In-Training Examination in a Cardiovascular Disease Fellowship Program Curriculum: Success Towards Board Certification

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Division of Cardiovascular Health and Disease
University of Cincinnati College of Medicine
No Disclosures
Objective

• ACC ITE Overview

• Does the ITE results correlate to ABIM Cardiovascular Disease board scores?

• Program utilization of ITE for individual fellows and program education.
Program Structure

- 19 General Cardiology fellows
- 2 Interventional Fellows
- 1 Cardiac Imaging Fellow
- 1 Heart Failure Fellow
History

• 2011 First ACC Organized In-Training Exam

• Organization Committee: Cardiology Training and Workforce Committee
  – Prior to 2011 A National Exam Was Not Available
  – Most programs developed their own in-service examination
History

• 210 programs participated in the ACC-ITE examination (2016-2017)
  – 288 ACGME Cardiology Fellowship Programs (2017 ACGME Report)

• ACC-ITE has become the primary Cardiology FIT testing tool during training in the U.S.
In-Training Exam

– Benefits your fellows by helping them to identify knowledge gaps and prepare for the ABIM certification examination.

– Helps your training program adapt to the needs of your fellows and assess for deficiencies in medical knowledge
Preparation for In-Training Exam

• ACC Identifies Dates in the Winter/Spring Year Prior

  – Usually held the 3rd Tuesday/Wednesday October

  • October 23-24, 2018
  • October 22-23, 2019
Preparation for In-Training Exam

• Fellow Preparation
  – No detailed material to review.
  – A web link will be provided for fellows to view an example question.
  – Plenty of rest the night before the exam.
The Big Day...

<table>
<thead>
<tr>
<th>Total Session Time</th>
<th>6 hours 15 minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorial</td>
<td>15 minutes</td>
</tr>
<tr>
<td>Exam Section 1 (30 items)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Break *</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Exam Section 2 (30 items)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Break *</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Exam Section 3 (30 items)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Break *</td>
<td>30 minutes</td>
</tr>
<tr>
<td>Exam Section 4 (30 items)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Break *</td>
<td>10 minutes</td>
</tr>
<tr>
<td>Exam Section 5 (30 items)</td>
<td>60 minutes</td>
</tr>
<tr>
<td>Survey</td>
<td>(untimed)</td>
</tr>
<tr>
<td>Examinee</td>
<td>Work Station</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>Sloan, Mark</td>
<td>2</td>
</tr>
<tr>
<td>Grey, Meredith</td>
<td>3</td>
</tr>
<tr>
<td>Carter, John</td>
<td>5</td>
</tr>
<tr>
<td>Altman, Teddy</td>
<td>3</td>
</tr>
<tr>
<td>Robbins, Arizona</td>
<td>6</td>
</tr>
</tbody>
</table>
Results
Program Use of Scores

- Review of Scores w/Fellow During Semi-Annual Evaluation
  - PGY Program Comparison
  - PGY National Comparison
Name:                          ID #: 00000
Program:  University of Cincinnati College of Medicine

This report shows your performance on this examination. Information to assist you in interpreting your scores is provided in the accompanying Performance Interpretation Guidelines document.

Your Scale Score  826
Your Percent Correct Score  87

<table>
<thead>
<tr>
<th>Content Area</th>
<th>Your Score</th>
<th>Third Year Fellows Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arrhythmias</td>
<td>82</td>
<td>56 (15)</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
<td>81</td>
<td>72 (13)</td>
</tr>
</tbody>
</table>
Program Use of Scores

• Review of Scores w/Fellow During Semi-Annual Evaluation
  – Program Director Compares to Peers in Program and National
  – Fellows ITE 2 and 3 year report
# Program Use of Scores

**In-Service Exam Report History**

**2014-2017**

**Fellow Name, MD**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Correct</td>
<td>57</td>
<td>57</td>
<td>67</td>
<td>62</td>
<td>69</td>
<td>69</td>
</tr>
<tr>
<td>Arrhythmias</td>
<td>28</td>
<td>42</td>
<td>69</td>
<td>60</td>
<td>67</td>
<td>72</td>
</tr>
<tr>
<td>Cororoney Artery Disease</td>
<td>53</td>
<td>62</td>
<td>74</td>
<td>61</td>
<td>63</td>
<td>68</td>
</tr>
<tr>
<td>Acute Coronary Syndromes/Acute MI</td>
<td>61</td>
<td>62</td>
<td>72</td>
<td>70</td>
<td>72</td>
<td>71</td>
</tr>
<tr>
<td>Valvular Disorders</td>
<td>71</td>
<td>58</td>
<td>56</td>
<td>56</td>
<td>78</td>
<td>71</td>
</tr>
<tr>
<td>Congenital Disorders</td>
<td>36</td>
<td>44</td>
<td>60</td>
<td>55</td>
<td>55</td>
<td>70</td>
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<tr>
<td>Aorta/Peripheral Vascular Disease</td>
<td>79</td>
<td>63</td>
<td>100</td>
<td>59</td>
<td>85</td>
<td>68</td>
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<tr>
<td>Hypertension/Pulmonary Disorders</td>
<td>90</td>
<td>70</td>
<td>80</td>
<td>70</td>
<td>67</td>
<td>65</td>
</tr>
<tr>
<td>Congestive Heart Failure</td>
<td>47</td>
<td>58</td>
<td>58</td>
<td>64</td>
<td>65</td>
<td>64</td>
</tr>
</tbody>
</table>
Program Use of Scores

• Clinical Competency Committee Reviews Scores
  – Milestone Reporting
  – Medical Knowledge….

• Program Evaluation Committee
  – Development of annual curriculum
  – Identify clinical education focus within rotations

• ACGME WebAds/GME Annual Program Evaluation
  – Faculty recruitment needs of program/division/department
  – Development of Self-Study
    • Program AIMS
    • Environment Context: Opportunities/Threats
The score you received on this examination is indicated above. For each item you answered incorrectly, the a) ACC competency statement (CS) and b) diagnosis (D) that relates to that item are listed. The competency statement identifies the fact or concept assessed by the item, while the diagnosis gives a more detailed description. We hope that these two descriptors will help you to ascertain your knowledge gaps and to plan your future study.

Competency Statements (CS) and Diagnoses (D) by Content Area

**Arhythrias (N = 18)**
- CS: 01.02.13: Perform permanent pacemaker implantation and manage complications
  - D: Arhythmia, pacemaker complications
- CS: 01.03.02: Use available system technology to access patient-specific arrhythmia data and graphics (e.g., Holter event, pacemaker data)
  - D: Intracardiac electrograms, polymorphic ventricular tachycardia
- CS: 03.02.07: Skill to identify the ECG changes of electrolyte and metabolic abnormalities, and of drug effects
  - D: Long Q-T syndrome, drug-induced
- CS: 03.03.01: Know the significance and mechanisms of monitoring quality and operation of the hospital or ambulatory digital ECG system
  - D: ECG, artifact
- CS: 10.02.09: Identify candidates for ICD
  - D: Hypertrophic cardiomyopathy, risk stratification for sudden cardiac death

**Coronary Artery Disease (N = 17)**
- CS: 06.02.01: Order, interpret, and integrate the results of CMR report with other clinical findings in the management of patients
  - D: Coronary artery disease, benefits of revascularization
- CS: 14.01.09: Role of non-invasive testing in risk-assessment, including the clinical, functional capacity, ECG, and hemodynamic stress test findings indicative of advanced coronary disease or high-risk state
  - D: Coronary artery disease, indications for revascularization
<table>
<thead>
<tr>
<th>Not Yet Assessable</th>
<th>Critical Deficiencies</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lacks the scientific, socioeconomic, or behavioral knowledge required to provide patient care</td>
<td>Possesses insufficient scientific, socioeconomic, and behavioral knowledge required to provide care for common medical conditions and basic preventive care</td>
<td>Possesses the scientific, socioeconomic, and behavioral knowledge required to provide care for common medical conditions and basic preventive care</td>
</tr>
</tbody>
</table>

Comments:
<table>
<thead>
<tr>
<th>Not Yet Assessable</th>
<th>Critical Deficiencies</th>
<th>Ready for unsupervised practice</th>
<th>Aspirational</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lacks foundational knowledge to apply diagnostic testing and procedures to patient care</td>
<td>Consistently interprets basic diagnostic tests accurately</td>
<td>Interprets complex diagnostic tests accurately while accounting for limitations and biases</td>
</tr>
<tr>
<td></td>
<td>Inconsistently interprets basic diagnostic tests accurately</td>
<td>Needs assistance to understand the concepts of pre-test probability and test performance characteristics</td>
<td>Knows the indications for, and limitations of, diagnostic testing and procedures</td>
</tr>
<tr>
<td></td>
<td>Does not understand the concepts of pre-test probability and test performance characteristics</td>
<td>Fully understands the rationale and risks associated with common procedures</td>
<td>Understands the concepts of pre-test probability and test performance characteristics</td>
</tr>
<tr>
<td></td>
<td>Minimally understands the rationale and risks associated with common procedures</td>
<td></td>
<td>Teaches the rationale and risks associated with common procedures and anticipates potential complications of procedures</td>
</tr>
</tbody>
</table>

Comments:
Program Use of Scores

• Clinical Competency Committee Reviews Scores
  – Milestone Reporting
    • Medical Knowledge….
Program Use of Scores

• Remediation
  – Fellows who fall below national average
    • 1st / 2nd year fellows
      – Review for improvement
    • 3rd year fellows
      – Prepare for ABIM subspecialty exam
  – Focused remediation w/Mentors
    • 1:1 Sessions
Program Use of Scores

• Remediation
  – Additional Board Review Sessions
    • Sessions for fellows who fell below national average or dropped in scores from previous year
  – Restructure Board Review for 2nd Half of Academic Year
    • Annual review of program outcomes
    • Program compared to National
Program Use of Scores

- Evaluation of Program
  - Survey recent graduates
    - Board review topics based on recent board examination
    - Evaluate conferences/board topics
- Review program data
  - Common themes
  - Other than structured board reviews, what other conferences or topics need covered
    - Opportunities for grand round presentations
    - ACC program directors toolbox
    - Subspecialty resources available for cath, EP, etc.
      - HRS
      - SCAI
      - SCMR
Does the In-Training Exam Predict ABIM Cardiovascular Disease Board Outcomes?
What can we tell you about the Bearcat Fellows…
Example: ITE Arrhythmia

Fellows Completing 2013-2015

In-Service Exam Score

Year

2013 2014 2015

Program
National

40 45 50 55 60 65 70
Example: ITE Coronary Artery Disease

Fellows Completing 2013-2015

In-Service Exam Score

Year

2013 2014 2015

Program National
Example: ITE Arrhythmia

Fellows Completing 2014-2016

In-Service Exam Score vs. Year

- Blue line: Program
- Red line: National
Example: ITE Coronary Artery Disease

Fellows Completing 2014-2016

In-Service Exam Score

Year

Program
National
Example: ITE Arrhythmia

Fellows Completing 2015-2017

In-Service Exam Score

Year

Program
National
Example: ITE Coronary Artery Disease

Fellows Completing 2015-2017

In-Service Exam Score

Year

2015 2016 2017

Program
National
5 Year Review ITE/Board Scores

\[ R^2 = 0.7129 \]
### TABLE 4  Multiple Linear Regression Model to Predict ABIM CVD Certification Examination Score of Trainees With First and Third Year ACC-ITE Examination Scores

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Unstandardized Coefficient</th>
<th>Standardized Coefficient</th>
<th>t Value</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC-ITE score in first yr</td>
<td>0.39</td>
<td>0.46</td>
<td>11.42</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ACC-ITE score change from first to third yr</td>
<td>0.28</td>
<td>0.29</td>
<td>9.45</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ABIM-IM certification examination score</td>
<td>0.32</td>
<td>0.24</td>
<td>5.97</td>
<td>&lt;0.001</td>
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<tr>
<td>USMLE step 1 score</td>
<td>0.25</td>
<td>0.05</td>
<td>1.28</td>
<td>0.200</td>
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<tr>
<td>USMLE step 2 (clinical knowledge) score</td>
<td>0.36</td>
<td>0.09</td>
<td>2.00</td>
<td>0.046</td>
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<tr>
<td>USMLE step 3 score</td>
<td>0.23</td>
<td>0.04</td>
<td>1.09</td>
<td>0.278</td>
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<tr>
<td>Age at time of ACC-ITE</td>
<td>-3.42</td>
<td>-0.12</td>
<td>-4.22</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sex (male, female*)</td>
<td>19.94</td>
<td>0.09</td>
<td>3.12</td>
<td>0.002</td>
</tr>
<tr>
<td>Medical school country (U.S., international)</td>
<td>8.84</td>
<td>0.05</td>
<td>1.51</td>
<td>0.131</td>
</tr>
</tbody>
</table>

*Reference group.

Abbreviations as in Tables 1 and 3.
Resources

CardioSource Plus for Institutions and Practices Product Roster

If your institution or practice subscribes to CardioSource Plus, you can access virtually all of ACC's online educational offerings within your institution's network. Simply log in to CardioSource and then click any of the links below.

- SAPs (Self-Assessment Programs)
- MODs (Meetings on Demand)
- Heart Songs
- General Cardiology MOC Modules
- Interventional Cardiology MOC Modules
- Guideline MOC Modules
- Other MOC Modules
- Board Review Products
SAPs (Self-Assessment Programs)
MODs (Meetings on Demand)
Heart Songs
General Cardiology MOC Modules
Interventional Cardiology MOC Modules
Guideline MOC Modules
Other MOC Modules
Board Review Products

- ACCSAP 9
- 2016 Recent Advances in Clinical Nuclear Cardiology and Cardiac CT
- Advanced Heart Failure and Transplant Self-Assessment Questions and Board Prep Program
- 2016 Interventional Cardiology Board Review Meeting on Demand™ Program
- Adult Congenital Heart Disease Self-Assessment Questions and Board Prep Program
- CathSAP 4
- Clinical Cardiac Electrophysiology Self-Assessment Questions and Board Prep Program
- EchoSAP 7
## ACC Sap breakdown

### Arrhythmias:

<table>
<thead>
<tr>
<th>Read:</th>
<th>Watch/Listen:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell EP</td>
<td>Basic EP</td>
</tr>
<tr>
<td>Pharm of Antiarrhythmics</td>
<td>AAD drugs</td>
</tr>
<tr>
<td>EP Study and Ablation</td>
<td>SVT</td>
</tr>
<tr>
<td>Autonomic Disorders</td>
<td>Afib/flutter</td>
</tr>
<tr>
<td>Dto of Sinus and AV conduction</td>
<td>Cases part 1</td>
</tr>
<tr>
<td>Approach to syncope</td>
<td>Brady-arrhythmia/PPM</td>
</tr>
<tr>
<td>Device therapy: PPM</td>
<td>VT</td>
</tr>
<tr>
<td>SVT</td>
<td>ICD and CRT</td>
</tr>
<tr>
<td>Prevention of Art Embolism &amp; CVA</td>
<td>Approach to Syncope</td>
</tr>
<tr>
<td>Afib flutter control</td>
<td>Cases part 2</td>
</tr>
<tr>
<td>V arrhythmias w Nil hearts</td>
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<tr>
<td>SCD in nil hearts</td>
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<tr>
<td>Vent arrhythmias in SHD</td>
<td></td>
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<tr>
<td>Device Tx: ICD</td>
<td></td>
</tr>
<tr>
<td>CRT</td>
<td></td>
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</table>

### Coronary Artery Disease

<table>
<thead>
<tr>
<th>Patient Assessment:</th>
<th>Watch/Listen:</th>
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<tbody>
<tr>
<td>H&amp;P</td>
<td>PE</td>
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<tr>
<td>Exercise Testing</td>
<td>Exercise testing</td>
</tr>
<tr>
<td>Echo</td>
<td>Echo Imaging</td>
</tr>
<tr>
<td>Nuc cardio</td>
<td>NuclPET</td>
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<tr>
<td>CCT</td>
<td>NuclPET review</td>
</tr>
<tr>
<td>CMR</td>
<td>Cardiac CT and CTA</td>
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<tr>
<td>Hemodynamic in Cath lab</td>
<td>Basic Cath lab hemo</td>
</tr>
<tr>
<td>Cor angiogram</td>
<td>Invasive Conventional LV angio</td>
</tr>
<tr>
<td>Intravascular Imaging techniques</td>
<td>ECG</td>
</tr>
<tr>
<td>Physio assessment of cor stenosis</td>
<td></td>
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<tr>
<td>aortic &amp; pulm CT and MR angiogram</td>
<td></td>
</tr>
<tr>
<td>Rad safety during imagan</td>
<td></td>
</tr>
<tr>
<td>Contrast media complications</td>
<td></td>
</tr>
<tr>
<td>noninvasive vascular eval</td>
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</tr>
</tbody>
</table>
Resources

• Mayo Cardiovascular Disease Board Review Curriculum
  – DVDs
  – Question/Answer Sets

• O’Keefe: Complete Guide to ECCGs

• ECG Source
Fellows want to know the why, not just the right answer to a question…

- A 53-year-old man with multiple atherosclerotic risk factors, including HTN, hyperlipidemia, and tobacco use, presents with a 6-month history of DOE and exertional chest tightness. He has orthopnea and paroxysmal nocturnal dyspnea. Echocardiography reveals a severely dilated LV with an EF of 20% and global ventricular hypokinesis. The ECG is normal.

- The next step in diagnostic evaluation should be:
  A. Holter monitor
  B. Stress test with measurement of maximal oxygen consumption
  C. Coronary angiography
  D. Heart transplant evaluation

  Answer: C

This patient is at high risk for CAD since he has multiple CV risk factors, cardiomyopathy, and apparent angina. Thus, coronary angiography should be preferred and noninvasive stress bypassed. A Holter monitor and transplant evaluation are not clinically warranted at this time.

Reference: Mayo Clinic Cardiology Board Review Question/Answers Lloyd and Murphy
What Have We Learned…

• Structure Board Review
  – Review annually with in-training exam breakdown and ABIM score reports
    • Include in Annual Program Review
  – Weekly board review w/detailed schedule
    • Preparation by fellows
    • Assign material to review
    • Encourage Q/A before and after session
  – Include faculty…focus on their expertise
    • Junior Faculty Are Huge Benefit….Recent Experience/Study Preparation
  – Structure Board Review by the Program
    • Better Results in In-Training Exam and ABIM Boards
    • Independent Study Sounds Great, but Scores Not Reflected
Thank You!

- University of Cincinnati, Division of Cardiovascular Health and Disease
- David Harris, MD (Program Director) and Robin Vandivier-Pletsch, MD (Assoc. Program Director)
- Regina Kayse, MD (Chief Fellow)
- Caroline Meunier (Graphing)