, to facilitate transitions of care. The calendar will also include a compilation of the planned monthly didactic conferences.

Appendix B: Conferences

All fellows attend core lecture series at CCF, July – September

Fellows are encouraged to attend the monthly CCF immunology conference

Friday didactics include:

- Weekly Journal club
- Monthly Westside conference
- Monthly research/basic science conference
- Bimonthly pathology and MS radiology conferences
- Resident/student presentations
- Monthly morbidity/mortality conference
- Immunology course

A weekly teaching activity will be organized and presented by the faculty attending (or designee), at a time agreed on by faculty and fellows. This activity may include lectures and/or demonstrations relative to the following topics:

- regional MS plain-film imaging (e.g., hand, shoulder, etc.)
- disease activity measures (in RA, OA, SLE, Spondyloarthropathies)
- bone/cartilage biology
- rheumatic medication MOAs
- basic laboratory/immunology techniques (ELISA/PCR/FACS/ISH)
- acute phase response
- genetics: genome, transcriptome, epigenome
- physical therapy
- occupational therapy
- introduction to MS US
- MS techniques: DEXA, capillaroscopy, polarizing light microscopy
- basics in immunology (innate/acquired, cellular & humoral elements)
- clinical trial design
- basic statistics

Other specific topics may be requested by the fellows.

Appendix C: Ancillary educational activities

During the course of the two years of this fellowship training program, each fellow will have the opportunity to participate in several additional activities, relevant to the practice of clinical rheumatology. These include:

- CREC certification. With respect to the conduct of clinical research, fellows will be introduced to good clinical practices (GCP), conventions of the International Conference on Harmonization (ICH), and will ultimately be accredited according to the Continuing Research Education Certification (CREC). Fellows will also meet with the rheumatology

research coordinators, and will consequently learn important information regarding study design, outcome measures, adverse outcomes, risk-benefit analyses, statistical techniques, and the importance of interaction with clinical research units, Institutional Review Boards, and other regulatory agencies involved in the conduct of clinical research.

- During July of the 2nd year, each fellow will participate in a CRSP (Clinical Research Scholars Program) training course, which will take place during the mornings.
- Fellows will be encouraged to undertake appropriate training in bone densitometry and achieve certification through the International Society of Clinical Densitometry (ISCD).
- Fellows will have the opportunity to acquire formal ultrasound training. Two rheumatology staff members have formally trained in musculoskeletal ultrasound through the USSONAR Program. First year fellows will be taught how to perform ultrasound studies on each of the eight joints covered by USSONAR and on ultrasound guided injections. Highly interested fellows are encouraged during their second year to compete for the USSONAR Fellowship Scholarship Program.

Those interested in competing will need to devote a significant amount of time in the month of October to performing and reading about ultrasound to be competitive for the Program. Fellows accepted into the Program will primarily learn from the feedback provided by USSONAR, with backup support from MetroHealth faculty as needed. Fellows who fail to get accepted into the USSONAR Program, may continue pursuing ultrasound training by arranging supervised ultrasound studies and ultrasound-guided procedures from Drs. Yue or Singer on an ad hoc basis. For both pathways, the fellow should aim to perform approximately 50 ultrasound studies or injections a year.

- Fellows will be supervised in the use of this technique in the ambulatory clinic by trained rheumatology faculty.
- Fellows will be apprised of, and encouraged to attend, several regional and national rheumatology conferences each year during the course of their training program.

Appendix D: Procedures

Procedures Expected – 100 per year

Joint aspiration and/or injection.

PIP/MCP.
Wrist.
Elbow.
Glenohumeral.
Knee
Ankle

Bursa injections.

Subdeltoid/subacromial.
Olecranon.
Trochanteric
Prepatellar
Anserine

Tendon injections.

Trigger finger.
Dequervains.
Medial/lateral epicondylitis.
Bicipital.
Posterior tibial.

Other soft tissue procedures.

Carpal tunnel.
Plantar fasciitis.
Trigger point

