

## **Clinical Cardiac Electrophysiology – EP Lopez/Cheng Service St. Luke’s Episcopal Hospital/Texas Heart Institute**

During this rotation, the Clinical Cardiac Electrophysiology (EP) fellow (typically in the third or fourth year of subspecialty) functions as a consultant in Clinical Cardiac Electrophysiology. The subspecialty trainee is expected to attain competence in the diagnosis and management of cardiac electrophysiological disorders in ambulatory and hospitalized patients, to include the following:

1. Basic fundamentals of cardiac electrophysiology, cellular, mechanisms, drugs used in the treatment of patients with cardiac electrophysiological disorders.
2. Develop a mechanistic approach to interpretation of various cardiac arrhythmias.
3. Perform effective, expeditious, and accurate assessment of cardiac electrophysiology patients.
4. Develop mastery of the indications for non-invasive and invasive electrophysiological studies.
5. Develop mastery of the mechanisms of drug actions and their interactions.
6. Learn the role of invasive electrophysiological studies, catheter ablation, and device therapy in the treatment of cardiac electrophysiology patients.
7. Performance focused pre-procedure patient evaluation.
8. Performance of EP studies under supervision with the acquisition of complete and accurate data.
9. Accurately interpret and analyze invasive electrophysiological data.
10. Design of a management plan, its implementation and follow-up
11. Recognition, management, and prevention of procedure-related complications.

The EP fellow will develop expertise in the recognition, diagnosis and management of the spectrum of cardiac arrhythmias that occur in an adult general medical/surgical hospital with a high volume of patients with cardiovascular disease. The EP fellow will be proficient in the performance of a focused cardiac electrophysiology history and physical examination. The EP fellow will develop expertise in recognizing the mode of presentation, clinical features, and differential diagnosis of various cardiac arrhythmias along with the proper use of clinical tests and other laboratory and imaging modalities to facilitate diagnoses.

The EP fellow will dedicate the majority of the time to patient care responsibilities, and will be actively and directly involved in diagnostic and therapeutic decision-making and performing invasive electrophysiological procedures. The majority of consults and primary admissions are done on an inpatient basis; however, the EP fellow will also have the opportunity to see outpatients in the office who are initially presenting with cardiac electrophysiological disorders. EP fellows regularly perform cardiac electrophysiological consultations and new admissions in hospitalized patients both in the critical care environment, and on the medical wards. EP fellows are required to interact with specialists from all disciplines of internal medicine, general surgery and other surgical specialties, critical care medicine and the Emergency Room, and, as the consultant, will communicate with the primary care physicians in an effective and appropriate manner. The EP fellow will fulfill all requirements to assure the privacy and confidentiality of all the medical information of the patient.

In addition, the EP fellow will actively participate in weekly scheduled teaching conferences that include core curriculum seminars, case presentations, cardiac electrophysiology journal club, electrophysiology tracing review, research conference, and cardiology grand rounds. Moreover, the EP fellow will be encouraged to do regular literature reviews and read about cardiac electrophysiology disorders exhibited by the cases seen on the service.

Under the guidance of supervising faculty, the EP fellow is responsible for evaluating consult and primary patients on the inpatient service during initial and follow-up care over the course of their hospitalization. Medical students, internal medicine residents, and cardiology fellows may be assigned to the cardiac electrophysiology service at St. Luke’s Episcopal Hospital and will be supervised by the EP fellow and staff attending. All patients are teaching patients on the inpatient service. There are no absolute limits to the number of patients followed on the service, but the average daily census is typically 10-20 patients with 3-5 new consults/admissions each weekday.

In addition to consultation and inpatient responsibilities, the EP fellow will participate in all invasive electrophysiological studies and device implantation procedures with the staff attending.

<b>Legend for Learning Activities</b>	
AR/FS – Attending Rounds/Faculty Supervision	LR – Literature Review (independent)
CC – Core Curriculum conferences	CPC – Case Presentation Conferences
DPC – Direct Patient Care	RC – Research Conference
JC – Journal Club	

<b>Legend for Evaluation Methods for Fellows</b>	
AE – Attending Evaluations	PE – Patient Evaluation
PDR – Program Director’s Review (twice annually)	360° – 360° Evaluation

**Principal Educational Goals by Relevant Competency**

The educational goals and objectives for the EP fellow on this rotation are indicated for each of the six ACGME competencies in the tables below. The first column describes whether the objective is knowledge, skill and/or attitude. The third column lists the most relevant learning activities for that objective, and the fourth column indicates the evaluation methods for that objective.

**A. Patient Care**

**Goal:** EP fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of cardiac electrophysiological disorders.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will demonstrate the:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Knowledge, Skills	Ability to take a complete medical history and perform a careful and accurate physical examination with a cardiac electrophysiology focus	DPC, AR/FS	AE

Knowledge, Skills	Ability to write concise, accurate and informative histories, physical examinations and progress notes with a cardiac electrophysiology focus	DPC, AR/FS	AE
Knowledge, Skills	Ability to formulate comprehensive and accurate problem lists, differential diagnoses and diagnostic & therapeutic plans	DPC, AR/FS, CPC, CC, LR	AE, PDR
Knowledge, Skills	Ability to properly order and interpret results in diagnostic testing, including laboratory, echocardiographic, angiographic, non-invasive electrophysiologic, and invasive electrophysiologic results	DPC, AR/FS, LR, CPC, CC, JC	AE, PDR
Knowledge, Skills	Ability to write concise, accurate, informative and helpful consultation notes, clearly outlining the recommendations and explaining their rationale	DPC, AR/FS	AE
Knowledge, Skills	Ability to prescribe and appropriately utilize the various antiarrhythmic agents for the prevention and treatment of various cardiac arrhythmias	DPC, AR/FS, LR, CPC, CC, JC, RC	AE
Knowledge, Skills	Ability to efficiently perform invasive electrophysiological studies, catheter ablation, and device implantation procedures for the treatment of the spectrum of cardiac electrophysiological disorders.	DPC, AR/FS	AE, PDR, 360°

## B. Medical Knowledge

**Goal:** EP fellows must demonstrate knowledge about established principles and evolving science critical to the practice of clinical cardiac electrophysiology.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Knowledge	Basic fundamentals of cardiac electrophysiology, cellular, mechanisms, drugs used in the treatment of patients with cardiac electrophysiological disorders.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR
Knowledge	Recognition, classification, and management of familial/genetic cardiac electrophysiological disorders, including the long-QT syndromes, Brugada Syndrome, hypertrophic cardiomyopathy and arrhythmogenic right ventricular cardiomyopathy.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR
Knowledge	Recognition, classification, and management of ventricular arrhythmias in patients with and without structural heart disease.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR
Knowledge	Recognition, classification, and management of various supraventricular arrhythmias in patients with and without structural heart disease.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR

Knowledge	Recognition, classification, and management of bradycardia and various levels of heart block.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR
Knowledge	Develop mastery of the mechanisms of drug actions and their interactions.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR
Knowledge	Develop mastery of the indications for non-invasive and invasive electrophysiological studies.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR
Knowledge	Learn the role of invasive electrophysiological studies, catheter ablation, and device therapy in the treatment of cardiac electrophysiology patients.	AR/FS, CC, DPC, MLR, JC, LR, CPC, RC	AE, PDR
Knowledge	Be capable of appropriate ordering and interpretation of electrophysiologic, radiographic, nuclear, and laboratory examinations.	AR/FS, CC, DPC, JC, LR, CPC, RC	AE, PDR
Knowledge	Recognize and manage invasive procedure related complications.	AR/FS, CC, DPC, JC, LR, CPC	AE, PDR

### C. Interpersonal Skills and Communication

**Goal:** EP fellows must demonstrate the knowledge, skills and attitudes necessary to develop and maintain appropriate interpersonal relationships and to communicate effectively with patients, families, colleagues and the public.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Skill	Communicate sensitively and effectively with hospitalized patients with cardiac electrophysiology disorders and with their families	DPC, AR/FS, CC, ID	AE, PE
Skill, Attitude	Display a willingness and ability to teach medical students, pharmacy students, medical residents, and general cardiology fellows	DPC, AR/FS	AE, 360°

### D. Professionalism

**Goal:** EP fellows must demonstrate the knowledge, skills, and attitudes necessary to practice professionally responsible, ethical and compassionate care in clinical cardiac electrophysiology practice.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Knowledge, Skill, Attitude	Interact professionally towards patients, families, colleagues, and all members of the health care team	DPC, AR/FS, CC, ID	AE, PE, 360°
Attitude	Display an appreciation of the social context of illness especially in hospitalized patients with cardiac electrophysiology disorders	DPC, AR/FS, CC, ID	AE, PE
Knowledge, skill, Attitude	Fulfill all the requirements to assure the privacy and confidentiality of all the medical information of the patient.	DPC, AR/FS, CC, ID, JC, LR	AE, PDR, PE, 360°

### E. Practice-Based Learning and Improvement

**Goal:** EP fellows must demonstrate the knowledge, skills, and attitudes necessary to initiate self-directed and independent learning. EP fellows must keep abreast of current information and practices relevant to clinical cardiac electrophysiology practice.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Attitude	Demonstrate a commitment to professional scholarship through the systematic and critical perusal of relevant print and electronic medical literature, with an emphasis on the integration of basic science with clinical medicine, and evaluation of information in light of the principles of evidence-based medicine	DPC, AR/FS, MR, LR, ID, CPC, CC, JC, RC	AE, PDR
Skill, Attitude	Integrate knowledge learned through participation in invasive and non-invasive EP procedures, ward rounds, teaching conferences and other educational activities into their practice	DPC, AR/FS	AE, PDR

### F. Systems-Based Practice

**Goal:** EP fellows must demonstrate the knowledge, skills, and attitudes necessary to manage effectively in multiple, diverse, complex systems of care to provide effective treatment, consultation and referrals for patients.

<b>Knowledge, Skills, Attitude</b>	<b>Objectives – Fellows will:</b>	<b>Learning Activities</b>	<b>Evaluation Methods</b>
Knowledge, Skill	Demonstrate the ability to work with the service requesting the consultation to assure that care for the patient’s medical needs is properly coordinated with care being delivered by the primary service	DPC, AR/FS	AE, PDR, PE
Skill, Attitude	Display a willingness and ability to help the requesting	DPC,	AE, PDR

	physician in a consultative or co-management capacity, according to the needs of the situation	AR/FS	
Skill, Attitude	Integrate knowledge learned through participation in invasive and non-invasive EP procedures, ward rounds, teaching conferences and other educational activities into their practice	DPC, AR/FS	AE, PDR
Attitude	Consider the cost-effectiveness of diagnostic, prevention and treatment modalities when selecting such strategies for patients.	DPC, AR, FS, CPC, JC, MC, P&T, ICC, LR, CC	AE, PE