PURPOSE

The purpose of this Manual is to describe all practical aspects of the Fellowship Program in Clinical Cardiac Electrophysiology (CCEP) at the McGovern Medical School at UTHealth. The Manual supplements the Manual for Cardiology Fellows and the Graduate Medical Education Trainee Handbook and is updated annually at the beginning of the academic year.

The ACGME-accredited fellowship consists of 24 months training, at the end of which the fellow will or should have met the requirements for the American Board of Internal Medicine examination in CCEP.
The first goal of the CCEP fellowship is to provide qualified cardiologists with a comprehensive, structured and scholarly experience in clinical CCEP. Diagnosis and management of clinical arrhythmias is emphasized using both invasive and noninvasive techniques. The second goal is to encourage scholarly productivity by providing opportunities for both basic and clinical research, quality improvement (QI) and teaching. The third goal is to maintain an interactive didactic curriculum to prepare every CCEP fellow to attain certification from the American Board of Internal Medicine in CCEP. The fourth goal is to facilitate in fellows development of well-rounded leadership and life-long learning skills. Toward these ends, specific educational objectives for each clinical rotation have been established.

The following four competencies are the same across rotations.

Practice Based Learning & Improvement:

1. Systematically analyze practice using quality improvement methods and implement changes with the goal of practice improvement,
2. Locate, appraise and assimilate evidence from scientific studies related to their patients’ health problems,
3. Initiate self-directed and independent learning,
4. Keep abreast of current information and practices relevant to clinical cardiac CCEP.
5. Utilize available resources to make timely and appropriate diagnostic and management decisions
6. Seek constructive feedback, and use it to improve performance
7. Demonstrate knowledge of the impact of study design on validity or applicability to individual patient situations and an ability to critically evaluate the relevant medical literature.
8. Model independent learning and use information technology to enhance knowledge and improve patient counseling
9. Identify knowledge deficits and work to remedy them

Interpersonal & Communication Skills:

1. Demonstrate interpersonal and communication skills in a professional, respectful, and effective manner that results in the effective exchange of information and collaboration with patients, their families, other physicians and healthcare professionals and the public.
2. Demonstrate the ability to obtain, interpret, and evaluate consultations from other medical specialties including general and interventional cardiology and cardiovascular surgery.

3. Serve as an effective consultant to other medical specialists and community agencies.

4. Employ effective communication in the care of the critical patient and his/her family, demonstrating sensitivity to situational and cultural needs in DNR, pain management, goals of care, and withdrawal of care discussions.

5. Maintain medical records and prescriptions that are legible and up-to-date, capturing essential information while simultaneously respecting patient privacy.

6. Recognize the need for and effectively use interpreters when necessary.

7. Present up-to-date information to students and residents in an organized fashion.

8. Provide feedback to students, residents and other professionals.

**Professionalism and Ethical Behavior:**

1. Demonstrate respect, compassion, and integrity in interactions with patients, their families and caregivers.

2. Demonstrate responsiveness to the needs of patients and the society that supersedes self-interest.

3. Demonstrate accountability to patients, society, and the profession, and a commitment to excellence and ongoing professional development.

4. Maintain appropriate professional boundaries and relationships with patients, other physicians and other healthcare team members.

5. Recognize and take measures to avoid potential conflicts of interest.

6. Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices.

7. Demonstrate sensitivity and responsiveness to patients’ culture, age, gender, religion, socioeconomic factors, family structures and disabilities.

8. Demonstrate sensitivity toward patients irrespective of race, gender, age, and other defining characteristics.

9. Recognize and apply ethical principles espoused by the Heart Rhythm Society, the American Board of Internal Medicine and the American College of Cardiology.

10. Acknowledge and comply with standards for responsible conduct of research and good clinical practice as defined by UT Health.

**Systems Based Practice:**
1. Demonstrate satisfactory knowledge of systems of care available for the critical or dying patient and his/her family, including the use of advance directives and hospice care.
2. Recognize the importance of and role for an interdisciplinary team approach in providing effective patient care.
3. Relate to other health care providers in a consultative nature, identifying clear and specific questions, providing necessary clinical information and communicating results to the patient.
4. Employ available system based resources to organize follow up care for the patient on subsequent visits.
5. Apply systems-based approaches for controlling health care costs and allocating resources.
6. Serve as an advocate for patients within a variety of systems.

Medical Knowledge and Patient Care

The following knowledge, skills, and attitude objectives address the competency areas of patient care and medical knowledge by rotation and postgraduate year.

INVASIVE CCEP

GOALS

This rotation is designed to enable the fellow to develop necessary medical knowledge, skills and confidence to manage complex arrhythmia patients. Diagnosis and management of clinical arrhythmias is emphasized using both invasive and noninvasive techniques. Toward this end, the first goal of the Invasive rotation is to provide qualified cardiologists with a comprehensive, structured and scholarly experience in clinical CCEP. The second goal is to encourage scholarly productivity by providing opportunities for both basic and clinical research, quality improvement (QI) and teaching. The third goal is to maintain an interactive didactic curriculum to prepare every CCEP fellow to attain certification from the American Board of Internal Medicine in CCEP. The fourth goal is to facilitate in fellows development of well-rounded leadership and life-long learning skills.

Rotation Description: During this rotation, Fellows must demonstrate comprehension of established and evolving concepts in clinical cardiac electrophysiology that are pertinent to the
management of patients with known or suspected cardiac arrhythmias and those at risk for serious arrhythmias, both with and without co-morbidities. Fellows must be able to provide patient care that is compassionate, appropriate and effective for the treatment of arrhythmia problems and the promotion of health.

The CCEP Fellow participates in the initial evaluation of patients scheduled for invasive EP studies not on the CCEP Inpatient/Consult services, and develops skills in invasive techniques under the direction of the Attending Staff. This Fellow will be primarily responsible for outpatients undergoing invasive procedures. S/he will see patients prior to the procedure, taking a complete history and physical, reviewing the relevant images, ECG and laboratory data. S/he will then instruct the patient on the procedure, and obtain informed consent.

The day of the procedure, the Fellow will perform the procedure, under the direct supervision of the Attending Staff, to the level of his/her experience and skill. After the procedure, the Fellow notifies the accepting house staff and writes post-procedure orders, as appropriate, and completes the physicians’ procedure report. The Fellow will review the results of the procedure with the Attending staff prior to completion of the final report.

As Fellows demonstrate progressive subject comprehension, analytic skill, procedural proficiency and judgement, progressive delegation of authority to the trainee will be awarded by the Attending Staff. Progressive authority is expected with advancement in PG year.

PGY7 Fellow

OBJECTIVES

Patient Care:

CCEP Fellows will demonstrate proficiency in:
1. care of patients in the cath lab, cardiac care unit and cardiac telemetry units,
2. consultation to physicians in other disciplines,
3. interpretation of noninvasive testing relevant to arrhythmia diagnosis and treatment, such as:
   a) relevant imaging studies, including chest radiography,
   b) electrocardiograms,
   c) tilt testing,
4. care of outpatients with known and suspected arrhythmias and those at risk for serious arrhythmias,
5. care of patients with pacemakers, ICD’s and CRT devices,
6. pre-procedural planning,
7. performance and interpretation of invasive CCEP procedures, and care of the arrhythmia patient before and after invasive procedures,
8. clinical decision making regarding invasive EP procedures and patient management
9. performance and interpretation of invasive electrophysiologic testing, including:
   a) electrode catheter introduction and positioning in atria, ventricles, coronary sinus, His bundle area and pulmonary artery,
   b) endocardial electrogram recording, including an understanding of amplifiers, filters and signal processors, and measurement of intervals
   c) programmed stimulation to obtain conduction times and refractory periods, and to initiate, terminate and entrain tachycardias,
   d) pharmacologic stimulation,
   e) activation sequence mapping recording, including electroanatomic mapping,
   f) transseptal puncture,
   g) epicardial access
10. performance of therapeutic catheter ablation for a variety of arrhythmias, including:
    a) AV nodal reentry tachycardia,
    b) AV reentry associated with accessory pathways,
    c) atrial tachycardia,
    d) atrial flutter,
    e) atrial fibrillation,
    f) AV junction ablation and modification, and
    g) ventricular tachycardia,
11. prescription and implantation of cardiac devices including pacemakers, ICD’s, CRT devices, left atrial occlusive devices and implantable event recorders, and their management including:
    a) device programming,
    b) noninvasive programmed stimulation for arrhythmia induction through the device,
    c) defibrillation threshold testing,
    d) lead extraction,
e) cardiac resynchronization therapy, and
f) final prescription of antitachycardia pacing, defibrillation and cardiac resynchronization therapies

12. teaching at the bedside and in didactic conferences,
13. recognition of specific co-morbidities that commonly occur in the setting of specific arrhythmias
14. identification of specific iatrogenic induced toxicities and side effects of antiarrhythmic drugs
15. selection of appropriate antiarrhythmic regimens for the patient
16. exhibition of effective methods of counselling patients about antiarrhythmic treatment and procedures

Medical Knowledge:

CCEP Fellows will demonstrate knowledge of:
1. the scientific method of problem solving and evidence-based decision making
2. clinical arrhythmia syndromes, including:
   a) sinus node dysfunction
   b) atroventricular and intraventricular conduction delay and block,
   c) supraventricular and ventricular tachyarrhythmias,
   d) unexplained syncope,
   e) aborted sudden cardiac death,
   f) palpitations,
   g) Wolff-Parkinson-White syndrome,
   h) prolonged QT syndromes, and
   i) other inherited and acquired arrhythmia syndromes,
3. arrhythmia diagnosis, showing competence in interpretation of 12 lead ECG’s and ECG telemetry recordings,
4. management of clinical bradyarrhythmias and tachyarrhythmias,
5. usefulness and limitations (sensitivity, specificity, positive and negative accuracy) of noninvasive and invasive cardiac arrhythmia testing,
6. indications, contraindications, risks and limitations of nonpharmacologic CCEP procedures and therapy, including ablation, surgery and device implantation,
7. indications for, methods of interrogation and programming of, and monitoring of pacemakers, defibrillators (ICD’s) and cardiac resynchronization therapy (CRT) devices,
8. indications for, pharmacology, pharmacokinetics, pharmacogenetics and effects of antiarrhythmic drugs
9. implementation of clinical trial data in the management of arrhythmia patients.
10. basic cardiac electrophysiology, including but not limited to genesis of arrhythmias, normal and abnormal electrophysiologic responses, autonomic influences, effects of ischemia, drugs and other interventions,
11. epidemiology of arrhythmias,
12. the genetic basis of pathological arrhythmias,
13. medical management of acute and chronic heart failure associated with left ventricular systolic dysfunction,
14. radiation physics, biology, and safety related to imaging equipment,

**PGY8 Fellow**

In addition to the objectives outlined above for PGY-7 level fellows, the fellow will demonstrate progressive competency in:

1. Proficiency in the initial management of cardiac arrhythmias
2. Proficiency in performance and interpretation of invasive EP procedures
3. Managing complications of catheter ablation and device implantation and extraction
4. Competency in the management of arrhythmic emergencies such as cardiac arrest, VT storm, pacemaker failure
5. Ability to anticipate, recognize and effectively manage complications of EP procedures, such as pericardial tamponade
6. Ability to educate medical students, internal medicine residents and junior fellows in the management of arrhythmias
7. Incorporating national guidelines in the management of arrhythmias
8. Effective communication and leadership of the inpatient team, including expectations and feedback to others.
9. Effective discussion of treatment plans and end of life issues with patients and families and with compassion.
10. Employing responsible, sensitive, and ethical behaviors with patients and other members of the health care team
11. Empathy towards different cultural backgrounds and religious beliefs in developing management plans, discussing advanced directives, DNR status, futility, and withholding or withdrawing therapy
12. Utilizing systems of care available for the dying patient and their families, including palliative care consultation, the use of advance directives and hospice care.
13. Employing available resources to organize patient care in the outpatient setting.

**Attitudes**
Fellows must maintain and apply investigatory and analytic thinking in approaching clinical situations.

**Demonstrated by**
Trainees will be principally taught by the supervising CCEP attending physician who supervises the clinical care of patients by fellows. Instruction and experience will be provided at the bedside and cath lab using interactive discussion and demonstration. Additional teaching will occur through structured didactic conferences. Invasive procedures are proctored directly by the attending physician. In turn, fellows demonstrate their comprehension and synthesis of subject matter by teaching other fellows and trainees at didactic and case conferences. The importance of continuous self-initiated independent study during training is emphasized with the realization that this should be a lifelong commitment.
Fellows regularly describe instructive patient encounters at clinical case and EP conferences, providing an opportunity to demonstrate analytic skills.

**Evaluation**
Fellows are evaluated at the end of each rotation in New Innovations. The evaluation surveys knowledge, skills, satisfactory progressive scholarship and professional growth and includes:

1. Fellow evaluations
2. Observed patient encounters
3. Periodic Peer and patient evaluations
4. Annual Allied health surveys
5. Procedure logs

**Remediation**
The program director and faculty will semi-annually review the fellow’s performance and will:

1. identify any specific knowledge deficits,
2. document all knowledge areas requiring remediation or additional concentration,
3. develop an individualized learning plan, along with the fellow, for remediation of specific knowledge deficiencies.

**INPATIENT EP/CONSULTS**
**Goal**
This rotation is designed to enable the fellow to develop necessary medical knowledge, skills and confidence to manage complex arrhythmia patients and the ability to interact with other specialties in a collegial manner. Toward this end, the first goal of the Inpatient EP/Consult rotation is to provide qualified cardiologists with a comprehensive, structured and scholarly experience in clinical CCEP. Diagnosis and management of clinical arrhythmias is emphasized using both invasive and noninvasive techniques. The second goal is to encourage scholarly productivity by providing opportunities for both basic and clinical research, quality improvement (QI) and teaching. The third goal is to maintain an interactive didactic curriculum to prepare every CCEP fellow to attain certification from the American Board of Internal Medicine in CCEP. The fourth goal is to facilitate in fellows development of well-rounded leadership and life-long learning skills.

Fellows must demonstrate comprehension of established and evolving concepts in clinical cardiac CCEP that are pertinent to the management of patients with known or suspected cardiac arrhythmias and those at risk for serious arrhythmias, both with and without co-morbidities. Fellows must demonstrate technical proficiency in performance of invasive CCEP procedures and peri-procedure management and be able to provide patient care that is compassionate, appropriate and effective for the treatment of arrhythmia problems and the promotion of health.

**Rotation Description:** This service provides primary management of patients admitted to under the care of CCEP faculty and consultation on cardiac arrhythmias for inpatients at Memorial Hermann Hospital. The service consists of an attending CCEP physician, 2 general Cardiology Fellows on EP rotation and a CCEP Fellow. Fourth year medical students and residents may participate on elective rotations. The Fellows collectively are expected to evaluate each consult patient on the day the consult is requested and to promptly discuss the case with the CCEP faculty. Written consultation notes will be left in the medical record in a timely fashion and direct communication with the primary service is expected. The fellows should make daily rounds on all patients on the team and are expected to write daily progress notes on all patients with active CCEP problems. The CCEP Fellow serves as junior consultant to the general Cardiology fellows and will coordinate invasive and non-invasive electrophysiologic services for these inpatients. The CCEP Fellow will round with the team and may write progress notes to supplement the comments of others.

Attending rounds are conducted daily and the time will vary according to the daily schedule. A weekend checkout rounds with the team on service is performed each Monday morning at 7:30am. The CCEP and rotating fellow are typically responsible for 8 - 20 patients with a maximum of 25. If this maximum number is reached, the fellows should inform the program director who will assign one of the other fellows to assist with this service. Patients who undergo surgery will still be followed by the team, although direct involvement in patient care
will be consultative until the patient transfers out of the CVICU and back to the cardiology units.

Invasive bedside procedures on inpatients are to be done by the Fellows under the supervision of the attending staff. CCEP Inpatient/Consult fellows will be responsible for interrogation and programming of implanted pacemakers, and implantable defibrillators and event recorders in patients under their care and for the interpretation of this information, under the direction of the attending physician. The CCEP Fellow will perform invasive EP procedures as described in the Invasive EP rotation. Emergency consults (5:00 pm to 8:00 am and weekends) are first seen by the in-house cardiology resident. The resident must then discuss the case with the in-house cardiology fellow, who will also see the patient, if necessary. During these hours, the on-call CCEP fellow and attending physician should be notified of the consult and the fellow's assessment; they will be available to return to the hospital to assist directly in the care of the patient as needed. There is no in-house CCEP call.

All Swan-Ganz catheter insertions, transvenous pacing catheter insertions and other invasive bedside procedures must be done by or under the direct supervision of the Cardiology or CCEP fellow, according to the level of skill and expertise of each resident and fellow. Attending Staff and senior Fellows are available to assist and supervise Fellows not yet skilled in a particular procedure. The level of supervision provided by the attending will depend upon the complexity of the case and the ability and experience of the particular residents and fellows involved. The house staff should be the primary caretakers, working under the direction of the Fellows and the Attending Physician. In general, physician orders should be written by the Resident or Intern, except in emergency situations or when patient care can be expedited, in which case the Attending Staff and Fellows may do so.

Occasional patients may be designated as “Non-teaching patients”. In those instances, the attending staff physician is directly responsible for all aspects of the individual’s care. Cardiology and CCEP Fellows, house staff and students will not routinely participate in the care of these individuals, however may perform specific tasks at the discretion of the attending staff. As with all inpatients, emergency medical services will be administered to non-teaching patients by CCEP Fellows in the course of their duties on the Code Team or as a bystander until the attending staff physician is directly available to assume those responsibilities.

**PGY7 Fellow**

**OBJECTIVES**

**Patient Care:**

CCEP Fellows will demonstrate proficiency in:
1. care of patients in the cardiac care unit and cardiac telemetry units,
2. consultation to physicians in other disciplines,
3. performance of bedside procedures, including temporary pacemaker placement,
4. interpretation of noninvasive testing relevant to arrhythmia diagnosis and treatment, such as:
   a) relevant imaging studies, including chest radiography,
   b) electrocardiograms,
   c) tilt testing,
   d) continuous in-hospital recordings,
   e) signal-averaged ECG recordings,
   f) exercise and pharmacologic stress test ECG recordings,
5. care of outpatients with known and suspected arrhythmias and those at risk for serious arrhythmias,
6. care of patients with pacemakers, ICD’s and CRT devices,
7. pre-procedural planning,
8. performance and interpretation of invasive CCEP procedures, and care of the arrhythmia patient before and after invasive procedures,
9. clinical decision making regarding invasive EP procedures and patient management
10. performance and interpretation of invasive electrophysiologic testing, including:
   a) electrode catheter introduction and positioning in atria, ventricles, coronary sinus, His bundle area and pulmonary artery,
   b) endocardial electrogram recording, including an understanding of amplifiers, filters and signal processors, and measurement of intervals
   c) programmed stimulation to obtain conduction times and refractory periods, and to initiate, terminate and entrain tachycardias,
   d) pharmacologic stimulation,
   e) activation sequence mapping recording, including electroanatomic mapping,
   f) transseptal puncture,
   g) epicardial access
11. performance of therapeutic catheter ablation for a variety of arrhythmias, including:
   a) AV nodal reentry tachycardia,
   b) AV reentry associated with accessory pathways,
   c) atrial tachycardia,
   d) atrial flutter,
   e) atrial fibrillation,
   f) AV junction ablation and modification, and
   g) ventricular tachycardia,
12. prescription and implantation of cardiac devices including pacemakers, ICD’s, CRT devices, left atrial occlusive devices and implantable event recorders, and their management including:
   a) device programming,
b) noninvasive programmed stimulation for arrhythmia induction through the device,
c) defibrillation threshold testing,
d) lead extraction,
e) cardiac resynchronization therapy, and
f) final prescription of antitachycardia pacing, defibrillation and cardiac resynchronization therapies

13. teaching at the bedside and in didactic conferences,
14. Recognition of specific co-morbidities that commonly occur in the setting of specific arrhythmias
15. Identification of specific iatrogenic induced toxicities and side effects of antiarrhythmic drugs
16. Selection of appropriate antiarrhythmic regimens for the patient
17. Exhibit effective methods of counselling patients about antiarrhythmic treatment and procedures

Medical Knowledge:

CCEP Fellows will demonstrate knowledge of:
1. the scientific method of problem solving and evidence-based decision making
2. clinical arrhythmia syndromes, including:
   j) sinus node dysfunction
   k) atrioventricular and intraventricular conduction delay and block,
   l) supraventricular and ventricular tachyarrhythmias,
   m) unexplained syncope,
   n) aborted sudden cardiac death,
   o) palpitations,
   p) Wolff-Parkinson-White syndrome,
   q) prolonged QT syndromes, and
   r) other inherited and acquired arrhythmia syndromes,
3. arrhythmia diagnosis, showing competence in interpretation of 12 lead ECG’s and ECG telemetry recordings,
4. management of clinical bradyarrhythmias and tachyarrhythmias,
5. usefulness and limitations (sensitivity, specificity, positive and negative accuracy) of noninvasive and invasive cardiac arrhythmia testing,
6. indications, contraindications, risks and limitations of nonpharmacologic CCEP procedures and therapy, including ablation, surgery and device implantation,
7. indications for, methods of interrogation and programming of, and monitoring of pacemakers, defibrillators (ICD’s) and cardiac resynchronization therapy (CRT) devices,
8. indications for, pharmacology, pharmacokinetics, pharmacogenetics and effects of antiarrhythmic drugs
9. implementation of clinical trial data in the management of arrhythmia patients.
10. basic cardiac electrophysiology, including but not limited to genesis of arrhythmias, normal and abnormal electrophysiologic responses, autonomic influences, effects of ischemia, drugs and other interventions,
11. epidemiology of arrhythmias,
12. the genetic basis of pathological arrhythmias,
13. medical management of acute and chronic heart failure associated with left ventricular systolic dysfunction,
14. radiation physics, biology, and safety related to imaging equipment,

**PGY8 Fellow**

In addition to the objectives outlined above for PGY-7 level fellows, the fellow will demonstrate progressive competency in:

15. Proficiency in the initial management of cardiac arrhythmias
17. Managing complications of catheter ablation and device implantation and extraction
18. Competency in the management of arrhythmic emergencies such as cardiac arrest, VT storm, pacemaker failure
19. Ability to anticipate, recognize and effectively manage complications of EP procedures, such as pericardial tamponade
20. Ability to educate medical students, internal medicine residents and junior fellows in the management of arrhythmias
21. Incorporating national guidelines in the management of arrhythmias
22. Effective communication and leadership of the inpatient team, including expectations and feedback to others.
23. Effective discussion of treatment plans and end of life issues with patients and families and with compassion.
24. Employing responsible, sensitive, and ethical behaviors with patients and other members of the health care team
25. Empathy towards different cultural backgrounds and religious beliefs in developing management plans, discussing advanced directives, DNR status, futility, and withholding or withdrawing therapy
26. Utilizing systems of care available for the dying patient and their families, including palliative care consultation, the use of advance directives and hospice care.
27. Employing available resources to organize patient care in the outpatient setting.
28. Using cost effective methods without compromising the quality of patient care.

**Attitudes**
Fellows must maintain and apply investigatory and analytic thinking in approaching clinical situations.
Demonstrated by
Trainees will be principally taught by their supervising CCEP attending physician who supervises the clinical care of patients by fellows. Instruction and experience will be provided at the bedside and during teaching rounds using interactive discussion. Additional teaching will occur through structured didactic conferences. Invasive procedures are proctored directly by the attending physician. In turn, fellows demonstrate their comprehension and synthesis of subject matter by teaching general cardiology fellows, residents and medical students on formal clinical rounds. The importance of continuous self-initiated independent study during training is emphasized with the realization that this should be a lifelong commitment. Fellows regularly describe instructive patient encounters at clinical case and EP conferences, providing an opportunity to demonstrate analytic skills.

In rotation, one CCEP Fellow will be responsible for supervising the EP Inpatient/Consult service under the immediate direction of the Attending Physician.

Evaluation
Fellows are evaluated at the end of each rotation in New Innovations. The evaluation surveys knowledge, skills, satisfactory progressive scholarship and professional growth and includes:

1. Fellow evaluations
2. Observed patient encounters
3. Periodic Peer and patient evaluations
4. Annual Allied health surveys
5. Procedure logs

Remediation
The program director and faculty will semi-annually review the fellow’s performance and will:

1. identify any specific knowledge deficits,
2. document all knowledge areas requiring remediation or additional concentration,
3. develop an individualized learning plan, along with the fellow, for remediation of specific knowledge deficiencies.

ELECTIVES

Goal
Fellows may enrich their training experience in cardiac CCEP and supplement experience in areas of special interest or deficiency, such as clinical or basic CCEP research and Pacemaker/Device development or management. Extramural electives in pediatric CCEP or special research facilities may be arranged on a case-by-case basis with the approval of the CCEP Fellowship Director, usually in one-month increments.
Knowledge
Depending upon the nature of the elective experience, CCEP Fellows will demonstrate knowledge of:

1. clinical arrhythmia syndromes, including
   a. sinus node dysfunction,
   b. atrioventricular and intraventricular conduction delay and block,
   c. supraventricular and ventricular tachyarrhythmias,
   d. unexplained syncope,
   e. aborted sudden cardiac death,
   f. palpitations,
   g. Wolff-Parkinson-White syndrome,
   h. prolonged QT syndromes, and
   i. other inherited and acquired arrhythmia syndromes,
2. arrhythmia diagnosis, showing competence in interpretation of 12 lead ECG’s and ECG telemetry recordings,
3. inpatient management of clinical bradyarrhythmias and tachyarrhythmias,
4. usefulness and limitations (sensitivity, specificity, positive and negative accuracy) of noninvasive and invasive cardiac arrhythmia testing,
5. indications, contraindications, risks and limitations of nonpharmacologic CCEP procedures and therapy, including ablation, surgery and device implantation,
6. indications for, interrogation and programming of, and monitoring of pacemakers, defibrillators (ICD’s) and cardiac resynchronization therapy (CRT) devices,
7. indications for, pharmacology, pharmacokinetics and effects of antiarrhythmic drugs
8. implementation of clinical trial data in the management of arrhythmia patients.

Skills
Depending upon the nature of the elective experience, Fellows will demonstrate technical proficiency in:

1. care of patients in the cardiac care unit and cardiac telemetry units,
2. performance of bedside procedures, including temporary pacemaker placement,
3. interpretation of noninvasive testing relevant to arrhythmia diagnosis and treatment, such as:
   a. relevant imaging studies, including chest radiography,
   b. electrocardiograms,
   c. tilt testing,
   d. continuous in-hospital recordings,
   e. signal-averaged ECG recordings,
   f. T wave alternans analysis,
   g. Exercise and pharmacologic stress test ECG recordings,
4. care of patients with pacemakers, ICD’s and CRT devices,
5. performance and interpretation of invasive CCEP procedures, and care of the arrhythmia patient before and after invasive procedures,
6. clinical decision making regarding invasive EP procedures and patient management
7. performance and interpretation of invasive electrophysiologic testing, including:
   a. electrode catheter introduction and positioning in atria, ventricles, coronary sinus, His bundle area and pulmonary artery,
   b. endocardial electrogram recording, including an understanding of amplifiers, filters and signal processors, and measurement of intervals
   c. programmed stimulation to obtain conduction times and refractory periods, and to initiate, terminate and entrain tachycardias,
   d. pharmacologic stimulation, and
   e. activation sequence mapping recording, including electroanatomic mapping,
8. performance of therapeutic catheter ablation for a variety of arrhythmias, including:
   a. AV nodal reentry tachycardia,
   b. AV reentry associated with accessory pathways,
   c. atrial tachycardia,
   d. atrial flutter,
   e. atrial fibrillation,
   f. AV junction ablation and modification, and
   g. ventricular tachycardia,
9. implantation of pacemakers, ICD’s, CRT devices, and implantable event recorders, including:
   a. device programming,
   b. noninvasive programmed stimulation for arrhythmia induction through the device,
   c. defibrillation threshold testing,
   d. lead extraction,
   e. cardiac resynchronization therapy, and
   f. final prescription of antitachycardia pacing, defibrillation and cardiac resynchronization therapies, and
10. teaching at the bedside and in didactic conferences.
11. laboratory investigation of cellular and molecular cardiac CCEP.

**Attitudes**
Fellows must maintain and apply investigatory and analytic thinking in approaching clinical situations.

**Demonstrated by**
Trainees will be principally taught by the supervising attending physician assigned by the program director and tailored individually to the subject of the elective. Instruction and experience will be provided at the bedside and during teaching rounds using interactive discussion. Additional teaching may occur through structured didactic conferences. Invasive
procedures are proctored directly by the attending physician. In turn, fellows demonstrate their comprehension and synthesis of subject matter by teaching medical students on formal clinical and/or research rounds. The importance of continuous self-initiated independent study during training is emphasized with the realization that this should be a lifelong commitment.

Fellows regularly describe instructive patient encounters at clinical case and ECG conferences, providing an opportunity to demonstrate analytic skills.

**Evaluation**

Fellows are evaluated at the end of each rotation. The evaluation surveys knowledge, skills, satisfactory progressive scholarship and professional growth and includes Fellow evaluations. Additionally, depending upon the nature of the Elective activity, the following may also be employed:

1. Fellow evaluations
2. Observed patient encounters
3. Random chart reviews
4. Review of scholarly activity
5. Peer evaluations
6. Procedure logs
7. Allied Health surveys
8. Communication and literature review evaluations

**Remediation**

The program director and fellowship committee, along with additional EP faculty will semi-annually review the fellow’s performance and will:

1. identify any specific knowledge deficits,
2. document all knowledge areas requiring remediation or additional concentration,
3. develop an individualized learning plan, along with the fellow, for remediation of specific knowledge deficiencies.
INPATIENT TEACHING FACILITIES

Hermann Hospital serves as the primary site of clinical training. Consultative services are also rarely performed at the Lyndon B. Johnson General Hospital and the University of Texas M. D. Anderson Cancer Center. While primary responsibilities vary with each rotation, fellows are always expected to assume an active role in patient care and in the teaching of nurses, medical students, house staff and general cardiology fellows. Participation in clinical research activities is expected and integrated throughout all clinical rotations. In addition, dedicated research electives are available.

Memorial Hermann Hospital
6411 Fannin
Houston, TX 77030

Chief of Medicine:
David McPherson, MD
Chairman, Department of Internal Medicine
Phone: (713) 500-6500

Chief of Cardiology:
David McPherson, MD
(713) 500-6559

Associate Chief of Cardiology
Susan Laing, MD
(713) 318-0209

Director of Cardiac CCEP
Ramesh Hariharan, MD
(281) 681-2228

Principal Teaching Method
On clinical rotations, trainees will be principally taught by their supervising CCEP attending physician. The faculty is a full-time employee of UT-Houston or has a clinical appointment at the institution. The experience in the hospital provides the academic and intellectual environment for acquiring the knowledge, clinical skill and judgment necessary for the training of a CCEP fellow. The supervising physician is expected to give guidance to residents and to define the goals and educational content of each rotation in accordance with the established curriculum. Instruction and experience will be provided at the bedside and during teaching rounds using interactive discussion. Additional teaching will occur through scheduled didactic lectures and conferences. The importance of continuous self-study during training is emphasized with the realization that this should be a lifelong commitment.

Supervision and Escalation Policy
Degrees of supervision are utilized by the Program as follows to ensure that limited autonomy and decision making is available as the Fellow graduates through the levels of education.

*Direct Supervision* – the supervising physician is physically present with the fellow and patient.

*Indirect Supervision*
- with direct supervision immediately available – the supervising physician is physically within the hospital or other site of patient care, and is immediately available to provide Direct Supervision.
- with direct supervision available – the supervising physician is not physically present within the hospital or other site of patient care, but is immediately available by means of telephonic and/or electronic modalities, and is available to provide Direct Supervision.

*Oversight* – The supervising physician is available to provide review of procedures/encounters with feedback provided after care is delivered.

The ultimate responsibility for the supervision of the Fellows within the Program rests with the Program Director. He/she monitors fellow supervision at all participating sites. The Program Director, in conjunction with the Associate Program Directors, elects qualified faculty to provide appropriate Direct Supervision of fellows in patient care activities. At the beginning of each rotation, the Fellow will be introduced to his/her attending who will be an identifiable, appropriately-credentialed and privileged attending physician who is ultimately responsible for that patient’s care and for the Direct Supervision of the Fellow. Each site and rotation has adequate faculty to instruct and supervise all the fellows assigned to the rotation and location. The number of learners on each service will be limited so that attendings have adequate time to effectively teach the Fellows. Fellows are provided with rapid reliable systems for communication with supervising faculty. Faculty scheduled to supervise on a rotation are required to provide fellows with continuous supervision and consultation.

Over the course of the 24 months of fellowship, each fellow must demonstrate proficiency in each of the critical clinical skills to be allowed increasing responsibility in patient care, leadership, teaching, and administration. These skills include, but are not limited to, using appropriate interview and examination techniques, documenting the encounter in a timely manner, ordering invasive diagnostic and therapeutic studies, ordering high risk medications, and performing common procedures. Fellows must then be certified by the attending after Direct Supervision of the procedure prior to performing or supervising the procedure. An electronic log will be kept of all procedures and signed off by the appropriate individual in the University’s New Innovations system. Regardless of the site or time of day, an attending physician must Indirectly Supervise procedures by being physically present at the site to be able to help if Direct Supervision is necessary with procedures. The academic hospitalist may serve this purpose at times that the designated attending is not on site. For all other medical decision making, an attending physician must be easily available by phone at all times. When on a
rotation where a residents and general cardiology fellows are also present, the residents and
cardiology fellows may also be directly supervised by the CCEP Fellow in procedures and patient
care matters only after the attending has certified that the CCEP Fellow is competent to
perform and supervise the procedure. Fellows and faculty members are responsible for
informing patients of their respective roles in each patient’s care.

Overall delegation of progressive authority is assigned by the Program Director. The Program
director has entrusted the authority to determine appropriate authority within a rotation to the
attending faculty on service, directly supervising the resident and intern’s patient care
interactions. Attendings are allowed to delegate portions of care to Fellows based on the needs
of the patient and the skills of the resident, however, all medical decisions are reviewed by the
attending physician. The progressive authority that necessarily comes with advancement in PG
year is determined solely by the Program Director after review of evaluations and comments
based on the 6 ACGME core competencies.

There are certain circumstances and events in which fellows must communicate with the
appropriate supervising faculty members. Those circumstances include, but are not limited to a
significant change in the patient’s status, a need for a high risk procedure or treatment, a
concern on a treatment decision, and any act that may impact patient safety (Cardiac arrest,
rapid response, etc.). Additionally, Fellows should notify supervising faculty if they are not able
to perform expected or needed patient care responsibilities due to duty hour limitations,
schedule conflicts or other issues. Fellows should use their judgment on any other issues that
arise, however if there is any question about the seriousness of a circumstance, it should always
be addressed with the attending.

**Fellow Evaluation**
Fellows are evaluated at the end of each rotation by the responsible attending CCEP physician
by way of the on-line New Innovations system. The evaluation surveys knowledge, skills,
attitude, interpersonal and communication skills, practice based learning, systems based
practice, satisfactory progressive scholarship and professional growth. Each fellow is
responsible for acknowledging the completed form. The fellow may respond to evaluations in
writing or on-line. Fellows keep a running log of procedures on an Excel spreadsheet and
copies are submitted at least semi-annually to the fellowship office.

**Faculty Evaluation**
Faculty are evaluated on-line by both CCEP and general cardiology fellows rotating on the EP
service at the end of each rotation. Fellows are also invited to comment on the educational
content and value of the rotation in writing. Fellows actively participate in the fellowship
committee that oversees the curriculum and in addition perform a written evaluation of the
CCEP program.
OTHER CLINICAL RESPONSIBILITIES

Pacemaker/Device Clinic
Monday-Friday
Pacemaker/Device outpatient surveillance is incorporated in all CCEP Clinics and periodically in outlying UT Cardiology Clinics for monitoring, programming and troubleshooting of pacemakers and defibrillators. Inpatient pacemaker and device recipients are seen at the bedside for patient education and monitoring. All recipients of new devices are to be educated and enrolled in long-term follow-up prior to hospital discharge. Pacing and sensing thresholds will be checked and any necessary reprogramming performed prior to discharge, as well. Implantable rhythm device interrogation, surveillance and remote monitoring is also performed daily in the Cardiology Clinics. CCEP Fellows are expected to participate in Pacemaker/Device Clinic at one or more of these locations for one half-day weekly, at the least, and are expected to perform interrogation and programming under the direction of the Attending Physician at that site. S/he is primarily responsible for seeing clinic inpatients and outpatients with rhythm management devices requiring medical attention under the supervision of the Attending Staff. All CCEP Fellows are encouraged to spend any additional time available in the Clinic gaining supplemental experience in programming and troubleshooting.

Teaching
Aside from routine teaching of housestaff and students on the Inpatient and Consult rotations, each fellow will be asked on occasion to give presentations on CCEP topics to housestaff, medical students, nurses and technical staff, usually in the context of the weekly CCEP conferences, including EP Core Curriculum Conference, EP Case (EGM) Conference and monthly EP Journal Club. Alternative conferences in which CCEP fellows may present educational material include Cardiology Grand Rounds, Cardiology Research Conference, and Cardiology Cath Conference. Each fellow will be expected during the course of the year to research, prepare and deliver a minimum of five formal presentations on CCEP topics or to present research findings for one or more of the following: the CCEP Core Curriculum and/or Cardiology Grand Rounds. CCEP Fellows are also expected to prepare presentation of material for CCEP Case Conference and CCEP Journal Club conferences.

Outpatient Clinics
EP Heart
Memorial Hermann Medical Plaza
6400 Fannin, Suite 2500
Houston, Texas 77030
Phone: (713)-486-1625
Independent of all clinical rotations, each CCEP fellow will attend outpatient clinic one or two half days weekly at one of the above locations. A faculty member will be available to discuss all new patient referrals to CCEP and assume supervisory responsibility for all patients seen by the fellow. Patients referred from outside physicians require a follow up letter after the patient has been seen. All charts and charge documents must be signed (electronically or by hand) by the faculty member.

On days when the CCEP Fellow is scheduled for clinic at the Southeast or Woodlands facilities, the Fellow may also participate in invasive EP procedures at those site under the direction of the medical director for the remainder of the day.

When any fellow is scheduled to be on leave, it is the fellow's responsibility to cancel his/her clinic. This is done by notifying the head nurse, the appointment clerks, and the nursing staff. It is required that a colleague be designated to take patient calls during the fellow's absence.
RESEARCH OPPORTUNITIES

All CCEP Fellows are encouraged to participate liberally in research and quality improvement projects. A list of ongoing clinical and basic research projects will be made available to each fellow at the beginning of each year. Fellows will also be encouraged to design and carry out their own clinical and/or basic projects under the advice of a sponsoring attending physician/scientist.

Fellows are expected to participate in screening, enrollment and data collection on research subjects for whose clinical care they are responsible during the course of their clinical rotations. More active participation in study design, grant application, IRB approval, data analysis, abstract presentation and manuscript submission is strongly encouraged.

Familiarity with and adherence to all university policies and procedures in the conduct of medical research is required. The following resources describe university policies and procedures:

Office of Research Support Committees
6410 Fannin, Suite 1100

Committee for the Protection of Human Subjects
Phone: (713)500-7943
FAX: (713-500-7951
https://www.uth.edu/cphs
iRis support: 713-500-7960
email: cphs@uth.tmc.edu
Director:
Cynthia Edmonds
713-500-7936
Institutional Official:
Anne H. Dougherty, MD
713-500-6590

Animal Welfare Committee
https://www.awc@uth.tmc.edu
Director
Meredith L. Moore, PhD
713-500-3545
Meredith.L.Moore@uth.tmc.edu
Sponsored Projects Administration
http://www.uth.edu/sponsored-projects-administration
Suite UCT 1006
7000 Fannin,
Houston, TX 77030
Telephone: (713) 500-3999
Fax: (713) 500-0355
E-mail: osp@uth.tmc.edu
http://www.uth.edu/sponsored-projects/
DIDACTIC SCHEDULE

In CCEP conferences, the following curriculum will be emphasized:

- Basic CCEP, including formation and propagation of normal and abnormal impulses, autonomic nervous control of cardiac electrical activity, and mechanisms of clinically significant arrhythmias and conduction disturbances,
- Evaluation and management of patients—both ambulatory and hospitalized—who have clinical syndromes resulting from bradyarrhythmias or tachyarrhythmias,
- Indications for and interpretation of noninvasive diagnostic studies, including ambulatory electrocardiography, esophageal, scalar and signal-averaged ECG, continuous in-hospital cardiac monitoring, exercise testing, tilt testing, and relevant imaging studies,
- Indications for, techniques and interpretation of diagnostic intracardiac electrophysiologic studies, and techniques of performing these studies,
- Indications for, techniques and effects of noninvasive therapeutic techniques, including esophageal and transcutaneous pacing, cardioversion, defibrillation, and cardiopulmonary resuscitation,
- Indications for, techniques and effects of invasive therapeutic techniques, including pacemaker and cardioverter-defibrillator implantation and explantation, catheter and surgical ablation of/for arrhythmias, and left atrial appendage occlusion,
- Pharmacology, pharmacokinetics, pharmacogenetics and use of antiarrhythmic agents and other drugs that affect cardiac electrical activity.

Conferences specific to the CCEP fellowship include:

**CCEP Core Curriculum**

**Objective:**
To supplement academic areas covered in clinical rotations and provide a well-rounded foundation in both basic and clinical cardiac CCEP. Emphasis will be placed on basic CCEP, autonomic nervous control of the heart, clinical arrhythmia syndromes, pharmacology, pacing and defibrillation physics, technology, and techniques, ablation physics, technology and techniques, noninvasive arrhythmia testing, clinical research and trials.

Each Thursday morning at 7:30 AM in the Fellows conference room, CCEP fellows and Cardiology fellows, residents and students rotating on the EP service will attend and/or present a lecture on CCEP topics with an emphasis on topics not fully covered on the clinical rotations or in other conferences. Attendance is mandatory for CCEP Fellows and for the Rotating Cardiology Fellows and students on the EP inpatient service.
**CCEP Journal Club**

Objective:
To review the current literature in cardiac CCEP, develop skills in critical scientific and statistical analysis and ethical considerations. Implications of new findings for development of ongoing and future research projects will be discussed.

On the 3rd Monday of each month at 7:00 PM at varying locations, the CCEP fellows and Cardiology fellows on the EP rotation will meet with attending physicians to review current journal articles. Each fellow will be responsible for presenting an article, with particular attention to methods, statistical analysis and results. Discussion will include a critical appraisal of the methods and ethics and discussion of the importance of the findings. Attendance is mandatory for CCEP Fellows and Rotating General Cardiology Fellows.

**CCEP Case (EGM) Conference**

Objective:
To review in depth interesting invasive EP procedures and analyze results, with emphasis on clinical indications for the procedure, mechanisms of arrhythmogenesis and effective diagnostic and therapeutic maneuvers. Patient outcomes will also be discussed in order to review and optimize morbidity and mortality.

The same group will meet each Friday at 7:30AM in the HVI Cath Lab Conference Room for a detailed discussion of invasive EP cases of the preceding weeks. Each fellow will be responsible for assembly of materials to present recent cases to the group, beginning with history and physical exam, pertinent ECG’s and labs, intracardiac tracings and noncontact 3-dimensional maps. All adverse outcomes of all invasive studies will be presented at the following conference and discussed by the group. Attendance is mandatory for CCEP Fellows and Rotating Cardiology Fellows, residents and students on the EP inpatient service.

**Cardiac Catheterization Conference**

Thursdays 5:00-6:00 p.m. in the HVI 3rd floor conference room. The cath fellows will present history, physical exam, labs, EKGs, x-rays, noninvasive studies and the actual cath films. Usually, two or three cases are presented and discussed with the medical and surgical staff. CCEP fellows are encouraged to attend.

**Cardiology Grand Rounds**

Wednesdays at noon in MSB B100. These are special lectures frequently presented by faculty and guest speakers with a clinical emphasis. CCEP fellows are encouraged to attend.
ANCILLARY COURSES

**Advanced Cardiac Life Support (ACLS)**
ACLS certification is required for all fellows, and it is the fellow's responsibility to keep certification current. Courses are offered through both UTH and Memorial Hermann-TMC. Hermann Hospital Life Flight Office. For Memorial Hermann, TMC go to . Call (713) 704-6151, email lifeflight.education@memorialhermann.org or go to http://trauma.memorialhermann.org/life-flight/life-flight-education/
For UT, go to HTTP://SCSC2.uth.tmc.edu/heartcodeacls
A list of additional courses offered in the Houston area is available through the American Heart Association at (713) 610-5000. http://med.uth.tmc.edu/administration/edu_programs/graduate-medical-education/certifications.html

**Radiation Safety Course**
The UTHSC Radiation Safety Division offers a short course in Radiation Safety several times a year. It is expected that each fellow will complete this course successfully within the first three months of his/her first year of the Cardiology fellowship. CCEP Fellows who have not already completed this course or an equivalent one at another institution will also be required to do so within the first three months of the first year. Call (713) 500-5840 to enroll. https://www.uth.edu/safety/radiation-safety

**SAFER**
SAFER is an on-line course promoting awareness of and prevention of physician fatigues. All fellows are required to complete this course.

OTHER CLINICALLY RELATED MATTERS

**Medical Licensure**
Those fellows entering the program on an Institutional Permit are expected to apply for a permanent license during fellowship training during the first year of their fellowship. Applications are requested from the Texas State Board of Medical Examiners, , 333 Guadalupe, Tower 3, Suite 610, Austin, TX 78701
P. O. Box 149134, Austin, TX 78714-9134; phone (512) 305-7010. The process is lengthy and detailed; it is recommended that application instructions be followed carefully. At the current time, the State Board does not accept National Board exams for licensure in Texas. The FLEX has been replaced by the USMLE (United States Medical Licensing Exam) as the national exam for licensure. The Medical School's liaison is the Office of Graduate Medical Education, phone (713) 500-5151. After obtaining a permanent license, a Texas Department of Public Safety (DPS) registration number must be obtained prior to application for a Federal DEA number. The DPS phone number is (512) 424-7293 http://www.dps.texas.gov/rsd/ControlledSubstances/index.htm
NOTE: An institutional permit does not entitle a fellow to assume professional activities outside of the fellowship program.

Professional Liability Insurance
Professional liability insurance (PLI) is provided through the University of Texas System Professional Liability Self-Insurance Program at no cost to the fellow. A current Institutional Permit or a current permanent Texas license is necessary to obtain insurance coverage. Copies of renewed IP’s or Texas licenses must be submitted each year to continue coverage. PLI coverage will be suspended immediately if you allow your Texas license or IP to expire.

The fellow will be covered by PLI when performing his/her assigned duties within the program. Such coverage is only at the affiliated hospitals and clinics to which the fellow is assigned through the program. Current limits of coverage are $100,000/ $300,000. PLI provided does not cover any professional activities other than those assigned through the program.

OTHER PERTINENT INFORMATION

Fellowship Administrative Offices
The CCEP Fellowship office is located in MSB 1.246B. Mary Jones is the coordinator of the fellowship program and facilitates communication between fellows and the University. Please be sure to inform Mrs. Jones of any change in home address or phone number. Also, you will need to make sure the office has current copies of any licenses you may hold (DPS, DEA, Texas licenses). Please inform the office in case of any emergencies, illness or other matters relating to the program or the performance of your duties as soon as possible, or at the latest within 24 hours of the occurrence. Tel (713)-486-1645. (713)-486-1631 FAX. Mary.R.Jones@uth.tmc.edu.

Night Call
No in-house call is scheduled for CCEP fellows. A General Cardiology Fellow will remain in-hospital 24 hours daily on a rotating schedule at Hermann Hospital. In addition, CCEP Fellows will be on beeper call for arrhythmia intervention and consultation in rotation. All EP inpatients will be seen on Saturdays and Sundays by the CCEP Fellow and/ or general cardiology fellow on call according to a rotating schedule. The fellow on-call for Sunday is also responsible for preparing inpatients for EP procedures scheduled for Monday. The CCU and the General Cardiology service fellows will carry code beepers and run all codes on the days their team is on long call. At night, the code beeper will be passed to the in-house fellow on call beginning at 6:00 pm. The call fellow will provide coverage until 7:00 am the following day. The call fellow will also approve emergency echocardiograms and emergency nuclear studies as necessary. The call schedule for fellows is published by the 15th of the month for the following month. If you have special requests such as scheduled vacations, etc., you must inform one of the chief cardiology fellows in writing by the 15th of the prior month. Also, if changes are made to the call schedule after it is published, you are responsible for notifying all concerned parties (i.e., Hermann page operator, fellowship office, cardiology answering service and all other parties...
Learning and Working Environment
Providing fellows with a sound academic and clinical education is carefully planned and balanced with concerns for patient safety and fellow well-being. Learning objectives will be accomplished through an appropriate blend of supervised patient care responsibilities, clinical teaching, and didactic educational activities. The program will ensure that the learning objectives are not compromised by excessive reliance on fellows to fulfill non-physician service obligations. Didactic and clinical education have priority in the allotment of fellows' time and energies. Duty hour assignments recognize that faculty and fellows collectively have responsibility for the safety and welfare of the patients.

Maximum total duty hours for CCEP fellows will be consistent with ACGME guidelines, general Cardiology and CCEP policies. Work hours are limited to 80 hours/week, averaged over a four week period. Shifts are limited to a maximum of 24 consecutive hours. Fellows will be scheduled for a minimum of one day free of duty every week when averaged over 4-weeks. At home call (pager call) cannot be assigned on these free days. One day is defined as one continuous 24-hour period free from all clinical, educational, and administrative activities. Duty hours are defined as all clinical and academic activities related to the fellowship program, i.e., inpatient and outpatient patient care, administrative duties related to patient care, the provision for transfer of patient care, time spent in-house during call activities, and scheduled academic activities such as conferences. Duty hours do not include reading and preparation time spent away from the duty site.

Time spent in the hospital (exclusive of travel time) by fellows on at-home call counts towards the 80 hour per week limit. Fellows are permitted to return to the hospital while on at-home call to care for new or established patients. Each episode of this type of care, while it must be included in the 80-hour weekly maximum, will not initiate a new “off-duty period”.

At-home call will not be so frequent or taxing as to preclude rest or reasonable personal time for each fellow. The program director and the faculty will monitor the demands of at-home call in the program and make scheduling adjustments as necessary to mitigate excessive service demands and/or fatigue.

Wellness
Fellows have 24/7 access to emergency mental health counseling through the UT Employee assistance Program and program directors also have access for advice.

The program encourages fellows to use alertness management strategies in the context of patient care responsibilities. Fellows may be allowed to remain on site in order to ensure that effective transitions occur, however this period of time must be no longer than an additional four hours. In unusual circumstances, CCEP fellows, on their own initiative, may remain beyond their scheduled period of duty to continue to provide care to a single patient. Justifications for such extensions of duty are limited to reasons of required continuity for a severely ill or unstable patient, academic importance of the events transpiring, or humanistic attention to the needs of a patient or family. Under those circumstances, the fellow must appropriately hand over the care of all other patients to the team responsible for their continuing care; and,

who receive the call schedule). There is a list on the FAX machine in MSB 1.246.
document the reasons for remaining to care for the patient in question and submit that documentation in every circumstance to the program director. The program director must review each submission of additional service, and track both individual fellow and program-wide episodes of additional duty. Special policies to address fellow fatigue and sleep deprivation are discussed with the fellows at the beginning of the academic year, and include the free use of taxis or Uber for round trip travel between the assigned institution and home when warranted to mitigate fatigue. Additionally, an online wellness/burnout/suicide risk screening tool and resource list is planned in the near future.

Call Rooms
A call room is provided for fellows taking in-house call at Hermann Hospital-TMC in the Heart and Vascular Institute. Keys to the call room are issued through the Hermann Hospital House Staff Affairs Office. A deposit is required.

Beepers and Paging
Long distance beepers are provided for each fellow. In-house, the system can be accessed on a Herman Hospital (713-704-XXXX) number by dialing "185" and the five digit pager number. Digital paging may be done through amion.com (utcardio) for 5 digit numbers and through usamobility.com for Hermann numbers. The Hermann Hospital page operator can be reached at (713) 704-4284. The Cardiology answering service can be reached at (713) 428-6362.

iPads
iPads will be issued to each CCEP Fellow for the duration of the program. These are configured with apps to facilitate medical record keeping and literature search. Fellows are expected to exercise caution and judgement to prevent privacy breach, loss, damage or theft in accordance with university policy described in in HOOP policy 84 https://www.uth.edu/hoop/policy.htm?id=1448016 and in Section B https://inside.uth.edu/finance/capital-assets-management/handbook-section-b.htm.

Uniforms
Two lab coats will be provided to each Fellow at the beginning of the academic year. The University of Texas-Houston Fellowship Program provides laundry services for Fellows. To have white coats laundered; Fellows can deposit them in the utility closet for Cardiology room 1.250. Clean coats may be picked up in this same room.

Offices
Subject to availability, the CCEP Fellows shall have shared desk space in the MSB Cardiology Section Fellows Room/6431 Fannin, MSB1.249. A desktop PC (IBM), laptops and PowerPoint projection equipment are available for the general use of the CCEP fellows. CCEP fellows are responsible for the care and security of this equipment.

Parking
Currently, off-site parking is provided to clinical Fellows at a reduced rate. Connecting bus and rail passes are available through the Hermann Hospital House Staff Affairs Office.

Photocopying
Photocopying is provided at two locations:
   1. Cardiology divisional offices 1st floor MSB, and
   2. TMC Medical Library

Each Fellow will be provided with a code number with which to operate these machines. It is expected that photocopying will be primarily for journal articles (i.e., not for entire books). DO NOT give the code number to anyone, including students and residents.

Professional Society Memberships
Fellows are encouraged to become Associates in the Heart Rhythm Society and the Houston EP Society during their first year. Fees are modest for fellows in training, compared to the benefits. Other cardiology societies, particularly the American College of Cardiology and the Cardiac CCEP Society, also offer educational benefits. For further information and application forms, please contact the fellowship office.

Educational Materials
The CCEP fellowship program maintains a library of educational materials, including current arrhythmia, CCEP and anatomy and pharmacology textbooks, as well as electronic media, including the HRS and Mayo Clinic CCEP Board Review courses. These are maintained in Dr. Dougherty’s office, MSB 1.234

A file of CCEP fellowship manual, schedules, resource materials and key articles in CCEP is also maintained on the EP Fellowship shared drive at https://secureshare.uth.tmc.edu, as well as a file of prior journal club articles, and these materials may be photocopied.

Past core curriculum lectures in are posted on the CCEP fellowship website and may be accessed for later review.

Time Cards/Leave Policy
Each Fellow is required to submit duty hours via the New Innovations system weekly. Vacation will be accrued at a rate of three calendar weeks (21 days) per year and sick leave at a rate of eight (8) hours per month of employment, not to exceed 30 days. To take vacation leave, the Fellow must complete a Leave Request Form (available in the fellowship office) one week prior to leaving, and must obtain the signature of the attending to whom the Fellow will be assigned during the vacation, as well as the signature of the fellowship director. It is the Fellow’s responsibility to arrange the clinical coverage during his/her absence. Absences for maternity/paternity must be covered by any accrued vacation and sick leave. If this is not sufficient time to cover the required length of absence, the Fellow must request of the Fellowship Committee a specific period of unpaid leave.
NOTE: In the instance of Fellows presenting research data at an approved educational meeting, absences will not be deducted from the educational leave balance. The Division of Cardiology provide a limited amount of compensation for airfare and accommodations for this travel in the continental US (only once per year) only if prior arrangements are made according to Division procedures.

Job Opportunities
Job opportunities will be posted by e-mail and in the fellowship office. Also posted are educational opportunities and other items of interest to Fellows.

Bookstores
The UT bookstore (Follett Bookstore) is located in the basement of the MSB and is easy to reach.

Libraries
The Jesse H. Jones Medical Library, the main medical library for the Texas Medical Center, is located directly behind the Medical School, is open seven days per week until 11:00 PM (with shorter hours on weekends), and has virtually all journal and text material needed. Its electronic database is available through the Houston Academy of Medicine located in the library. UT Cardiology personnel have access to the PubMed database.

Evaluations and Personnel Files
In compliance with the guidelines of the American Board of Internal Medicine, each fellow will be evaluated by the respective attending faculty member upon completion of each rotation. Fellows are responsible for reviewing and acknowledging the comments and cosigning. They have the right to review their files, which are kept in the fellowship office. The CCEP fellowship director and Fellowship Committee will meet with each CCEP Fellow twice yearly to review his/her progress.

Meals
The Memorial Hermann Hospital Cafeteria, 1st floor of the Robertson pavilion, is open daily for breakfast, lunch and dinner. A discount is given if an ID badge is shown. Coffee shops are available on the 1st floor of the MSB, and throughout MHH.
## USEFUL TELEPHONE NUMBERS

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<thead>
<tr>
<th>NAME</th>
<th>TITLE</th>
<th>ROOM #</th>
<th>PHONE</th>
<th>CELL</th>
<th>E-MAIL</th>
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<tbody>
<tr>
<td>Mary Jones</td>
<td>CCEP Fellowship Coordinator</td>
<td>6400 Fannin, Ste 2550</td>
<td>713-486-1645</td>
<td>713-301-7326</td>
<td><a href="mailto:Mary.R.Jones@uth.tmc.edu">Mary.R.Jones@uth.tmc.edu</a></td>
</tr>
<tr>
<td>Anne Dougherty, MD</td>
<td>CCEP Fellowship Director Cardiac</td>
<td>6431 Fannin St. MSB 1.234</td>
<td>713-500-6590</td>
<td>713-503-0320</td>
<td><a href="mailto:Anne.H.Dougherty@uth.tmc.edu">Anne.H.Dougherty@uth.tmc.edu</a></td>
</tr>
<tr>
<td>Ramesh Hariharan, MD</td>
<td>Chief, Cardiac Electrophysiology</td>
<td>6400 Fannin, Ste 2550</td>
<td>832-287-5206</td>
<td></td>
<td><a href="mailto:Ramesh.Hariharan@uth.tmc.edu">Ramesh.Hariharan@uth.tmc.edu</a></td>
</tr>
<tr>
<td>Jose Cuellar-Silva, MD</td>
<td>Faculty</td>
<td>6400 Fannin, Ste 2550</td>
<td>404 376-1818</td>
<td></td>
<td><a href="mailto:Jose.R.CuellarSilva@uth.tmc.edu">Jose.R.CuellarSilva@uth.tmc.edu</a></td>
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<tr>
<td>Khashayar Hematpour, MD</td>
<td>Faculty</td>
<td>6400 Fannin, Ste 2550</td>
<td>626 695-7115</td>
<td></td>
<td><a href="mailto:Khashayar.Hematpour@uth.tmc.edu">Khashayar.Hematpour@uth.tmc.edu</a></td>
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<tr>
<td>Siddharth Mukerji, MD</td>
<td>Faculty</td>
<td>6400 Fannin, Ste 2550</td>
<td>832 802-1133</td>
<td></td>
<td><a href="mailto:Siddharth.S.Mukerji@uth.tmc.edu">Siddharth.S.Mukerji@uth.tmc.edu</a></td>
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<tr>
<td>Saumya Sharma, MD</td>
<td>Faculty</td>
<td>6400 Fannin, Ste 2550</td>
<td>281 413-1086</td>
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<td><a href="mailto:Saumya.Sharma@uth.tmc.edu">Saumya.Sharma@uth.tmc.edu</a></td>
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<tr>
<td>Mary Lim-Fung, DO</td>
<td>Faculty</td>
<td>6400 Fannin, Ste 2550</td>
<td>646-262-8180</td>
<td></td>
<td><a href="mailto:Mary.Lim@uth.tmc.edu">Mary.Lim@uth.tmc.edu</a></td>
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<tr>
<td>Zaka Khan, MD</td>
<td>Faculty</td>
<td>6400 Fannin, Ste 2550</td>
<td>718-419-6576</td>
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<td><a href="mailto:Zaka.U.Khan@uth.tmc.edu">Zaka.U.Khan@uth.tmc.edu</a></td>
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<tr>
<td>Mohammed Numan, MD</td>
<td>Pediatric EP faculty</td>
<td>6410 Fannin</td>
<td>713-500-5737</td>
<td></td>
<td><a href="mailto:Mohammed.T.Numan@uth.tmc.edu">Mohammed.T.Numan@uth.tmc.edu</a></td>
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<tr>
<td>Stephanie Blackmer</td>
<td>Administrative Assistant</td>
<td>6431 Fannin St. MSB 1.234</td>
<td>713-500-6590</td>
<td></td>
<td><a href="mailto:Stephanie.Blackmer@uth.tmc.edu">Stephanie.Blackmer@uth.tmc.edu</a></td>
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<tr>
<td>MHH/ HVI Cath Lab</td>
<td>Patrick Byrnes Angela Scott</td>
<td>6411 Fannin, HVI, 2nd floor</td>
<td>713-704-2360</td>
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<td><a href="mailto:Patrick.byrnes@memorialhermann.org">Patrick.byrnes@memorialhermann.org</a></td>
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<td>Cath Lab scheduling</td>
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<td><a href="mailto:Angela.scott@memorialhermann.org">Angela.scott@memorialhermann.org</a></td>
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<td>Lead EP Nurse Contact</td>
<td>Michael Negrych</td>
<td>6411 Fannin St, HVI2nd floor</td>
<td>832-275-0596</td>
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<td><a href="mailto:Michael.negrych@memorialherman.org">Michael.negrych@memorialherman.org</a></td>
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<td>Claudette McDonald</td>
<td>Cardiology Fellowship Coordinator</td>
<td>6431 Fannin St, MSB 1.240A</td>
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<td><a href="mailto:Claudette.N.McDonald@uth.tme.edu">Claudette.N.McDonald@uth.tme.edu</a></td>
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<td>MHH TMC Heart Center</td>
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