Executive Summary
Petition for Added Qualifications in Cardiology for Board Certified Pharmacotherapy Specialists

Cardiovascular agents constitute one of the largest and most widely used drug classes. Although these drugs have the potential to significantly improve the treatment of various cardiac diseases, they are potent agents with the potential for serious adverse effects, toxicity and drug interactions. The safe and effective use of each of these drugs requires a thorough understanding of appropriate patient selection, drug timing, dosing regimens and monitoring parameters. To provide comprehensive pharmaceutical care, pharmacists must be able to recommend rational drug therapy based on patient-specific factors and monitor complex drug regimens. Because of the prevalence and complexities of cardiovascular disease, there is clearly a need within the pharmacy profession for individuals with added expertise in cardiovascular pharmacotherapy.

Cardiology is a unique and distinct clinical practice within the Pharmacotherapy specialty that is focused on the rational and effective use of agents to treat and prevent cardiovascular diseases. It is in the best interest of both the profession and patients to have pharmacists with additional training and expertise in cardiology. The pharmacists included in this petition have fulfilled all of the requirements for specialty board certification in pharmacotherapy. In addition, these individuals possess a greater depth of knowledge, skills and experience in the area of cardiovascular pharmacotherapy. They have extensive clinical experience, and practice in a variety of inpatient and outpatient settings. In addition, over half have completed additional postgraduate training in cardiovascular pharmacotherapy. Many provide a high level of pharmaceutical care as indicated by the establishment of formalized collaborative drug therapy management privileges in their practice.

These individuals with advanced cardiovascular pharmacotherapy skills fill a vital need in both inpatient and ambulatory settings. They are able to proactively participate with physicians and other health care providers in the care of cardiovascular patients. They provide consultations on the appropriate use and monitoring of cardiovascular drugs with more depth and sophistication than that of a generalist or of a board certified pharmacotherapy specialist whose focus is other than cardiology.

The ultimate goal of pharmacotherapy specialization and added qualifications is to insure quality patient care and improve therapeutic outcomes. As the cardiovascular field continues to expand in both scope and complexity, there will be an increasing need for highly trained pharmacotherapy specialists with expertise in the field of cardiology. Added qualifications in cardiology would clearly identify for employers, third party payers, physicians, patients and the public those individuals who have specialized in pharmacotherapy and have additional competencies and expertise in the field of cardiology.

Petition for Added Qualifications in Cardiology for Board Certified Pharmacotherapy Specialists

Introduction

The Board of Pharmaceutical Specialties, in 1997, issued Petitioner Information for Added Qualifications, providing a process for recognition of focused areas of practice within a specialty area of pharmacy. Shortly thereafter, through the Cardiology Practice and Research Network (PRN) of the American College of Clinical Pharmacy, more than 150 Board Certified Pharmacotherapy Specialists (BCPS) with focused practices in cardiology were identified as possible candidates to seek recognition and certification for Added Qualifications in Cardiology.

The leadership of the Cardiology PRN inquired of its membership if those who were BCPS would desire to seek Added Qualifications in Cardiology. As an overwhelming majority of PRN members were interested in applying, a subcommittee was formed. Following submission of a petition for Added Qualifications in Infectious Diseases by the Society for Infectious Diseases Pharmacists (SIDP) in May 1998, with permission from its leadership, the SIDP document was used as a guide for drafting the cardiology petition. We are grateful to the SIDP for providing this leadership for added qualifications in other focused areas, especially for their work on the portfolio review process.

Although this document was drafted by members of the Cardiology PRN, we feel that Added Qualifications in Cardiology will benefit all board certified pharmacotherapy specialists who have a focused practice in cardiology. On behalf of the Cardiology PRN and other interested members, this petition is submitted by ACCP to the Specialty Council for Pharmacotherapy. Letters of support from 25 of these BCPS are included as part of this petition. The petition is organized in segments, with each of the four required criteria addressed independently.

<u>Criterion 1</u>: Describe the benefits society and the profession will receive if this area of Added Qualifications within the specialty is recognized.

Heart disease remains the number one killer of Americans. In 1990, an estimated 5.2 million people were hospitalized with a primary discharge diagnosis of cardiovascular disease.[1] An estimated 930,000 people die of cardiovascular disease in the United States (US) annually which accounts for

approximately 43% of all deaths. Among Americans less than 75 years of age, almost 5 million years of potential life are lost annually due to cardiovascular disease.

An estimated 6 million people have coronary heart disease (CHD), many of whom will die of sudden cardiac death or myocardial infarction (MI). Specifically, each year an estimated 900,000 people in the US experience an MI.[2] Deaths from MI have continued to decline with improvements in treatment, but the frequency of heart failure is subsequently increasing. Approximately 3 million people suffer from heart failure with 400,000 new cases each year.[3,4] This makes heart failure the number one diagnosis-related group for patients 65 years of age or older. Because the costs of hospitalization for heart failure frequently exceed the Medicare reimbursement, heart failure has been identified as a major economic public health problem. In addition, atrial fibrillation often complicates heart failure and affects an estimated 2.2 million Americans. Elderly patients without heart failure are also at risk for atrial fibrillation, which is associated with a significant risk for stroke.[5] Major modifiable risk factors for coronary heart disease, such as hypertension and dyslipidemia, affect millions of individuals as well.

Although heart disease remains a major cause of morbidity and mortality, significant progress has been made in prevention, early detection and treatment. Death rates have been steadily declining over the past several decades. For example, from 1980 to 1990, the age-adjusted death rate from CHD fell 32.6% and that of stroke 32.4%.[1] These findings are likely due to many factors, including widespread efforts to increase public awareness of heart disease and encourage risk factor modification, along with the discovery of highly effective new treatments and drugs. Nevertheless, it is clear that heart disease is and will continue to be a major public health issue in this country. If pharmacists are to continue expanding their professional role through the delivery of comprehensive pharmaceutical care, there is a need for individuals who have additional training and expertise in the cardiovascular area.

Cardiovascular agents constitute one of the largest and most widely used drug classes. In recent years, the cardiovascular drug market has exploded. Because of the enormous health care burden to society and the potential economic benefits, drug companies have invested substantial amounts of time and money into cardiovascular drug research and development. Along with the growing number of new drugs within existing therapeutic classes, entirely new classes of cardiovascular drugs have been developed, including low molecular weight heparins, angiotensin II receptor antagonists and the glycoprotein IIb/IIIa inhibitors. Although these new drugs have the

potential to significantly improve the treatment of various cardiac diseases, they are potent agents with potential for serious adverse effects, toxicity and drug interactions. Moreover, many of the newer agents are considerably more costly than older drugs (e.g., low molecular weight heparin versus standard heparin or glycoprotein IIb/IIIa inhibitors versus aspirin) and therefore cost-effective strategies must be developed.

In recent years, the primary literature has been flooded with the findings of clinical trials involving cardiovascular drug therapy including large “megatrials” evaluating outcomes. These trials have demonstrated benefits for both primary and secondary prevention of CHD and have shown unequivocal reductions in outcomes such as reduced mortality and reinfarction following acute myocardial infarction, decreased stroke associated with atrial fibrillation, decreased end organ damage from hypertension, and decreased morbidity and mortality from heart failure. In response to these clinical trial findings, cardiovascular patients often receive complex multidrug regimens. For example, following MI, patients may appropriately receive thrombolytic agents, various antiplatelet drugs, anticoagulants, vasodilators, beta-blockers, angiotensin converting enzyme (ACE) inhibitors, and in some cases, inotropic or antiarrhythmic drugs. Additional drugs may subsequently be indicated for coronary risk factor modification, including lipid modifying drugs, antihypertensive agents, antidiabetic agents, hormone replacement therapy and smoking cessation aids. These agents must be safely prescribed in combination with other noncardiovascular agents the patient may require.

Although potentially beneficial, the safe and effective use of each of these drugs requires a thorough understanding of appropriate patient selection, drug timing, dosing regimens and monitoring parameters. For example, timing is particularly important for effectively initiating drugs such as thrombolytics, beta-blockers and ACE inhibitors following MI.

In many cases, the greatest benefit to risk ratio for specific drugs is seen in certain subsets of patients. For example, ACE inhibitors are shown to be most effective in MI patients with left ventricular dysfunction or clinical heart failure. Another example is the appropriate selection of an antiarrhythmic agent in the setting of MI. Drug therapy selection should be based on the type and seriousness of the arrhythmia and other patient-specific factors such as left ventricular function. In addition, the selection of proper anticoagulation strategies for stroke prevention in patients having atrial fibrillation should be based on patient-specific criteria and a thorough knowledge of the published evidence. Warfarin may be indicated in patients who have a higher risk for stroke, whereas aspirin could be used in lower risk patients or patients who are not candidates for warfarin therapy.

All of these examples illustrate the complexities of cardiovascular drug therapy and the need for in-depth current knowledge of the clinical trial evidence.

In addition to new drug therapies, our knowledge of the pathophysiology of cardiovascular diseases is also rapidly expanding. Heart failure is an excellent example of a disease for which our understanding of the underlying pathophysiology has grown tremendously in the last few years to include new concepts such as the role of neurohormones, remodeling, apoptosis and the distinction between diastolic and systolic dysfunction. In response to these new findings, the role of older agents such as digoxin has been redefined and newer therapies such as ACE inhibitors and beta-blockers have emerged as recommended therapies.

To provide comprehensive pharmaceutical care, pharmacists must be able to recommend rational drug therapy based on patient-specific factors, and monitor complex drug regimens. Because of the prevalence and complexities of cardiovascular disease, there is clearly a need within the pharmacy profession for individuals with added expertise in cardiovascular pharmacotherapy.

Numerous publications have documented improved patient compliance and treatment outcomes, as well as cost effectiveness, when pharmacists with extensive knowledge and skills in cardiovascular pharmacotherapy participate in disease state management. The benefits of involvement by highly skilled clinical pharmacy practitioners have been shown in inpatient, ambulatory and managed-care settings for patients with a variety of cardiovascular disorders. Many studies have shown that pharmacist-managed anticoagulation services result in significant improvements in patient outcomes, shorter hospitalizations, decreased readmissions, and are cost effective.[6-18] For example, a recently published study compared outcomes between usual medical care and a pharmacist-managed anticoagulation clinic.[6] Clinic patients demonstrated lower rates of bleeding and thromboembolic events as compared to those who received usual care. Moreover, the pharmacist clinic saved an estimated $162,058 per 100 patients annually in reduced hospitalizations and emergency department visits. A second study evaluating the cost effectiveness of a pharmacist-managed anticoagulation service estimated a potential cost avoidance of $4,073 per person-year of follow-up.[7] For patients with hyperlipidemia, studies have demonstrated improved treatment outcomes and increased quality of life when pharmacists are involved in patient care.[19-25] For example, one study demonstrated a 2-fold increase in the number of patients achieving National Cholesterol Education Program lipid goals for those managed by a physician and pharmacist team compared with patients managed only by physicians.[19] Improved blood pressure control and cost

savings have also been documented when pharmacists are involved in the management of hypertension.[26-31] Furthermore, a recent study in patients with congestive heart failure demonstrated reductions in unplanned hospital admissions and out-of hospital deaths following home-based intervention by a pharmacist and nurse.[32]

The individual clinical pharmacists involved in these studies have developed added skills and knowledge in cardiovascular pharmacotherapy through a variety of pathways including formalized education, specialized training and certificate programs, as well as extensive practice experience on cardiovascular services. Despite these differences, studies clearly demonstrate that clinical pharmacists with cardiovascular expertise can positively impact patient care.

It is in the best interest of both the profession and patients to have pharmacists with additional training and expertise in cardiology. The pharmacists included in this petition have fulfilled all of the requirements for board certification in pharmacotherapy. In addition, these individuals possess a greater depth of knowledge, skills and experience in the area of cardiovascular pharmacotherapy. In anticipation of this petition, a survey of 161 BCPS with an interest in cardiology was conducted. Among the 89 respondents, 34% indicated that they have practiced 2-5 years, 28% 5-10 years and another 28% 10 years or more. These individuals devote on average 50% of their time to cardiology.

These individuals practice in a variety of settings. Approximately one-half are associated with academic medical centers. Many practice on cardiac care units (40%) or telemetry floors (26%). Also, many practice in ambulatory care settings: 18% in anticoagulation clinics, 18% in lipid clinics, 9% in family practice clinics, and 24% in primary care clinics. Others work with specialty clinics focused on smoking cessation, hypertension, arrhythmias or heart failure (Table 1). Approximately 35% have completed postgraduate training in cardiology, including 21% who have completed cardiovascular fellowships. In addition, 19% have completed certificate programs in cardiovascular-related areas (e.g., hyperlipidemia, anticoagulation, smoking cessation). Approximately 45% of the respondents indicated they have been granted formalized collaborative drug therapy management privileges in their practice.

These individuals with advanced cardiovascular pharmacotherapy skills fill a vital need in both inpatient and ambulatory settings. These individuals are able to proactively participate with physicians and other health care providers in the care of cardiovascular patients. They are able to provide consultations on the appropriate use and monitoring of cardiovascular drugs with more

depth and sophistication than that of a generalist or a BCPS with a different area of focus. For example, in the hospital cardiac care unit, these pharmacists are knowledgeable about the complexities of cardiovascular hemodynamics and interventions such as inotropic and vasodilator therapy for advanced heart failure, antiarrhythmic therapy for life-threatening arrhythmias or antithrombotic drug regimens for acute coronary syndrome patients undergoing revascularization procedures. In preventive cardiology clinics, these pharmacists with advanced cardiovascular knowledge are able to counsel patients on lifestyle modifications, recommend appropriate therapy to modify coronary risk factors and provide comprehensive disease state management to improve outcomes and reduce costs.

Through their participation in research studies, pharmacists with advanced cardiovascular training are able to make significant contributions toward the management of cardiovascular disease and further enhance the image of pharmacy as a scholarly profession. In our survey of BCPS pharmacists with an interest in cardiology, 37% of the respondents indicated they had received competitive grant money for cardiovascular research. Schools of pharmacy have a need for pharmacists with expertise in the cardiovascular field to coordinate and teach this complex area of pharmacotherapy to their students. Approximately 87% of the survey respondents stated they are responsible for either experiential or didactic teaching for pharmacy students and other health care practitioners. Graduate students need mentors in the field of cardiovascular pharmacotherapy to guide and direct their research efforts. In our survey, 28% of the respondents reported they precept either a residency or fellowship in cardiology. Over one-half of the respondents reported they have contributed to the literature through the publication of cardiovascular review articles or research findings in peer-reviewed pharmacy and medical journals. In addition, many serve as referees or members of editorial boards for various journals on matters relating to cardiovascular pharmacotherapy.

Pharmacists with added training in cardiology are also a valuable resource for written and live continuing education programs focused on cardiovascular topics. In addition, these individuals are well qualified to represent the profession on matters involving cardiovascular pharmacotherapy such as the development of practice guidelines and consensus statements from the pharmacy profession or as part of an interdisciplinary effort with other health care professionals. In fact, BCPS members of the Cardiology PRN have participated in the development of the Joint National Committee guidelines for the treatment of hypertension[33] and the American College of Chest Physicians expert panel

recommendations for antithrombotic therapy. [34] Furthermore, their presence and participation at national cardiovascular meetings such as the American Heart Association and American College of Cardiology provide expertise and a visible presence that is vital to the pharmacy profession.

Heart disease will continue to be a major public health problem in this country. As a result, cardiovascular drug development will continue at an escalating rate. The ultimate goal of pharmacotherapy specialization and added qualifications is to insure quality patient care and improve therapeutic outcomes. As the cardiovascular field continues to expand in both scope and complexity, there will be an increasing need for highly trained pharmacotherapy specialists with expertise in the field of cardiology. Added qualifications in cardiology would clearly identify for employers, third party payers, physicians, patients and the public those individuals who have specialized in pharmacotherapy and have additional competencies and expertise in the field of cardiology.

<u>Criterion 2</u>: Document how the area of Added Qualifications is sufficiently distinct within the specialty practice area.

Cardiology is a unique and distinct clinical practice within the Pharmacotherapy specialty that is focused on the rational and effective use of agents to treat and prevent cardiovascular diseases. Therapeutic agents used to treat cardiovascular disorders are some of the most frequently prescribed medications. Appropriate use of these agents requires extensive knowledge of the medical literature and advanced clinical skills to ensure favorable outcomes and limit adverse effects.

While all Pharmacotherapy specialists must have a general knowledge of cardiovascular diseases and their treatment, not all can be expected to maintain the necessary skills required to manage complicated cardiovascular disorders. For example, not all Pharmacotherapy specialists can be expected to manage patients in cardiogenic shock or patients with refractory ventricular tachycardia. Pharmacotherapy specialists who have these types of specialized skills, because of their additional training and experience, are distinct within the specialty.

Formal post-graduate training in cardiovascular pharmacotherapy is available. In the 2000 Directory of Residencies and Fellowships published by ACCP, 14 fellowships and 13 specialty residencies emphasizing cardiovascular pharmacotherapy are listed (Appendix 1). In addition, there are numerous traineeship programs for specialty practice areas within cardiology. For example, the National Pharmacy Cholesterol Council sponsors a lipid clinic training program, the American Society of Health-System Pharmacists sponsors an Anticoagulation training program, and the ACCP

Research Institute offers a traineeship in anticoagulation. Furthermore, various cardiology associations offer numerous opportunities for continuing education in the field. The American College of Cardiology and the American Heart Association both have annual meetings attended by pharmacists practicing in the area of cardiology. In addition, both of these organizations sponsor seminars in a variety of areas ranging from hypertension to congestive heart failure. ACCP has offered numerous hours of continuing education in the area of cardiovascular pharmacotherapy in the past 5 years (Appendix II).

The Research Institute of ACCP has sponsored either a Cardiovascular Fellowship and/or a Cardiovascular Research Award since 1984. The National Institutes of Health's National Heart Lung and Blood Institute provides millions of dollars annually for research into the causes and treatment of cardiovascular diseases. In addition, the American Heart Association provides research funding for investigators through both its national office and its regional affiliates. Many pharmacy investigators have been successful in obtaining funding from these organizations (Appendix III).

The Cardiology PRN was formed within ACCP to serve the needs of practitioners with a practice focus in cardiology. The PRN has now grown to include over 300 members, and is one of the largest PRNs in the College. Altogether, there are 750 members in ACCP who have indicated cardiology as an area of primary emphasis. In addition, the American Society of Health-System Pharmacists includes over 450 members who have indicated cardiology as a primary practice specialty.

To illustrate the scope of practice of cardiovascular pharmacotherapy, there are no less than 60 journals publishing articles related exclusively to cardiovascular diseases. These include, "Journal of the American College of Cardiology", "Circulation", "Circulation Research", "Hypertension", "American Journal of Cardiology", "American Heart Journal", "Clinical Cardiology", "Journal of Hypertension" and "Atherosclerosis," among others. These do not include major periodicals, such as the "New England Journal of Medicine", "Journal of the American Medical Association", "Lancet" or "Annals of Internal Medicine," which often publish important articles in this area. Also not included in this count are major journals in pharmacy, pharmacokinetics or clinical pharmacology that publish numerous important articles pertaining to cardiovascular pharmacotherapy.

Appendix IV lists published papers, arranged by journal title, authored by BCPS who practice in the area of cardiology.

<u>Criterion 3</u>: Provide documented estimates for the current and future numbers of practitioners within the proposed area of Added Qualifications, and of the number of these pharmacists who are likely to apply for the Added Qualifications designation.

Among the 1,413 BCPS in 1999, 179 had indicated cardiology as the major focus area of their primary practice on the demographic survey administered by the Board of Pharmaceutical Specialties in conjunction with taking the Pharmacotherapy specialty certification examination. Since 1991, an average of 12.3% (range: 8.6-16.9%) of those passing the Pharmacotherapy examination have indicated cardiology as their primary practice focus.

In our survey of 161 board certified pharmacotherapy practitioners with a known interest in cardiology, 77% of respondents reported a moderate to high interest in applying for Added Qualifications in Cardiology. If the results of this recent survey are combined with historical data, it is possible to develop a 5-year projection of the number of individuals who might pursue Added Qualifications in Cardiology. At present within ACCP, there exists a group of 224 BCPS who indicate a primary interest in cardiology, and it is probable that 77% (172) would request a portfolio review soon after the approval of the petition. In addition, an estimated 12% of individuals passing the Pharmacotherapy exam each year will have a focused practice in cardiology (i.e., 20 each year, based on historical information), with approximately 77% requesting consideration of Added Qualifications in Cardiology. A conservative estimate would be that over the next five years, between 200 and 250 individuals will seek recognition of Added Qualifications in Cardiology.

In addition within ACCP, there are another 523 practitioners with a primary interest in cardiology who are not board certified. The American Society of Health-System Pharmacists reports having over 450 members who have indicated cardiology as a primary practice area. It is possible that if Added Qualifications in Cardiology were approved, the number of these individuals sitting for pharmacotherapy specialty board examination might increase, further increasing the number of individuals eligible to seek added qualifications recognition.

Letters of support from 25 BCPS who plan to seek Added Qualifications in Cardiology are included as part of this petition (Appendix V).

<u>Criterion 4</u>: Propose the specific elements of a portfolio review by which an applicant would be screened for conferral of Added Qualifications (e.g., pertinent training and education;

practice experience and activities; scholarship/education; professional achievement and recognition).

Pharmacotherapy specialists seeking recognition of Added Qualifications in Cardiology must submit a portfolio that contains sufficient information to justify this additional credential and which clearly defines the distinction between the individual and other specialists. The required elements are based on the characteristics of BCPS who have focused areas of practice in cardiology, as discussed throughout this petition. The following are required elements of such a portfolio submission:

1. Letter from applicant requesting review of portfolio for purpose of seeking Added Qualifications in Cardiology.
2. Current curriculum vitae
3. Detailed summary of each of the following elements (if not included in CV):
    a. Any special or unique training or professional development programs in the area of cardiology.
    b. Work experience in the area of cardiovascular pharmacotherapy.
    c. Specific professional responsibilities for patient care of patients with cardiovascular diseases in outpatient and inpatient settings.
    d. Any professional awards, honors, or special achievements relative to cardiovascular pharmacotherapy.
    e. Bibliography of applicant's relevant professional publications.
    f. List of applicant's past and present research or other scholarly activities in the area of cardiovascular pharmacotherapy.
    g. Summary of past and current activities in didactic or clerkship education of health care professionals in cardiovascular pharmacotherapy.
    h. List of memberships in professional organizations, with specific notation of any service or leadership activities in the organization.
    i. Any additional information that the applicant desires to include that supports the recognition of Added Qualifications in Cardiology.

The following scoring system has been developed by appointed representatives of the Specialty Council on Pharmacotherapy and the Society of Infectious Diseases Pharmacists. It has been adapted for use in determining Added Qualifications in Cardiology.

Proposed Scoring System

Each item identified below will be evaluated based on either a NO response or a YES response. For all NO responses, 0 points are awarded. For each YES response, all the points shown will be awarded.

A. The Cardiology Pharmacotherapist designs, implements, monitors, evaluates, and modifies patient pharmacotherapy to ensure effective, safe, and economical therapy in patients with cardiovascular diseases.

1.	Member of an interdisciplinary team contributing regularly to the care of patients with cardiovascular diseases.	0 or 1 point
2.	Monitors patients, assesses therapy, and intervenes to optimize pharmacotherapy of cardiovascular diseases.	0 or 3 points
3.	Provides patient education on cardiovascular pharmacotherapy.	0 or 2 points
4.	Evidence of prior professional experience in the management of patients with cardiovascular diseases as outlined above (a, b, and/or c).	0 or 2 points

(Minimum Score Needed for Added Qualification: 2 points)

B. The Cardiology Pharmacotherapist retrieves, analyzes, evaluates, and interprets scientific literature to enhance the provision of patient- and population-specific cardiology information and clinical care.

1. Provides verbal or written cardiology pharmacotherapy consultations for individual patient care. 0 or 3 points
2. Member of Pharmacy and Therapeutics Committee, Clinical Pathway or Practice Guideline Development Committee (or equivalents). 0 or 2 points
3. Manages or participates in cardiology drug use programs, implementation of clinical pathways, or specific quality control activities. 0 or 3 points
4. d. Develops written cardiology drug information monographs or summaries for use by other health care professionals. 0 or 2 points

(Minimum Score Needed for Added Qualification: 3 points)

C. The Cardiology Pharmacotherapist participates in the generation of new knowledge relevant to the practice of cardiology pharmacotherapy.

1. Designs and/or conducts investigator-initiated research in cardiovascular pharmacotherapy. 0 or 2 points
2. Serves as investigator for contract clinical trials for cardiovascular drug development. 0 or 2 points
3. Presents research at national or international scientific meetings and/or publishes peer-reviewed reports of original research. 0 or 2 points
4. Publishes peer-reviewed reviews in the area of cardiovascular pharmacotherapy. 0 or 2 points
5. Serves as reviewer for scientific/professional publications in cardiology. 0 or 1 point

(Minimum Score Needed for Added Qualification: 0 points)

D. The Cardiology Pharmacotherapist educates health care professionals, students, patients, and the public regarding rational cardiovascular pharmacotherapy.

1. Preceptor for Cardiovascular Specialty Resident and/or Cardiology Research Fellow. 0 or 2 points
2. Provides didactic lectures on cardiology topics to health care professionals in training. 0 or 2 points
3. Precepts cardiology clerkship experiences for health care professionals in training. 0 or 2 points
4. Develops/provides unique programs for patient and/or public education concerning cardiology topics. 0 or 2 points

(Minimum Score Needed for Added Qualification: 2 points)

E. Other Information Relevant to Portfolio Review

1. Membership in professional/scientific organizations for cardiology practitioners/researchers. 0 or 1 point
2. Special training or professional development programs in cardiology pharmacotherapy. 0 or 2 points
3. Special awards/honors/achievements in cardiology pharmacotherapy or related professional practice. 0 or 1 point

(Minimum Score Needed for Added Qualification: 0 points)

PROPOSED MINIMUM SCORE FOR RECOGNITION AS A PHARMACOTHERAPY SPECIALIST WITH ADDED QUALIFICATIONS IN CARDIOLOGY:

12 TOTAL POINTS (out of 38 possible points)

AND

ACHIEVING THE MINIMUM SCORE FOR EACH SECTION (as indicated).

Table 1. Characteristics of Board Certified Pharmacotherapy Specialists with Practices in Cardiology (number surveyed = 161; number responded = 89)

Time in Practice	**2-5 Years**	**5-10 Years**	**> 10 Years**
	34%	28%	28%

Education	**Specialty Residency**	**Fellowship**	**Applicable Certificate Program**
	13%	24%	19%

Practice Setting	
Acute Care	45%
Cardiac Care Unit	40%
Telemetry Floor	26%
Anticoagulation Clinic	18%
Lipid Clinic	18%
College of Pharmacy or Medicine	33%
Pharmaceutical Industry	18%
Managed Care	7%
Primary Care Clinic (including Family Practice)	35%

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34. Guidelines for the use of antithrombotic therapy. American College of Chest Physicians. November 1998, suppl.

Appendix I

Residency and Fellowship Training Programs with Emphasis on Cardiovascular Pharmacotherapy

2000 ACCP Director of Residencies and Fellowships

Residencies with Emphasis in Cardiovascular Pharmacotherapy (Program Number, Preceptor, Institution, Areas of Emphasis):

9. Fran M. Gengo, Pharm.D., FCP, Preceptor; Dent Neurologic Institute: Ambulatory Care, Anticoagulation, Neurology.

16. Cheryl Laughlin, Pharm.D., Preceptor; Physicians, Inc.: Ambulatory Care, Internal Medicine, Cardiology.

23. Marieke Schoen, Pharm.D., BCPS, Preceptor; University of Illinois at Chicago: Ambulatory Care, Cardiology.

24. Frank Paloucek, Pharm.D., Preceptor; University of Illinois at Chicago: Ambulatory Care, Cardiology.

37. Pierre Martineau, Pharm.D., Preceptor; Hopital du Sacre Coeur de Montreal: Cardiology.

38. Kerry Pickworth, Pharm.D., Preceptor; Ohio State University: Cardiology.

41. Aileen Bown Luzier, Pharm.D., Preceptor; State University of New York at Buffalo: Cardiology, Ambulatory Care, Managed Care.

43. Sharon Yamashita, Pharm.D., Preceptor; Sunnybrook Health Science Centre: Cardiology, Critical Care.

64. Lisa Colodny, Pharm.D., BCNSP, Preceptor; Broward General Medical Center: Critical Care, Infectious Diseases, Cardiology.

69. Lance J. Oyen, Pharm.D., BCPS, Preceptor; Mayo Medical Center: Critical Care, Cardiology.

240. Celeste M. Lindley, Pharm.D., MS, Preceptor; University of North Carolina at Chapel Hill: Oncology, Hematology, Anticoagulation.

295. Edward M. Hampton, Pharm.D., Preceptor; VA Medical Center, Oklahoma City: Pharmacokinetics, Infectious Diseases, Cardiology.

300. Eric Racine, Pharm.D., Preceptor; Harper Hospital, DMC: Pharmacotherapy, Cardiology, Pharmacoeconomics.

Fellowships with Emphasis in Cardiovascular Pharmacotherapy (Program Number, Preceptor, Institution, Areas of Emphasis):

34. Daniel E. Hilleman, Pharm.D., Preceptor; Creighton University: Cardiology, Critical Care, Pharmacoeconomics.

35. C. Michael White, Pharm.D., Preceptor; Hartford Hospital: Cardiology.

36. James E. Tisdale, Pharm.D., Preceptor; Henry Ford Hospital/Wayne State University: Cardiology.

39. Sarah A. Spinler, Pharm.D., FCCP, Preceptor; Philadelphia College of Pharmacy: Cardiology.

40. Robert J. Straka, Pharm.D., Preceptor; Regions Hospital/HealthPartners: Cardiology, Pharmacokinetics.

42. Aileen Bown Luzier, Pharm.D., Preceptor; State University of New York at Buffalo: Cardiology, Ambulatory Care, Pharmacoepidemiology.

44. Brian G. Hardy, Pharm.D., FCCP, Preceptor; Sunnybrook Health Science Centre: Cardiology, Critical Care, Infectious Diseases.

45. Stephanie Gardner, Pharm.D., Preceptor; University of Arkansas for Medical Sciences: Cardiology.

46. Julie A. Johnson, Pharm.D., BCPS, Preceptor; University of Florida: Cardiology, Pharmacokinetics, Pharmacodynamics.

47. Bradley G. Phillips, Pharm.D., BCPS, Preceptor; University of Iowa: Cardiology, Clinical Research.

48. J. Herbert Patterson, Pharm.D., FCCP, Preceptor; University of North Carolina at Chapel Hill: Cardiology, Pharmacokinetics.

49. Mark A. Munger, Pharm.D., Preceptor; University of Utah: Cardiology.

50. Matthew K. Ito, Pharm.D., BCPS, Preceptor; VA Medical Center, San Diego: Cardiology, Lipids, Clinical Research.

96. B. Daniel Lucas, Jr., Pharm.D., Preceptor; Camcare Health Education and Research Institute: Drug Development, Cardiology.

Appendix II
Cardiology Programming from the
American College of Clinical Pharmacy, 1995-1999

Annual Meeting (October 1999)

Evolving Pharmacotherapeutic Concepts in Managing Acute Coronary Syndromes (2 hours)

Cardiovascular Disease in Women: Examining Gender Differences in Outcomes (2 hours)

- Cardiovascular Disease in Women
- Gender Differences in Using Invasive Diagnostic Testing and Therapies
- Gender Bias in Treating Acute Myocardial Infarction

Point/Counterpoint: Should Hormone Replacement Therapy be Used for Secondary Prevention of Cardiovascular Disease? (2 hours)

International Congress on Clinical Pharmacy (April 1999)

Experience with a Pharmacy-Based Multidisciplinary Lipid Clinic (35 minutes)

Differences in Public Health Approaches to Treating Hyperlipidemia: Is the Grass Always Greener on the Other Side of the Atlantic? (2 hours)

- Patient Case Presentation
- Treating to Target: In Support of the NCEP Guidelines
- Dyslipidemia and Cardiovascular Risk Assessment: In Support of the European Treatment Guidelines

Treatment of Progressive Nephropathy in Patients with Diabetes and Hypertension: Aspects of Clinical Practice (35 minutes)

Annual Meeting (November 1998)

Glycoprotein IIb/IIIa Inhibition: A New Strategy for Preventing Platelet Aggregation in Cardiovascular Patients (2 hours)

Insulin Resistance and Atherosclerosis (1 hour 45 minutes)

- Insulin Resistance and Modifying Insulin Sensitivity
- Diabetes and Atherosclerosis

Pro/Con Debate—The JNC-VI Guidelines: How Closely Should They Be Followed? (2 hours)

- Overview of Hypertension Screening and Treatment Guidelines: JNC-VI
- Pro: Why the JNC-VI Guidelines Should Be Followed
- Con: Why the JNC-VI Guidelines Should Not Be Followed

Quality Indicators of Care in Congestive Heart Failure (1 hour)

Pro/Con Debate: Patients with Type 2 Diabetes Mellitus Should be Treated Aggressively for Hypertriglyceridemia (1 hour 30 minutes)

Inflammation and Atherosclerosis (1 hour 30 minutes)

- Therapeutic Targets for Inflammatory Diseases—Atherosclerosis
- Clinical Modulation of Inflammation—Atherosclerosis
- Significant Papers Related to Inflammation and Atherosclerosis

Why Aren't ACE Inhibitors Used in Heart Failure? (1 hour)

Should Low Molecular Weight Heparins Replace Heparin? (1 hour)

Spring Practice and Research Forum (April 1998)

Advances in Managing Heart Failure (55 minutes)

Advances in Anti-Thrombotic Therapy (55 minutes)

Controversies in Cardiovascular Therapeutics: Drugs Versus Devices: (2 hours)

Should Thrombolytic Agents be First-Line Therapy for Acute Myocardial Infarction?

- *Pro: They are first-line therapy.*
- *Con: They are not first-line therapy.*

Should Antiarrhythmic Agents be First-Line Therapy to Prevent Sudden Cardiac Death?

- *Pro: They are first-line therapy.*
- *Con: They are not first-line therapy.*

Annual Meeting (November 1997)

Expanding Therapeutic Horizons: Arterial Indications for Low Molecular Weight Heparins (2 hours)

Growth Factors in Cardiac Diseases (30 minutes)

Significant Papers in Pharmacotherapy (30 minutes)

Pro/Con Debate: Calcium Channel Blockers are First-Line Therapy for Ischemia and Hypertension: (1 hour 45 minutes)

- *Pro: They are first-line therapy.*
- *Con: They are not first-line therapy.*

Should the Elderly be Treated for Dyslipidemia? (1 hour)

The Hyperlipidemic Patient (30 minutes)

Outpatient Treatment of Uncomplicated, Proximal, Deep Venous Thrombosis (30 minutes)

Pathogenesis and Treatment of Hyperlipidemia Following Cardiac Transplantation (25 minutes)

Accelerated Graft Vasculopathy: Pathogenesis, Risk Factors, and Future Therapies (35 minutes)

Spring Practice and Research Forum (April 1997)

Ischemic Cellular Injury and Death (3 hours)

- Apoptosis: Programmed Cell Death
- Reactive Oxygen Species in Cellular Injury
- Signal Transduction Pathways

Updates in Pharmacotherapy—State of the Art Treatment of Ischemic Heart Disease (3 hours)

- Angiotensin Converting Enzyme Inhibitors for Acute Myocardial Infarction
- Antithrombotic Therapy for Acute Ischemic Heart Disease
- Approaches to Prevent Reocclusion after Coronary Angioplasty or Stent Placement

Treatment of Hypertensive Conditions in Pregnancy (40 minutes)

Annual Meeting (August 1996)

Evolving Trends in the Pathogenesis and Management of Coronary Heart Disease (3 hours)

A Comparison of the Economic Outcomes of Diltiazem IV and Digoxin IV in the Treatment of Atrial Fibrillation and Atrial Flutter (25 minutes)

Update on Recent Heart Failure Clinical Trials (1 hour 45 minutes)

- Current Perspectives in the Treatment of Heart Failure
- Current Pharmacotherapy of Heart Failure: New Drugs and New Trials
- Heart Failure Guidelines: Standard of Care?

Coronary Artery Bypass and COPD Paths (2 hours)

Myocardial Infarction and Carotid Endarterectomy Paths (2 hours)

Cardiovascular and Role of the Pharmacist Paths (2 hours)

Congestive Heart Failure Path (2 hours)

The Living with Heart Failure Questionnaire in Clinical Trials (25 minutes)

Winter Practice and Research Forum (February 1996)

Acute Management of Ventricular Arrhythmias: Focus on New Developments (3 hours)

New Drugs for Treatment of Cardiovascular Disease (55 minutes)

New Pathophysiologic Issues in Congestive Heart Failure (3 hours)

- Neurohumoral Disturbances: Pathophysiologic and Treatment Considerations
- Role of Cytokines in the Pathogenesis of Congestive Heart Failure
- Pathophysiology and Therapeutic Implications

Annual Meeting (August 1995)

Evolving Concepts in the Treatment of Heart Failure (3 hours)

How to Perform Exercise Testing in Cardiac Research (2 hours)

Contemporary Issues in Antithrombotic Pharmacotherapy (1 hour 30 minutes)

- Controversies with “Conventional Range” Anticoagulation: What Range is Right for Atrial Fibrillation and Prosthetic Heart Valves?
- Thrombolytics and Adjunctive Therapy: Where Are We Now?
- New Directions in Antithrombotic Pharmacotherapy

Winter Practice and Research Forum (February 1995)

Cardiovascular Molecular Biotechnology: A Field of Genes (3 hours)

- Introduction to Biotechnology: Everything You've Always Wanted to Know but Were Afraid to Ask
- Clinical Applications of the Polymerase Chain Reaction, Part I
- Clinical Applications of the Polymerase Chain Reaction, Part II

Workshops (3 hours)

- Accessing the Biotechnology Freeway
- Demonstration of the Polymerase Chain Reaction
- Extraction of DNA

Appendix III

Selected Funded Grants from BCPS Cardiology Practitioners

Federally Funded Grants:

"Cocaine-Ethanol Interaction." Principal investigator. National Heart Lung and Blood Institute R15HL54311-01, NIH AREA Grants Program, $75,000.

"Stroke Prevention in Atrial Fibrillation III." Co-Investigator. NINDS RO1 NS24224, $35,000.

"Antiplatelet Effects of Rectal versus Oral Aspirin in Healthy, Middle-Aged Volunteers." Co-Investigator. Hospital of the University of Pennsylvania Clinical Research Center/U.S. Public Health Services Research Grant M01-RR00040/National Institutes of Health, $15,385.

"Pharmacodynamic and Pharmacokinetic Relationships Between Intravenous Digoxin and Atrial Natriuretic Peptides." Co-Investigator. Hospital of the University of Pennsylvania Clinical Research Center/U.S. Public Health Services Research Grant M01-RR00040/National Institutes of Health, $23,000.

"Effects of Pentoxifylline in Chronic Severe Heart Failure." PHS M01-RR000064 $78,000.

"Misoprostol Effects on NSAID-Induced Blood Pressure Changes in Essential Hypertension." PHS MO1-RR000064 $35,840.00

"Cocaine and Cardiovascular Dysfunction in Murine AIDS." National Heart, Lung and Blood Institute, R01. Co-Investigator. $1,448,500.

"A Comparison of Cerebral Blood Flow in Migraine Sufferers during Headache, Headache-Fee and Treatment Periods." Principal Investigator, Department of Defense, $114,276.

National and Regional Foundation Grants:

"Effect of Topiramate on Nitroglycerin-Induced Headache in Migraineurs; Assessment by H215O PET." Principal Investigator. Robert-Wood Johnson Pharmaceutical Research Institute, $123,497.

"Modulation of Inflammation by Plasminogen Activators." National American Heart Association, $120,000.

"Sex Hormones and Torsades de Pointes", Ohio Valley Affiliate of the American Heart Association, $60,000.

"Mechanisms of Vascular Dysfunction Associated with Insulin Resistance." American Heart Association Georgia Affiliate, $29,664.

"Endothelial Derived Hyperpolarizing Factor and Insulin Resistance." American Heart Association Southeast Affiliate, $70,000

"Collaborative Education of Medical Residents and Doctor of Pharmacy Students in a Primary Care Ambulatory Clinic." Kansas Health Foundation, $9,650.

"Impacting the Use of Beta-Blockers in Elderly Patients Following Acute Myocardial Infarction." Kansas Foundation for Medical Care, $7200.

"ACE Inhibitor Utilization in Medicaid Patients with CHF." University of Kansas Research Foundation, $5,000.

National Pharmacy Association Grants:

"Mechanisms and Reversibility of Vascular Sequelae Associated with Insulin Resistance." National Pharmacy Cholesterol Council. $24,853.

"Mechanism of the Digoxin-Amiodarone Interaction." Principal Investigator. Astra Clinical Pharmacy Research Award, $15,000.

"Endothelial Dysfunction and Insulin Resistance." American Association of Colleges of Pharmacy. $12,243.

"Cardiovascular Effects of Cocaethylene." Principal investigator. American College of Clinical Pharmacy Research Institute Cardiovascular Pharmacotherapy Research Award, $10,000.

"Influence of Heart Failure on the Pharmacokinetics of Ibutilide." Principal Investigator. American College of Clinical Pharmacy Grants Program (Cardiovascular Research Award) and Rhone-Poulenc Rorer, $10,000.

Industry Sponsored Grants:

"The Effects of Covera-HS® on Diurnal Variation in Forearm Vascular Resistance and Blood Pressure in Hypertensive Patients." Principal investigator. Searle Pharmaceuticals, $101,000.

"Comparison of the Safety and Efficacy of Cardizem® CD vs Placebo in a Hypertensive Hispanic (Mexican-American) Population" Principal Investigator. Marion Merrell Dow, Inc., $8,000.

" Bioequivalence of Controlled Release Matrix Tablets Containing Hydroxpropyl Methylcellulose with Different Molecular Weight Distributions." Co-Principal Investigator. Dow, Inc. $91,000.

"Proposal for the Development of a Joint Institutional/Industry Educational Program: Post-Doctoral Fellowship in Cardiovascular Pharmacotherapy." Principal Investigator/Preceptor. Marion-Merrell Dow, Inc., $38,320.

"Pharmacoeconomics and Efficacy of Intravenous Diltiazem Compared to Digoxin for the Management of Post-Surgical Atrial Fibrillation". Principal Investigator. Marion-Merrell Dow, Inc., $69,535.

"Proposal for the Continuation of a Joint Institutional/Industry Educational Program: Post-Doctoral Fellowship in Cardiovascular Pharmacotherapy." Principal Investigator/Preceptor. Hoechst Marion Roussel, $48,000.

"Proposal for the Continuation of a Joint Institutional/Industry Educational Program: Post-Doctoral Fellowship in Cardiovascular Pharmacotherapy." Principal Investigator/Preceptor. Hoechst Marion Roussel, $51,812.

"Patient Satisfaction and Compliance with the Tablet Formulation of Colestipol." Pharmacia & Upjohn, $6,380.

"Low Molecular Weight Heparins: Analysis of Prescribing Patterns and Outcomes." Pharmacia & Upjohn, $14,300.

"The Efficacy of Pravastatin Alone or Combined at a Lower Dose with Cholestyramine in Patients with Coronary Artery Disease and Primary Hypercholesterolemia." Principal Investigator. Bristol-Myers Squibb $24,800.

"Comparative Pharmacokinetic and Pharmacodynamics of Pravastatin and Simvastatin in Patients with Primary Hypercholesterolemia." Principal Investigator. Merck $16,000.

"The Effects of Formulation and Vehicle Preference on Palatability and Compliance of the Bile Acid Sequestrants." Principal Investigator. Upjohn, $19,000.

"Pravastatin to Simvastatin Conversion-Lipid Optimization Program." Principal Investigator. Merck: $20,000.

"Pharmacological Stressor Cost Model." Fujisawa USA, Inc $2,000.

"Adenosine Myocardial Perfusion Imaging in COPD Patients: a Case Control Study." Fujisawa USA, Inc., $2,500.

"Comparison of 24-hour Ambulatory Blood Pressure Monitoring in Hypertensives: Fixed Dose Conversion from Nifedipine GITS to Nifedipine CC." Pfizer, Inc $2,000.

"Meta-Analysis of Adenosine versus Dipyridamole in Myocardial Perfusion Imaging." Fujisawa USA, Inc $12,406.

"Cost-Effectiveness of Adenosine and Dipyridamole in Myocardial Perfusion Imaging." Fujisawa USA, Inc $10,000.

"Comparative Pharmacoeconomics of Glycoprotein IIb/IIIa Inhibitors in Percutaneous Coronary Interventions and Acute Coronary Syndromes." Principal Investigator. Schering/Cor, $10,000.

Appendix IV

Selected Publications from BCPS Cardiology Practitioners

American Family Physician
Calcium channel antagonists: morbidity and mortality--what's the evidence? Am Fam Physician 1998 Apr 1;57(7):1551-60.

American Journal of Cardiology
Angiotensin-converting enzyme inhibitor use in survivors of acute myocardial infarction. Am J Cardiol 1995 Jun 1;75(16):1184-6.

Torsades de Pointes associated with intravenous haloperidol in critically ill patients. Am J Cardiol 1998 Jan 15;81(2):238-40.

American Journal of Health-System Pharmacists
Highlights of the sixth report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Am J Health Syst Pharm 1998 Feb 15;55(4):382-8.

American Heart Journal
Quality of care for patients hospitalized with heart failure at academic medical centers Am Heart J 1999 Jun;137(6):1028-34.

Pharmacologic profile of survivors of acute myocardial infarction at United States academic hospitals. Am Heart J 1996 May;131(5):872-8.

American Journal of Hypertension
Evaluation of two forms of sustained release nifedipine using 24 h ambulatory blood pressure monitoring. Am J Hypertens 1997 Sep;10(9 Pt 1):992-6.

Annals of Pharmacotherapy
Adjunctive intracoronary thrombolysis in complicated coronary angioplasty. Ann Pharmacother 1997 Oct;31(10):1244-6.

Archives of Family Medicine
Selected factors that influence responses to antihypertensives. Choosing therapy for the uncomplicated patient. Arch Fam Med 1994 Jun;3(6):528-36

Archives of Internal Medicine
Evaluation of excessive anticoagulation in a group model health maintenance organization. Arch Intern Med 1998 Mar 9;158(5):528-34.

Status of antithrombotic therapy for patients with atrial fibrillation in university hospitals Arch Intern Med 1996 Nov 11;156(20):2311-6.

American Journal of Managed Care
Treatment patterns for heart failure in a primary care environment. Am J Manag Care. 1997 Nov;3(11):1669-76.

Cardiovascular drug prescribing patterns: where is the evidence of improvement? Am J Manag Care 1997 Nov;3(11):1779-80.

Atherosclerosis
High dose ascorbate supplementation fails to affect plasma homocyst(e)ine levels in patients with coronary heart disease. Atherosclerosis 1994;111(2):267-70.

British Journal of Clinical Pharmacology
Racial differences in propranolol enantiomer kinetics following simultaneous i.v. and oral administration. Br J Clin Pharmacol 1996 Sep;42(3):339-46.

Influence of metabolites on protein binding of verapamil enantiomers. Br J Clin Pharmacol 1995 May;39(5):536-8.

Chest
Atrial fibrillation after bypass surgery: does the arrhythmia or the characteristics of the patients prolong hospital stay? Chest 1998 Jun;113(6):1489-91.

Circulation
Unfractionated heparin dosing in the FRIC study [letter] Circulation 1998 Apr 14;97(14):1424.

Effect of acute magnesium administration on the frequency of ventricular arrhythmia in patients with heart failure. Circulation 1994 Feb;89(2):660-6.

Clinical Infectious Disease
Clinical presentation and analysis of risk factors for infectious complications of implantable cardioverter-defibrillator implantations at a university medical center. Clin Infect Dis 1998 May;26(5):1111-6.

Coronary Artery Disease
Doses of cardiovascular medication in elderly patients with renal impairment. Coron Artery Dis 1997 Aug-Sep;8(8-9):495-8.

Drug Metabolism and Disposition
Metoprolol metabolism via cytochrome P4502D6 in ethnic populations. Drug Metab Dispos 1996 Mar;24(3):350-5.

Epidemiology
Is the use of psychotropic drugs associated with increased risk of ischemic heart disease? Epidemiology 1995 Jul;6(4):376-81.

Free Radical Biology and Medicine
Tissue plasminogen activator (tPA) inhibits interleukin-1 induced acute lung leak. Free Radic Biol Med 1998 Jul 15;25(2):184-8.

Antiinflammatory activity of tissue plasminogen activator in the carrageenan rat footpad model. Free Radic Biol Med 1997;22(6):985-8.

Journal of the American Board of Family Practitioners
Thrombolysis in acute ischemic stroke [see comments] J Am Board Fam Pract 1998 Mar-Apr;11(2):145-51.

Journal of the American College of Cardiology
Superiority of "triple" drug therapy in heart failure: insights from the PROVED and RADIANCE trials. Prospective Randomized Study of Ventricular Function and Efficacy of Digoxin. Randomized Assessment of Digoxin and Inhibitors of Angiotensin-Converting Enzyme J Am Coll Cardiol 1998 Sep;32(3):686-92.

Effects of intermittent transdermal nitroglycerin on occurrence of ischemia after patch removal: Results of the Transderm-nitro intermittent dosing evaluation study (TIDES II), J Am Coll Cardiol 1997;30:955-61.

Relation between gender, etiology and survival in patients with symptomatic heart failure. J Am Coll Cardiol 1996 Dec;28(7):1781-8.

Journal of Cardiovascular Pharmacology
Antifibrillatory effect of esmolol alone and in combination with lidocaine. J Cardiovasc Pharmacol 1996 Mar;27(3):376-82.

Journal of Clinical Pharmacology
The effects of fluvastatin, a CYP2C9 inhibitor, on losartan pharmacokinetics in healthy volunteers. J Clin Pharmacol 1999 Apr;39(4):418-24.

Postabsorption concentration peaks with brand-name and generic verapamil: a double-blind, crossover study in elderly hypertensive patients. J Clin Pharmacol 1997 Jun;37(6):526-34.

Dosing of antihypertensive medications in patients with renal insufficiency. J Clin Pharmacol 1995 Jan;35(1):81-6.

Journal of Pharmacology and Experimental Therapeutics
Cocaine concentration-effect relationship in the presence and absence of lidocaine: evidence of competitive binding between cocaine and lidocaine. J Pharmacol Exp Ther 1996 Feb;276(2):568-77.

Heart
Sinus bradycardia and multiple episodes of sinus arrest following administration of ibutilide. Heart. 1998 Jun;79(6):628-9.

Hypertension
Comparison of nifedipine alone and with diltiazem or verapamil in hypertension. Hypertension 1996 Jul;28(1):109-14.

Inflammation
Tissue plasminogen activator (tPA) inhibits human neutrophil superoxide anion production in vitro. Inflammation 1997 Feb;21(1):27-34.

Medical Decision Making
Patient preferences for thrombolytic therapy in acute myocardial infarction. Med Decis Making 1997 Oct-Dec;17(4):464-71.

Pacing and Clinical Electrophysiology
Effect of chronic oral moricizine and intravenous epinephrine on ventricular fibrillation and defibrillation thresholds. Pacing Clin Electrophysiol 1996 Jan;19(1):82-9.

Pediatric Cardiology
Effective use of magnesium for acquired torsade de pointes in a 4-month-old infant. Pediatr Cardiol 1995 Mar-Apr;16(2):79-81.

Pharmacoeconomics
Economic impact of digoxin toxicity. Pharmacoeconomics 1997 Aug;12(2 Pt 1):175-81.

Pharmacotherapy
The effect of high-dose ascorbate supplementation on plasma lipoprotein(a) levels in patients with premature coronary heart disease. Pharmacotherapy 1995 Jul-Aug;15(4):458-64.

Predictors of future antihypertensive use in patients with mildly elevated blood pressure. Pharmacotherapy 1995 May-Jun;15(3):272-8.

Progress in Cardiovascular Disease
Electrophysiologic and proarrhythmic effects of intravenous inotropic agents. Prog Cardiovasc Dis 1995 Sep-Oct;38(2):167-80.

Stroke
Aspirin use and incident stroke in the cardiovascular health study. CHS Collaborative Research Group. Stroke 1998 May;29(5):887-94.

Therapeutic Drug Monitoring
Comparison of fluorescence polarization immunoassay with liquid chromatography for quantification of procainamide and N-acetylprocainamide in urine. Ther Drug Monit 1996 Dec;18(6):693-7.

Appendix V

Board Certified Pharmacotherapy Specialists Who Plan to Seek Added Qualifications in Cardiology

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