



2018 CARDIOVASCULAR & PULMONARY SPECIALIST CERTIFICATION CANDIDATE GUIDE



SPRING 2017

Dear Fellow Physical Therapist:

Congratulations! By acquiring this Candidate Guide, you have been proactive in your interest in and pursuit of specialist certification. The specialist certification program has been designed to identify and define physical therapy specialty areas and to formally recognize physical therapists who have attained advanced knowledge and skills in those areas.

Certification also assists the public and health care community in identifying therapists with acknowledged expertise in a particular field of practice and demonstrates that physical therapists are devoted to addressing the unique needs of the people with whom we work.

Certification is achieved through successful completion of a standardized online application and examination process. Coordination of this program is provided by the American Board of Physical Therapy Specialties (ABPTS), the governing body for approval of new specialty areas and certification of clinical specialists. Specialty councils representing the 9 recognized specialty areas have been appointed to delineate and describe the advanced knowledge, skills, and abilities of clinical specialists; determine specific requirements for certification; and develop the certification examinations.

The dedicated volunteers currently giving their time and service to the development of this process are listed in the rosters in the beginning of this guide. APTA established this program in 1978 to provide formal recognition for physical therapists with advanced clinical knowledge, competence, and skills in a special area of practice. The program evolved from the membership of special interest sections of APTA as a way to encourage and facilitate the professional growth of individual members and thereby facilitate growth of the entire profession.

Certified specialists have clearly demonstrated their commitment to service by the variety, depth, and consistency of their professional involvement. Their desire to attain formal recognition of their advanced clinical knowledge, competence, and skills reflects their devotion to their profession and their patients. In these times of dramatic health care reform, dedication to public service by providing high quality physical therapy services is paramount.

If you share these personal and professional principles, then you are in the right place! Please join the growing number of physical therapists who have chosen this pathway of professional development.

Thank you for your interest and I wish you success in this endeavor.

Sincerely,

Tracy Spitznagle, PT, DPT, MHS

Board-Certified Women's Health Clinical Specialist

Chair, American Board of Physical Therapy Specialties

ROSTERS

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SPECIALTY COUNCIL

AMERICAN BOARD OF PHYSICAL THERAPY SPECIALTIES

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1. GENERAL INFORMATION

1.1. American Physical Therapy Association

The American Physical Therapy Association (APTA) is a national professional organization representing more than 95,000 physical therapists, physical therapist assistants, and physical therapy students throughout the United States. Its goals are to serve its members and to serve the public by increasing the understanding of the physical therapist's role in the health care system, and by fostering improvements in physical therapy education, practice, research, and professional development.

APTA established the specialist certification program in 1978 to provide formal recognition for physical therapists with advanced clinical knowledge, experience, and skills in a special area of practice, and to assist consumers and the health care community to identify physical therapy specialists.

1.2. American Board of Physical Therapy Specialties

Coordination and oversight of the specialist certification process is provided by the American Board of Physical Therapy Specialties (ABPTS), which is the governing body for approval of new specialty areas and certification of clinical specialists. ABPTS comprises board-certified physical therapists from different specialty areas; a physical therapist member of the APTA Board of Directors; an individual with expertise in test development, evaluation, and education; and a nonphysical therapist member representing the public.

The American Physical Therapy Association (APTA) prohibits preferential treatment or adverse discrimination on the basis of race, creed, color, gender, age, national or ethnic origin, sexual orientation, disability or health status in all areas including, but not limited to, its qualifications for membership, rights of members, policies, programs, activities, and employment practices.

1.3. Specialty Council

The Specialty Council, representing the area of cardiologic and pulmonary physical therapy, has been appointed to delineate the advanced knowledge, skills, and abilities for their specialty areas; to determine the academic and clinical requirements for certification; and to develop the certification examinations and oversee the maintenance of specialist certification. The Council comprises 4 board-certified specialists in the practice area.

1.4. Additional Physical Therapy Examinations

Individuals interested in Clinical Electrophysiology, Geriatric, Neurologic, Orthopaedic, Pediatric, and Sports, and Women's Health certifications must complete a separate online application, on APTA's Specialist Certification Program website (www.abpts.org).

1.5. National Board of Medical Examiners

The National Board of Medical Examiners® (NBME®) is a nonprofit organization that strives to provide the highest quality testing and research services to organizations involved in the licensure and certification of medical and health science professionals. NBME provides test development, test administration, editorial production, and psychometric services to ABPTS and the specialty councils.

1.6. Prometric

NBME currently delivers the specialist certification examinations by computer through Prometric. Prometric administers testing programs for educational institutions, professional associations, corporations, and other organizations. Examinations are delivered in test centers that have secure rooms dedicated to test delivery.

Note: Prometric test center locations are subject to change, and there is no guarantee that a center listed on the Prometric website at the time of application will be available for a future ABPTS administration. The most efficient way for candidates to check for test center locations is to log on to www.prometric.com/ABPTS and select "locate a test center." This provides the most up-to-date information.

1.7. Restriction of the Term Board-Certified Specialist

APTA's House of Delegates adopted a policy that no physical therapist shall purport to be a "Board-Certified Clinical Specialist" unless (s)he has successfully completed the certification process as developed by the American Board of Physical Therapy Specialties (HOD 06- 94-23-39). In addition, ABPTS does not permit applicants for certification to state that they are "board eligible."

2. CERTIFICATION REQUIREMENTS

2.1. General Requirements

Applicants must hold a current permanent/unrestricted license to practice physical therapy in the United States or any of its possessions or territories. In addition, applicants are required to pay the application review and examination fee.

Applicants must meet the minimum eligibility requirements for the 2018 examination by the application deadline, **July 1, 2017**.

Applicants must submit a complete application and review fee for each specialist certification exam. ABPTS does not permit applicants to use the same direct patient care hours for different specialty areas.

2.2. Other Requirements

Applicants must meet requirements for Option A or Option B.

Option A

Direct Patient Care: Applicants must submit evidence of 2,000 hours of direct patient care as a licensed United States physical therapist (temporary license excluded) in the specialty area within the last ten (10) years, 25% (500) of which must have occurred within the last three (3) years. Direct patient care must include activities in each of the elements of patient/client management applicable to the specialty area and included in the *Description of Specialty Practice (DSP)*. These elements, as defined by the *Guide to Physical Therapist Practice*, are examination, evaluation, diagnosis, prognosis, and intervention.

Practice Settings: The Cardiovascular & Pulmonary Specialty Council recommends that direct patient care include patient/client management of individuals with primary injury diseases or other conditions involving the cardiovascular and pulmonary system in both acute care and rehabilitation settings. *Applicants may not include experience in the specialty area that will occur after the application deadline, July 1, 2017*

Advanced Cardiac Life Support Certification: Applicants must be currently certified in Advanced Cardiac Life Support (ACLS) by the American Heart Association.

Data Analysis Project: Applicants must submit evidence of involvement in the formulation and execution of a clinical data analysis project directly related to the cardiovascular and pulmonary specialty area within the last 10 years. Acceptable data analysis projects include: treatment efficacy studies, such as a quality assurance or utilization review project, program analysis, structured surveys, formal systematic reviews, and formal clinical research trials. Projects that will not fulfill this criterion include projects that do not start with a question or purpose, do not devise a methodology to answer the question, collect data, determine the results, and reach a conclusion. Examples of projects that are not acceptable include a literature review, a case report, or the development of patient education materials. Projects must be completed and dissemination concluded at an appropriate level and degree that is congruent with the scope of the project at the time of application submission. Examples of appropriate and reasonable dissemination include a conference presentation or publication for a funded research project; or presentation or in-service to the primary stakeholders of the project's results in the case of a data analysis or quality assurance project.

Submission of the data analysis project should be in the form of (1) a brief statement that describes your specific involvement (study design, data collection, data analysis, etc) and (2) project description that includes an abstract summarizing the project in which you participated (written in standard form, ie, purpose, methods, results, and conclusions); and a brief statement of the limitations of the study design/methodology, method of disseminating the results, and how the project has changed the candidate's practice of cardiovascular and pulmonary physical therapy.

Dissemination of the project results should be made at an appropriate level and degree that is congruent with the scope of the project. For example, if the project conducted is a funded research project, then a conference presentation or publication would be a reasonable expectation. If the data analysis project is a quality assurance project, then appropriate dissemination would be to the primary stakeholders of the project's results.

Whether the applicant fulfills the data analysis project requirement will be evaluated according to the following questions:

1. Is the project related to cardiovascular and pulmonary physical therapy?
2. Has the applicant submitted evidence of participation that demonstrates scholarly activity and knowledge of the research process? Acceptable roles in the project include defining the study question or purpose, devising the study methodology, and data analysis. Participation in data collection only does not fulfill this requirement.
3. Has the project been completed and the results disseminated to advance the practice of cardiovascular and pulmonary physical therapy?

Successful applicants will be able to answer yes to all of the above questions. Please see the document posted on the ABPTS website for additional guidance to project submission.

NOTE: Additional information, concerning the "do's" and "dont's" on the specialty application data analysis, may be found on page 16 of this guide.

Cardiovascular and Pulmonary Specialty Council Statement on Submission of the Same Data Analysis Project by Two or More Candidates

The Cardiovascular and Pulmonary Specialty Council recognizes that the data analysis project may take many forms and may have many physical therapists (PT) working on the same project who desire to pursue specialist certification. The intent of the requirement is not for each candidate to present a unique data analysis project, but to demonstrate an understanding of research methods through project design and development, data collection, data analysis, formulation of results, and dissemination of outcomes at an appropriate level. The Council will accept the same project from different candidates; however, the Candidate Guide states that the applicant must submit "evidence of participation that demonstrates scholarly activity and knowledge of the research process". Each candidate must independently compose and submit evidence of his or her unique contributions and participation throughout the research process that satisfy the requirements for certification.

Option B

Applicants must submit evidence of successful completion of an APTA-accredited postprofessional clinical residency completed within the last 10 years that has a curriculum plan reflective of the Description of Specialty Practice: Cardiovascular & Pulmonary (DSP). Experience from residencies in which the curriculum plan reflects only a portion of the DSP will not be considered.

Applicants applying under Option B also must meet the cardiac life support certification and data analysis requirements as referenced in Option A.

Applicants must submit evidence of successful completion of an APTA-accredited post professional Cardiovascular & Pulmonary clinical residency. Applicants who are currently enrolled in an ABPTRFE-accredited clinical residency, or enrolled in a residency program that has been granted candidacy status, may apply for the specialist certification examination in the appropriate specialty area prior to completion of the residency. These applicants will be conditionally approved to sit for the examination, as long as they meet all other eligibility requirements, pending submission of evidence of successful completion of the ABPTRFE-accredited clinical residency to APTA's Specialist Certification Program no later than 1 month before the examination window opens. To verify your residency program's accreditation status, please visit www.abptrfe.org.

2.3. Steps to Complete Certification

Certification as a Physical Therapy Clinical Specialist consists of 2 major steps:

STEP 1. You must submit evidence that you have fulfilled the minimum eligibility requirements as defined by the specialty council. This includes completion of all required application forms, fees, documentation of the required practice hours, and other requirements specified by the specialty council.

You must meet all requirements by the application deadline, July 1, 2017. The Specialty Council will not consider experience toward the minimum eligibility requirements that was not acquired by the application deadline.

STEP 2. Following completion of Step 1 and approval of the application, the candidate must sit for and receive a passing score on the computer-based certification exam.

Certification is awarded for a period of 10 years. ABPTS has recently transitioned to a model of continued competency throughout the

years of certification rather than a one-time recertification process as the certification period lapses. This new model has been titled the “Maintenance of Specialist Certification (MOSC).” Please review details of MOSC program in Section 2.4.

2.4. Maintenance of Specialist Certification (MOSC)

Since the inception of board-certified physical therapy clinical specialization in 1978, board certification was not lifelong; it was valid for a period of 10 years. To be recertified as a clinical specialist, the specialist had to demonstrate ongoing practice in the specialty area by meeting a minimum number of practice hours and also by either passing the exam again, preparing a professional development portfolio (PDP), or by completing an APTA-accredited residency program. In assessing the recertification process, several issues came to the attention of ABPTS regarding this process:

- Most specialists (88%) have chosen to recertify using the PDP option. While this shows ongoing activity in the specialty area, there is little quality control regarding the specific activities listed in the PDP, and there is no independent assessment of knowledge in the specialty area.
- The specialty councils have repeatedly attempted to revise the PDP to improve the quality of data and the representativeness of specialist practice, but despite multiple revisions there continues to be a shared sense among the specialty councils and ABPTS that the PDPs do not capture the essence of specialist practice.
- As the number of specialists has increased over the past 25 years, the workload required by specialty councils to review the PDP documents has become overwhelming.
- A study that ABPTS conducted of recertification of multiple health care professions has indicated that most certification boards are not using a portfolio approach.
- A continuing competence model is a necessary step of accountability to our patients, health care organizations, and to the public to ensure a certain level of quality and expertise in physical therapist clinical specialist practice.
- A continuing competence-based model would be more consistent with the direction in which state licensing requirements are moving.

The purpose of a transition to the Maintenance of Specialist Certification process is:

- To more effectively verify current competence as an advanced practitioner in the specialty area
- To more effectively evaluate professional development and clinical experience
- To better encourage ongoing education and professional growth
- To keep pace with the rapidly expanding specialty knowledge base and scientific evidence that guides our clinical decision making
- To promote improved health outcomes related to physical therapy specialty services

ABPTS has developed a model for certification that focuses on continuing competence of the physical therapist specialist. This new model has been titled the “Maintenance of Specialist Certification” and includes the following elements:

- Professional Standing and Direct Patient Care Hours
- Commitment to Lifelong Learning Through Professional Development
- Practice Performance Through Examples of Patient Care and Clinical Reasoning
- Cognitive Expertise Through a Test of Knowledge in the Profession

Requirement 1: Professional Standing and Direct Patient Care Hours

- In years 3, 6, and 9, a specialist must submit evidence of current licensure as a physical therapist in the United States or any of its possessions or territories.
- In years 3, 6, and 9, a specialist must submit evidence of 200 hours of direct patient care acquired in the specialty area within the last 3 years. Direct patient care hours accrued in year 10 may be applied to the year 3 requirements for the next MOSC cycle.

Requirement 2: Commitment to Lifelong Learning Through Professional Development

- Each board-certified specialist is obligated to participate in ongoing professional development, **within his or her designated specialty area**, which leads to a level of practice consistent with acceptable standards. Each specialist may choose to pursue professional development that leads to a level of practice beyond prevailing standards.
- A web-based system to track continuing competence in a specialty area will be developed. This system will provide an individual account tracking mechanism for each specialist to record professional development activities during years 3, 6, and 9 of his or her certification cycle. There is not an hour requirement in this area, but the specialist must show evidence of professional development activities (equivalent to 10 MOSC credits) within 2 of the 3 designated activity categories in years 3, 6, and 9. By year 9, a specialist must have accrued a minimum of 30 MOSC credits and demonstrated professional development in each of the 3 designated activity categories. These activities include professional services, continuing education coursework, publications, presentations, clinical supervision and consultation, research, clinical instruction, and teaching.

Requirement 3: Practice Performance Through Examples of Clinical Care and Reasoning

- The purpose of this requirement is to document continuing competency in patient/client management in the specialty area.
- The specialist will use an online system to complete 1 reflective portfolio submission in years 3, 6, and 9 of his or her certification cycle. These reflective portfolio submissions will be used to demonstrate the specialist’s use of clinical care and reasoning. Each submission must have a reflective component and must have documentation that reflects clinical reasoning.
- These reflective portfolio submissions will not be scored but will be screened for completion of required information and reflection.

Requirement 4: Cognitive Expertise Through a Test of Knowledge in the Profession

- During year 10 of the certification cycle, the specialist will be required to sit for a recertification examination, comprising approximately 100 items. The exam will be specialty specific,

assess an individual's cognitive expertise in the specialty area, and **reflect contemporary specialist practice.**

- The exam blueprint breakdown for this exam will mirror that of the initial certification exam, as noted in the various *Descriptions of Specialty Practice*. Items will be coded and pulled from existing specialty item banks.
- Successful completion of requirements 1-3 are prerequisites for sitting for the recertification exam. If a specialist fails to receive a passing score after the first attempt, he or she will be permitted to sit for the exam 1 additional time and will maintain his or her certification during this 1-year grace period.

Timeline: MOSC System Launched

- Systems are now in place for the new MOSC process.
- All individuals whose certification expiration is 2023 or beyond are subject to the new MOSC process. This will include a waiver of the first 3-year requirements for specialists whose certifications expire in 2023, 2024, and 2025. These cohorts will be required to fulfill the year 6 (second 3-year) requirements beginning in 2016, 2017, and 2018 respectively.
- The first recertification exams will be administered in 2023.

Any additional questions/concerns should be addressed to staff at spec-recert@apta.org or 800/999-APTA (2782), ext 3390.

2.5. Ineligibility for Certification

Item writers and reviewers are not eligible to sit for the specialist certification examination in their specialty area for 2 years from the date of involvement in the process.

Specialty council members, ABPTS members, and cut-score study participants are prohibited from sitting for the specialist certification exam for a period of 2 years from the date of participation in the certification process.

3. APPLICATION PROCESS

3.1. Application Deadline

Completed applications and application review fees for the 2018 specialist certification examinations must be submitted online to the APTA Specialist Certification Program on or before July 1, 2017. Applications submitted after the deadline may not be reviewed.

3.2. Procedures for Application Review

The Specialist Certification Program staff will conduct the initial review of all submitted documents within approximately 6 weeks. Then your application will be forwarded to the Specialty Council for their expert review. This final review process will take approximately 20 business days from the time the Council receives the documents, and should the council have questions or need clarification about documents submitted the Specialist Certification staff will contact you via email. The applicant must resubmit requested documentation within 10 business days after email notification is received. Only one resubmission is permitted for an exam cycle.

If the applicant does not resubmit by the specified deadline or if the Specialty Council determines that the resubmitted documents do not meet the certification requirements, the record will indicate that he or she has not met the minimum eligibility requirements and is not approved to sit for the 2018 exam.

3.3. Services for Persons With Disabilities

The American Board of Physical Therapy Specialties (ABPTS) provides reasonable and appropriate accommodations in accordance with the Americans with Disabilities Act for individuals with documented disabilities who demonstrate a need for accommodations.

It is the responsibility of the person with a disability to provide advance notice and appropriate documentation of the disability with a request for test accommodations. If an applicant identifies functional limitations or special needs that would prevent him or her from taking the certification exam under standard testing conditions, ABPTS in consultation with its testing agency, will evaluate and respond to that applicant's needs for special arrangements.

Any requests must be submitted to ABPTS, accompanied by the appropriate forms and uploaded at the time of the online application submission for the exam (by July 1, 2017). The request for testing accommodations must include verification of the disabling condition from a professional specializing in the relevant area and a description of the requested accommodation. Applicants will be notified in the fall of the decision regarding the request and the accommodations that will be provided. If accommodation is not requested in advance, availability of accommodation cannot be guaranteed.

Note: Certain testing accommodations may require shared cost with candidate.

3.4. Certification in More Than 1 Specialty Area

Applicants must submit a complete set of online application materials and fees for each specialist certification exam. A certified specialist who applies for certification in a second specialty area is not permitted to submit the same direct patient care hours that he or she submitted for certification in the first specialty area. The Specialist Certification Program staff will review previously submitted applications for duplication of hours.

3.5. Submission of Application

It is the applicant's responsibility to ensure that the application is completed according to instructions.

In addition, it is imperative that you enter your name on the application exactly as it appears on the identification form you intend to present at the testing center. Please note that the way your name is written on the application is also the way your name will appear in the APTA membership database.

Applicants who opt to pay the review fee by check should send the application fee with the appropriate payment form described in Section 3.6 below in a single mailing to:

APTA
Specialist Certification Application
P.O. Box 75701
Baltimore, MD 21275

If applicable, verification of current physical therapy license must be sent separately by your state licensing agency.

3.6. Application Review Fee

The nonrefundable application review fee must be submitted with your online application to the APTA Specialist Certification Program on or before July 1, 2017.

Payment of the review fee may be made by check (payable to APTA) or by credit card (MasterCard, VISA, Discover, or American Express). The Payment Form must accompany your fee. The applicant review fees are listed below:

APTA Member: \$515
Non-APTA Member: \$860
Member/Non-APTA Member Reapplication: \$160

Note: Reapplication fee is due by August 31, 2017

3.7. Time Limit for Active Application/Reapplication

Applicant files will remain active for only 2 consecutive exam administrations. However, eligibility for the second exam administration requires an online reapplication submission by August 31, along with a \$160 reapplication fee, as well as the current examination fee by November 30. This policy applies to those who choose to delay sitting for the exam, those who are not approved to sit for the examination, and those who do not pass the exam. Eligible reapplicants will receive reapplication information by e-mail directly from the Specialist Certification Program. To reapply, you must submit an online reapplication, verification of current licensure to practice physical therapy, updated direct patient care hours, and any other requested documentation. The APTA Specialist Certification Program must receive this documentation by the reapplication deadline for the next scheduled exam. Reapplicants must meet the current practice requirements to be eligible to sit for the exam.

After 2 consecutive exam administrations, you must submit an entirely new application and initial applicant review fee to apply for specialist certification

3.8. Address Changes

Should your mailing address, e-mail address, or phone number change, please notify the APTA Specialist Certification Program immediately. The Specialist Certification Program maintains separate records from APTA's membership database, so candidates must email (spec-cert@apta.org) or phone (800/999-2782, ext 8520) the department.

4. SCHEDULING THE EXAM

4.1. Examination Fee and Scheduling Permit

The examination fee is submitted after you have been notified that you are eligible to sit for the exam. The fee must be received by the APTA Specialist Certification Program on or before November 30, 2017.

You may pay the examination fee by check (payable to APTA) or by credit card (MasterCard, VISA, DISCOVER or AMEX), by mail or online. Please note that both first-time and repeat test takers must pay the following examination fees:

APTA Member: \$800
Non-APTA Member: \$1,525

If you are planning to sit for the examination in an international location, make sure that you enter that in your online application.

Before the end of December, after your examination fee has been received, APTA's Specialist Certification Program will send you an e-mail with instructions on how to access and download your electronic scheduling permit online. You must print your scheduling permit before you contact Prometric to schedule a test date. Check to make sure that the information on your permit is correct, and that your name (first

name, middle initials, last name) exactly matches your name on the identification you will use on the day of the examination. If the name on your permit does not match the name on your identification, you must contact APTA immediately. Name changes or corrections cannot be made within 7 business days of your scheduled testing date. You will be denied admission to the test if the name on the permit does not match the name on your identification.

4.2. Test Dates

The examination will be administered at test centers worldwide between the dates of **March 3 and March 17, 2018.**

4.3. How to Schedule an Appointment at a Testing center

The Specialist Certification Program will notify approved candidates when they may begin to schedule a date to sit for the examination. Candidates are not eligible to schedule a session until they have paid their exam fee and have their scheduling permit.

You **must print or download** your scheduling permit before you contact Prometric to schedule a testing appointment. To schedule a testing appointment, you will need to provide Prometric with the scheduling number that is included on your scheduling permit. Appointments are assigned on a first-come, first-served basis; therefore, you should schedule an appointment as soon as possible after you have accessed your scheduling permit. If you delay scheduling, you may not be able to make an appointment at your preferred test site or for your preferred test date. You should report any problems in scheduling a testing appointment to the Specialist Certification Program at least 4 weeks before the first day of the testing window to give ABPTS an opportunity to resolve the problem.

Prior to your testing appointment, you can log in at the URL provided to access and reprint your permit if necessary.

4.4. Refunds and Cancellations

The Applicant Review Fee is not refundable. You must notify the APTA Specialist Certification Program in writing if you decide, for any reason, not to sit for the 2018 exam. Upon receipt of written notification, your examination fee will be refunded minus 20% of the fee. **Please allow 6 weeks for processing.**

4.5. Rescheduling an Exam

If you are unable to keep a testing appointment and would like to reschedule, you must contact Prometric by 12:00 pm local time of the second business day prior to your appointment. The rescheduled test date must fall within the testing window. Fees from your previously scheduled test will be transferred to the rescheduled exam as follows:

- a. If you contact Prometric by 12:00 pm local time of the second business day prior to your test date, you will be permitted to reschedule without penalty. If you provide less than 2 business days' notice, Prometric will charge a \$101 fee to reschedule your examination (*rescheduling fees vary for international sites*).
- b. If you cancel your appointment within 2 business days or do not appear on your test date, you must contact Prometric Candidate Cares at the phone number listed in the permit and pay a \$101 fee to reinstate your eligibility record in order to reschedule your appointment within the testing window (*rescheduling fees vary for international sites*).

5. PREPARING FOR THE EXAM

5.1. Description of Specialty Practice (DSP)

The *Descriptions of Specialty Practice* (DSP) are documents developed for each specialty area that outline the knowledge, skills, and abilities related to clinical practice in the specialty area. The DSP content is based on a detailed practice analysis conducted by the specialty council. A practice analysis involves extensive research, including survey data and judgments of subject matter experts, of the knowledge, tasks, and roles that describe advanced specialty practice. The specialty council develops the written exam from the DSP and includes a percentage of questions from each of the major content areas identified in the practice analysis. Because applicants will find the DSP for their specialty area helpful in organizing exam preparation, a copy is made available electronically to each new applicant upon submission of their application and payment of the application review fee. If you wish to purchase an advance copy of the DSP, please contact APTA's Member Services at 800/999-2782.

5.2. Exam Content Outline

The content outline for the exam that specifies the percentage of questions in each major content area is found on page 10. The content outline is presented as an approximation of the test construction and should not be interpreted as an exact distribution of test items.

5.3. Preparation for the Exam

You declare your intent to sit for the specialist certification exam at the time of application and are expected to begin preparation for the exam at that time. You are responsible for determining the method and amount of preparation necessary for the exam. Results from candidate surveys suggest that helpful methods of examination preparation include, but are not limited to, advanced level texts, *Physical Therapy*, and other journals containing current physical therapy research. You may also want to review the *Description of Specialty Practice* and the content outline to determine what content will be covered on the exam and to direct your study efforts.

5.4. Review Materials and Courses

A resource guide listing prepared by APTA's Cardiovascular & Pulmonary Section can be found on page 15. Some sections hold review courses related to advanced practice in their specialty area. Applicants should contact their section directly to receive information. Neither ABPTS nor the specialty councils review or endorse the content of review materials and courses.

5.5. Study Groups

The APTA Specialist Certification Program maintains a list of candidates who are interested in participating in study groups. To be included in study group listings, select "participate in study group" and answer "yes" on the online application. Study group lists will be generated and emailed by November 17, 2017, to candidates who have indicated their interest in participating in study groups. **Study group lists are emailed by request only.**

5.6. Exam Development

The specialist certification examinations are developed by specialty councils of ABPTS. APTA has contracted with the NBME to assist in the development, administration, scoring, and reporting of results for the certification examinations. Using the DSP as a basis, the specialty councils make the final determinations regarding the exam content and the number of items in each area.

Questions (items) for the exam are solicited from content area experts currently practicing in the specialty area representing the full range of practice settings and focus in all regions of the country. Item writers attend workshops and receive instruction to enable them to write high quality, practice-related test items. Test items undergo extensive editing and review by subject matter experts and professional test editors before specialty councils approve them to be placed on the examinations.

5.7. Exam Question Format

Questions (items) are designed to test synthesis and analysis levels of cognitive skills, as well as content knowledge. The exam is composed of objective multiple-choice questions with 4 or 5 answer choices. The questions either stand alone or are part of a series that relates to a presented case study. Beginning on page 9 are sample questions that are representative of the format of questions for each exam, but may not necessarily reflect the ability level or content of the items. There are 200 items on the exam, consisting of 50 questions in each 1½-hour time block.

5.8. Answer Strategy

You should consider answers to each question carefully and eliminate the least likely ones instead of randomly selecting an answer. Please keep in mind that there is no penalty for incorrect responses. Since test scores are based on the actual number of questions answered correctly, it is to the candidate's advantage to select an answer for each question rather than leaving any blank. There is only one best answer for each question.

5.9. Tutorial

After you are approved to sit for the examination, the Specialist Certification Program will make available a tutorial so that you may practice using the testing software prior to your test day. The tutorial can be accessed on the APTA Specialist Certification website (www.abpts.org/SpecCertExamTutorial/). You should acquaint yourself with the testing software well before your test date. Test center staff are not authorized to provide instruction on use of the software.

The tutorial will also be available at the beginning of the examination session. You may use up to 10 minutes before beginning the examination. The test driver is easy to understand and requires little or no prior computer experience.

6. SITTING FOR THE EXAM

6.1. Computer Testing

The specialist certification examinations are administered by computer. The examination questions are presented on computers, and candidates provide their responses using a mouse or keyboard. NBME works with Prometric to deliver these examinations worldwide at more than 300 test centers. Approved candidates should contact Prometric as soon as possible once they have their scheduling permit to schedule a testing appointment. Candidates may take the test on any day that it is offered during the testing window, provided that there is space at the Prometric test center of choice.

6.2. Test Centers and Testing Conditions

Prometric provides computer-based testing services for academic assessment, professional licensure, and certification. Please be aware that there may be test takers from other professions taking examinations during your test administration. Their exam schedule may differ from your schedule, and they may arrive and depart at different times.

These test centers provide the resources necessary for secure administration of the examination, including video and audio monitoring and recording, and use of digital cameras to record the identity of candidates.

6.3. Exam Time

You should arrive 30 minutes before your scheduled testing appointment.

The official exam time begins the moment that you enter your identification number online. There are 200 questions on the exam. The exam is administered during a seven (7) hour testing session, which consists of an online tutorial (up to 10 minutes), four 1½-hour test periods, an optional break after any section (up to 50 minutes), and a post-test survey if time is available within testing session. Please note that if you finish a section early, you may not use the extra time for a different section of the exam.

If you have unused time after you complete the examination, you will be given the opportunity to complete an online survey about the test administration. The purpose of the survey is to evaluate the test scheduling and delivery procedures. Your responses will be kept confidential, and the time you take to complete this survey will not detract from your allotted examination time.

6.4. Admission to the Test

You should arrive at the test center at least 30 minutes before your scheduled testing time on your testing day. If you arrive late, the test center administrator may refuse you admission. If you arrive more than 30 minutes after your scheduled testing time, you will not be admitted. In that event, you must pay a \$101 fee to Prometric to reinstate your eligibility record in order to reschedule your appointment within the testing window (*rescheduling fees vary for international sites*).

Upon arrival at the test center, you must present a printed copy of your scheduling permit or present it electronically (e.g. via Smartphone) and an unexpired, government-issued form of identification (such as a current driver's license, valid passport, or military ID) that includes both your photograph and signature. You will also sign a test center log, be photographed, and store your personal belongings in your assigned locker. You will be scanned with a handheld metal detector and be asked to empty and turn out your pockets prior to entry into the testing room to confirm that you have no prohibited items. You will be required to remove eyeglasses for visual inspection by the test center administrators. Jewelry, except for wedding and engagement rings, is prohibited and hair accessories are subject to inspection. You should not wear ornate clips, combs, barrettes, headbands, and other hair accessories. Any examinee wearing any of these items may be prohibited from wearing them in the testing room, and asked to store such items in their locker. These inspections will take a few seconds, and will be done at check-in and upon return from breaks.

If you brought a printed copy of your scheduling permit, the Test Center Staff will collect it. You will be provided with laminated writing surfaces and markers. You will be instructed to write your name and Candidate Information Number (CIN) on one of the laminated writing surfaces provided. Your scheduling permit will be retained by the Test Center Administrators. You may request access to the permit during the examination if it becomes necessary for you to rewrite the CIN on the laminated writing surface. Test Center Staff will escort you to your assigned testing station and provide brief instructions on use of the computer equipment. Laminated writing surfaces and markers issued are to be used for making notes and/or calculations during the testing session. They should only be used at your assigned testing station, and only after you have begun your examination by entering your CIN. You must enter your CIN to start the examination, which will begin with a brief tutorial prior to the first test block. Depending

on the type of markers provided, you may also be provided an eraser. Otherwise, if you have filled the laminated writing surfaces and need additional space for making notes, you will need to notify test center staff and a replacement will be provided. Laminated writing surfaces must be returned to test center staff at the end of the testing session.

If your identification contains your photograph but not your signature, you may use another form of unexpired identification that contains your signature, such as student/employee identification card or a credit card, to supplement your photo-bearing, government-issued identification. As a security procedure, you will be photographed before you begin taking the examination.

Important Note: You will not be admitted to the testing room without presenting either a printed or electronic copy of your permit and an unexpired, government-issued form of identification (such as a driver's license or passport) that includes **both** your photograph and signature. The name on your scheduling permit must exactly match the name on your identification form. The only acceptable difference would be the presence of middle name or middle initial, or suffix on one document and its absence on the other. If you do not present your permit and required identification on the exam day, you will be denied admission to test. In that event, you must pay a fee to Prometric to reschedule your test (see section 4.5 for additional instructions).

6.5. Testing Regulations and Rules of Conduct

Test center staff monitor all testing sessions. Candidates must follow instructions of test center staff throughout the examination. Test center staff are not authorized to answer questions from candidates regarding examination content, testing software, or scoring.

If staff observes a candidate violating test administration rules or engaging in other forms of irregular behavior during an examination, the test center staff will not necessarily tell the candidate of the observation at the time of the examination. Test center administrators are required to report such incidents to NBME; each is fully investigated.

Candidates may not bring any personal belongings into the testing area, including but not limited to the following:

- Mechanical or electronic devices, such as cellular telephones, calculators, watches of any type, electronic paging devices, recording or filming devices, radios
- Outerwear such as coats, jackets, head wear, gloves
- Book bags, backpacks, handbags, briefcases, wallets
- Books, notes, study materials, or scratch paper
- Food, candy, gum, or beverages

If you bring any personal belongings to the test center, you must store them in a designated locker outside the testing room. You should keep in mind that the lockers are small and that mechanical or electronic devices stored in lockers must be turned off. Making notes of any kind during an examination, except on the laminated writing surface provided at the test center, is not permitted and removal of those materials from the secure testing area during a testing session or break is prohibited.

Note: Although the site provides noise-reducing headphones, you are encouraged to bring your own cordless soft-foam earplugs (subject to inspection).

6.6. Irregular Behavior During the Examination Process

Irregular behavior includes any action by candidates or others when solicited by a candidate that subverts or attempts to subvert the examination process. Test center administrators are required to report any irregular behavior by a candidate during the examination. Irregular behavior may include, but is not limited to, the following:

- Seeking and/or obtaining access to examination materials
- Impersonating a candidate or engaging another individual to take the examination by proxy
- Giving, receiving, or obtaining unauthorized assistance during the examination or attempting to do so
- Making notes of any kind during an examination except on the erasable writing surface provided at the test center
- Memorizing and/or reproducing examination materials
- Failure to adhere to test center regulations
- Possessing unauthorized materials during an examination administration (eg, recording devices, photographic equipment, electronic paging devices, cellular telephones, reference materials)
- Any other behavior that threatens the integrity of the specialist certification examinations

Looking in the direction of the computer monitor of another candidate during the examination may be construed as evidence of copying or attempting to copy, and a report of such behavior may result in a determination of irregular behavior. Candidates must not discuss the examination while a session is in process. Test center administrators are required to report all suspected incidents of irregular behavior. A candidate who engages in irregular behavior or who violates test administration rules may be subject to invalidation of their examination.

6.7. Canceled or Delayed Exam Administration or Problems at the Testing Center

Every effort is made to administer an examination at the scheduled test time and location. On occasion, however, exam administrations may be delayed or canceled in emergencies such as severe weather, a natural disaster that renders a Prometric Testing Center (PTC) inaccessible or unsafe, or extreme technical difficulties. If Prometric closes a testing center where you have already scheduled a testing appointment, it will reschedule the examination appointment at no additional charge.

In that event, Prometric will attempt to notify you in advance of your testing appointment to schedule a different time and/or center. Rescheduling an appointment for a different time or center may occur at the last minute due to limited availability of seats in a PTC.

You are advised to reconfirm your appointment with Prometric and maintain flexibility in any travel arrangements you may make.

If you experience an emergency situation on the day of your examination that you feel may jeopardize your ability to perform effectively on the examination, you may be eligible to postpone sitting for the examination until 2019. However, please note that if you opt to still sit for the examination and are not successful, this is not a basis for appealing examination results and your ability to sit again in 2019 at no additional cost may be in jeopardy.

Any candidate once checked in and seated at a test station, who is

delayed to take the examination by more than 30 minutes because of technical difficulties, is responsible for reporting the delay to the Specialist Certification Program at 800/999-2782, ext 8520, as soon as possible. For such cases, the candidate may be eligible to choose to reschedule his or her examination at no additional charge. Before deciding to reschedule, you should be sure that there is another appointment available during the testing period. The test administration will not be considered “irregular” if you choose to remain and test despite the delay. You will receive the maximum number of hours available to candidates to complete the exam even if the test is delayed.

Any candidate, once checked in and seated at a test station, who has a concern or complaint about the test center environment, should immediately report the problem to the test center administrator. If you feel that the problem was not resolved to your satisfaction, you should contact the Specialist Certification Program at 800/999-2782, ext 8520, as soon as possible.

6.8. Exam Deferral

Candidates may defer their examinations through the ABPTS online application system located at www.abpts.org. To access your application click on “Online Application” from the Quick Links menu. Find your current application and click “History.” On the left-hand side of the screen, click on “Applicant Admin.” At the top of the Applicant Admin page is “Submit Deferral.” It is recommended that you review the [deferral guidelines](#) before selecting “Yes” from the drop-down menu. Last, scroll to the bottom of the page, and click “Save” to complete the deferral request. Please note you will not receive an email confirming the deferral, but once you click save that will finalize the process.

6.9. Equipment Malfunction

Should you experience any difficulty with the computer, please notify the test center administrator immediately. Do not wait until you have completed the exam to bring equipment malfunctions to the attention of the test center administrator. Once again, if you feel that the problem was not resolved to your satisfaction, you should contact the Specialist Certification Program at 800/999-2782, ext 8520, as soon as possible.

Please note that, occasionally, a computer at the test center may need to be restarted. Prometric has appropriate safeguards in place to ensure the integrity of candidate examination data. As soon as a candidate answers a test item, the response is immediately copied and saved, on the candidate’s directory on the server at a center. If there is a computer restart, the driver locates the results from the directory and picks up where the examinee left off. The system does not change or delete any responses. Thus, examination data are captured at the instant a candidate responds to a question; the computer can be restarted, if necessary, without losing or corrupting examination data.

6.10. Incomplete Examinations

After you start taking an examination, you cannot cancel or reschedule that examination unless a technical problem prevents you from completing your examination. As noted in section 6.8, if you experience a computer problem during the test, notify test center staff immediately. The testing software is designed to allow the test to restart at the point it was interrupted. In most cases, your test can be restarted at the point of interruption with no loss of testing time. If you do not finish the exam for any reason you are not permitted to resume the incomplete sections of the test. You must reapply for the next regularly scheduled administration (see section on “Reapplication” 3.7). The examination fee is nonrefundable for incomplete examinations.

7. EXAM RESULTS

7.1. Exam Results and Notification

After ABPTS meets in May 2018 to make certification decisions, score reports will be prepared for online distribution in mid-June 2018. The score report specifies your examination score, the passing score on the examination, and feedback on your performance in the major competency areas tested. In mid-June 2018, the Specialist Certification Program staff will send you an e-mail notification announcing that score reports are available online, including instructions on how to access and download your score report.

Although there is a time lapse between the close of the examination window and the availability of examination results, much is happening during this period of time. Key validation takes place after the exam window closes in March. Key validation is a process of preliminary scoring and item analysis of the exam data, followed by careful evaluation of the item-level data, to identify potentially flawed or incorrect items prior to final scoring. During April and early May, standard setting committees are convened at the NBME to participate in content-based standard setting studies. The outcome of each committee's standard setting meeting is the recommendation of a passing standard of each of the specialty examinations during their May meeting. NBME then scores the specialist certification examinations and candidates are notified of their exam results as soon as this information is received by the Specialist Certification Program.

7.2. Scaled Scores

While your score is based on the number of questions answered correctly, it is a scaled score. ABPTS requires a scaled score of 500 to pass the examination. Scaling is a procedure that converts raw scores (number of correct responses) to a more easily interpretable scale. The purpose of scaling scores is to simplify things by keeping the passing score at the same number (eg, 500) for all exam forms, while the raw scores necessary for passing may vary for different forms.

7.3. Passing Scores

The certification examinations assess a clearly defined domain of knowledge and skills. You will be certified upon achievement of a passing score on the examination. The passing score is based on a detailed analysis of exam data and a recommended performance standard from a panel of clinical subject matter experts. This panel includes physical therapists in the specialty representing diversity in practice setting, years of experience, theoretical perspective, and geographic region.

Upon receiving board-certification, the candidate will:

- receive a certificate recognizing board certification as a specialist in an area of physical therapy
- be entitled to note they are "board-certified" in their specialty
- receive a board certified specialists lapel pin in his or her specialty area
- be recognized by his or her colleagues at APTA's annual Ceremony for Recognition of Clinical Specialists at APTA's Combined Sections Meeting
- be included in the online Directory of Certified Clinical Specialists in Physical Therapy

8. CONFIDENTIALITY

8.1. Confidentiality of Applicant Identity

Applicant names, application documents, and test scores are considered confidential. Only Specialist Certification Program staff, members of the American Board of Physical Therapy Specialties, members of the Specialty Council, and designated staff at the NBME and its subcontractors shall have access to this information. Applicant identity can be released for study group purposes only, with the consent of each applicant. Copies of test scores will be released only at the written request of the candidate.

8.2. Confidentiality of Examination Content

All candidates must sign/acknowledge the Affidavit & Pledge of Confidentiality in their online application for certification. Candidates must not disclose examination content to others or reproduce any portion of the examination in any manner. The examination of any candidate who violates these security rules will not be scored.

9. GROUNDS FOR DISCIPLINARY ACTION

Applicants or candidates who are determined to have engaged in fraud, misrepresentation, or irregular behavior in the application or examination process, to have disclosed examination content to others or reproduced any portion of the examination in any manner, or to have violated the Affidavit & Pledge of Confidentiality will be subject to disciplinary action, to be determined by ABPTS, which may include, without limitation, withdrawal of any certification granted and permanent or temporary exclusion from the certification process. Before taking disciplinary action, ABPTS will give the individual written notice of the evidence against the candidate and an opportunity to respond.

10. PROCEDURES FOR REVIEW OF DECISIONS

10.1. Reconsideration of Decision Regarding Eligibility to Sit for the Exam

An applicant whom the Specialty Council has determined to be ineligible may request the Council to reconsider its denial of eligibility. The request for reconsideration must specify the grounds on which it is based. An applicant may submit new information in support of his or her request for reconsideration. An applicant may challenge the Specialty Council's application of the eligibility requirements to his or her case, but not the requirements themselves. An applicant may not appeal to ABPTS unless he or she has first submitted a request for reconsideration to the Council. An applicant must submit his or her request for reconsideration no later than 2 weeks from the date of the denial letter. For purposes of determining compliance with the foregoing deadline, a request for reconsideration will be deemed submitted on the postmark date. The Specialty Council will notify the applicant in writing of its decision on reconsideration.

10.2. Appeal to ABPTS of Specialty Council's Decision Regarding Eligibility to Sit for the Exam

An applicant who wishes to submit an appeal must contact the Specialist Certification Program for a complete copy of the procedures.

An applicant whom the Council has determined upon reconsideration to be ineligible may appeal the decision to ABPTS. An applicant may challenge the Council's application of the eligibility requirements to his or her case, but not the requirements themselves. The applicant must

submit his or her appeal no later than 2 weeks from the date of the Council's decision on reconsideration. The appeal must be in writing and must be addressed to the Chair of ABPTS at the APTA Specialist Certification Program. For purposes of determining compliance with the foregoing deadline, a request for reconsideration will be deemed submitted on the postmark date. The appeal must specify the grounds on which it is based.

The Appeal Committee, a committee of ABPTS, will be responsible for the review and disposition of requests from applicants for appeal of a Specialty Council decision. The Appeal Committee will make its decision no later than 30 days from the date of receipt of the request for appeal. The Appeal Committee will send written notification of its decision to the Chair of the Specialty Council and the applicant by certified mail, return receipt requested, no later than 7 days from the date of its decision.

10.3. Procedures for Review of Certification Actions

A candidate who wishes to request that ABPTS reconsider its decision to deny certification must request a complete copy of procedures from the Specialist Certification Program.

The purpose of the ABPTS reconsideration procedure is to enable a candidate to challenge an ABPTS decision denying certification and to seek relief from untoward circumstances associated with the onsite administration of the examination and errors in the transmission of examination responses due to technical malfunction. To be considered, the request must include supporting evidence of technical malfunction.

Candidates must submit a request for reconsideration in writing and address the request to the Chair of ABPTS at the APTA Specialist Certification Program. To request reconsideration, the candidate must submit a written request no later than 2 weeks after the date of the letter notifying the candidate of exam results. For purposes of determining compliance with the foregoing deadline, a request for reconsideration will be deemed submitted on the postmark date. The request for reconsideration must specify the grounds on which it is based and the corrective action sought. Within 7 days of the receipt of a request for consideration ABPTS will acknowledge in writing the receipt of the request, including the date on which the request was received.

10.4. Appeal to APTA Board of Directors of ABPTS Decision to Deny Certification

A person may not appeal to the APTA Board of Directors unless he or she has submitted a request for reconsideration to ABPTS. A candidate who wishes to submit an appeal must request a complete copy of procedures from the Specialist Certification Program. Any candidate adversely affected by the ABPTS decision on reconsideration may appeal to the APTA Board of Directors within 14 days of receipt of the ABPTS notification of the Appeal Committee's decision. A candidate must submit this appeal in writing, and the candidate must address it to the President of the APTA at the APTA Governance Department. The candidate must also send a copy of the written appeal to the Chair of ABPTS at the APTA Specialist Certification Program. The appeal must set forth arguments in support of the candidate's position. ABPTS will send written acknowledgment of receipt of the appeal to the candidate within 7 days after ABPTS receives the candidate's written appeal request.

11. EXAM CONTENT OUTLINE & SAMPLE QUESTIONS

11.1. Exam Content Outline

All questions on the exam relate to competencies outline in the document *Description of Specialty Practice: Cardiovascular & Pulmonary Physical Therapy* (2007). The content outline lists major content areas and components of the exam. The exam comprises case histories, each accompanied by multiple choice questions. The cardiovascular and pulmonary diagnoses that may be included in the exam content are listed with their frequency of occurrence on page 9.

Category	% of Exam Questions
Professional behaviors: leadership, education, and administration	10%
Consultation	4%
Evidence-based practice	10%
History taking and systems review	10%
Tests and measures	10%
Evaluation: Analyzing, interpreting, diagnosis, prognosis, outcome determination	30%
Interventions: Procedural interventions; coordination, communication, and documentation	12%
Foundational, clinical, and behavioral sciences	14%
TOTAL	100%

11.2. Diagnoses Seen by Cardiovascular & Pulmonary Clinical Specialists

The following lists the most common patient diagnoses seen by specialists. They are listed by frequency seen and rank ordered within each category. The distribution of cases used in the specialist certification exam will reflect the frequency of these diagnoses, based on the survey of specialists: frequently (60% of exam items), occasionally (30% of exam items), and rarely (10% of exam items).

Cardiovascular Diagnoses Diagnoses Seen Frequently

- Atherosclerotic Disease, Coronary Atherosclerosis
- Atherosclerotic Disease, Peripheral Vascular Occlusive Disease
- Chronic (Left Side) Heart Failure
- Patients at High Risk for Development of Cardiovascular Disease or Complications
- Hypertension
- Rhythm Disturbances/Dysrhythmia
- Atherosclerotic Disease, Peripheral Vascular and Cardiovascular Complications of Diabetes
- Hypertensive Heart Disease
- Ischemic Conditions, Myocardial Infarction
- S/P Invasive or Surgical Procedures, Coronary Angioplasty
- S/P Invasive or Surgical Procedures, Coronary Artery Bypass Graft

- Ischemic Conditions, Angina
- Cor Pulmonale/Right Heart Failure
- S/P Invasive or Surgical Procedures, Cardiac Pacemaker Insertion
- Atherosclerotic Disease, Intermittent Claudication
- Cardiomyopathy
- Valvular Disorders
- Atherosclerotic Disease, Venous Stasis
- S/P Invasive or Surgical Procedures, Aortofemoral or Other Vascular Bypass Grafts
- S/P Invasive or Surgical Procedures, Valve Replacement
- Aneurysms
- S/P Invasive or Surgical Procedures, Vascular Stent Placement
- S/P Invasive or Surgical Procedures, Defibrillator Implant
- Ischemic Conditions, Intermediate Coronary Syndrome
- S/P Invasive or Surgical Procedures, Intra-aortic Balloon Pump

Diagnoses Seen Occasionally

- S/P Invasive or Surgical Procedures, Aortic Aneurysm Repair
- S/P Invasive or Surgical Procedures, Aortic Dissection Repair
- Pericarditis
- S/P Invasive or Surgical Procedures, Ventricular Assist Device Placement
- S/P Invasive or Surgical Procedures, Heart Transplant
- Congenital Defects, Septal
- Ischemic Conditions, Prinzmetal Angina

Diagnoses Seen Rarely

- Congenital Defects, Patent Ductus Arteriosus
- S/P Invasive or Surgical Procedures, Extracorporeal Membrane Oxygenation
- S/P Invasive or Surgical Procedures, Correction of Congenital Heart Defects
- Lymphedema
- Congenital Defects, Coarctation of the Aorta
- Lymphadenopathy
- Congenital Defects, Tetralogy of Fallot
- Congenital Defects, Common Ventricle
- Congenital Defects, Transposition of Great Vessels
- Congenital Defects, Eisenmenger Syndrome

Pulmonary Diagnoses

Diagnoses Seen Frequently

- Pulmonary Edema
- Emphysema/Bronchitis (Acute or Chronic)
- Pulmonary Artery Hypertension/Primary Pulmonary Hypertension
- Hypertension
- Asthma
- Pneumonia (Bacterial, Viral, Pneumococcal, Aspiration, Bronchopneumonia)
- Atelectasis, Adult Primary

- Pulmonary Effusion
- High Risk for Development of Pulmonary Disease or Complications
- Acute Respiratory Failure
- S/P Surgical Procedure, Abdominal Surgery
- Postoperative Pulmonary Complications (Other Than Atelectasis)
- S/P Surgical Procedure, Tracheotomy
- Acute Upper Respiratory Infection
- Pneumothorax
- S/P Surgical Procedure, Other Thoracic Surgery
- Adult Respiratory Distress Syndrome
- Pulmonary Embolism
- Bronchiectasis
- Pulmonary Fibrosis, Primary/Idiopathic
- Neoplastic Diseases, Carcinoma In Situ (Bronchus/Lung)
- Orthopedic Impairment, Fractured Ribs

Diagnoses Seen Occasionally

- Orthopedic Impairment, Kyphoscoliosis
- Cystic Fibrosis
- Neoplastic Diseases, Malignant Neoplasm (Trachea/ Bronchus/ Lung/Larynx/Pleura)
- S/P Surgical Procedure, Lung Reduction or Resection
- Influenza
- S/P Surgical Procedure, Lung Transplant (Single or Double)
- Bronchiolitis
- Pulmonary Fibrosis, Iatrogenic (Radiation/Chemotherapy)
- Lung Abscess
- Empyema
- S/P Surgical Procedure, Esophagectomy
- Orthopedic Impairment, Flail Chest
- Spinal Cord Lesion or Injury, Cervical
- Sarcoidosis

Diagnoses Seen Rarely

- Graph Versus Host Disease
- Spinal Cord Lesion or Injury, Thoracic
- Spinal Cord Lesion or Injury, Lumbosacral
- Pneumoconiosis
- Tuberculosis
- BPD
- S/P Surgical Procedure, Heart-Lung Transplant
- Atelectasis, Newborn
- Hepatopulmonary Syndrome
- Meconium Aspiration

11.3. Sample Questions

Case 1

A 57-year-old man is brought to the emergency department because of right-sided chest pain, worsening shortness of breath, and a three-day history of coughing and fever. He has no recent history of loss of consciousness, trauma, or vomiting. Medical history includes alcohol abuse, peptic ulcer disease, partial gastrectomy, atrial fibrillation treated with rivaroxaban and metoprolol, positive Mantoux screening six years ago that was treated pharmacologically for one year, and multiple pneumonias. The patient is divorced and does not have contact with his two children. He used to work as a baker but is currently unemployed. He lives alone in a second-floor apartment; there are four steps without a railing to enter the building, one flight of stairs with a railing to enter the apartment, and no stairs within the apartment. On examination, he appears cachectic and sallow-skinned. Temperature is 39.4°C (103.0°F), heart rate is 130 beats/min, respiratory rate is 32 cycles/min, and blood pressure is 80 mmHg and palpable. Physical examination shows moderate shortness of breath. Auscultation of the chest discloses S and S heart sounds, a grade II/VI systolic ejection murmur, and coarse crackles throughout the lung fields that are greater on the right than the left. There is dullness to percussion over the right posterior base and right mid-lung areas. No edema is noted. Complete blood count shows:

Leukocyte count	14,200/mm ³
Hematocrit	34.9%
Hemoglobin	12.4 g/dL
Platelets	242,000

Arterial blood gas analysis on room air and on 100% oxygen via face mask shows:

	Room Air	100% Oxygen via Face Mask
pH	7.38	7.37
Pco ₂	25 mmHg	38 mmHg
PO ₂	40 mmHg	115 mmHg
HCO ₃	18 mEq/L	23 mEq/L

Sputum Gram stain shows occasional gram-positive diplococci in chains and 3+ polymorphonucleocytes. Radiography of the chest shows right lower lobe and potential right middle lobe consolidation. Twelve-lead ECG shows sinus rate is 140, PR interval is 0.14, and QRS interval is 0.08.

Case 1 Questions

- Which of the following is the best rationale for the relationship between the patient's vital signs and arterial blood gas analysis on room air findings?
 - The altered blood pressure is due the HCO₃ level
 - The altered heart rate is due to the PaCO₂ level
 - The altered respiratory rate is due to the PaO₂ level
 - The altered temperature is due to the pH value
- Which of the following is the most likely cause of this patient's pulmonary findings?
 - Acquired from the community in this chronically malnourished host
 - Aspiration due to long-term alcohol abuse
 - Inflammation resulting from inhaled allergen in flour dust
 - Tuberculosis based on previously positive Manteaux screening

3. Which of the following is the best physical therapy treatment for this patient's pulmonary dysfunction at this time?

- Diaphragmatic breathing to improve his cough effort
- Use of postural drainage, percussion and shaking for secretion removal
- Pursed-lip breathing to improve hypocapnea
- Use of a threshold device for inspiratory muscle training

Case 2

A 38-year-old man is admitted to the emergency department because of chest discomfort and weight gain. Medical history includes morbid obesity, obstructive sleep apnea on bilateral positive airway pressure support, nonischemic cardiomyopathy, ejection fraction of 15%, diastolic heart failure, placement of an internal cardiac defibrillator (ICD), hypertension, hyperlipidemia, anxiety, and restless leg syndrome. Medications on admission include torsemide, metolazone, spironolactone, aspirin, metoprolol, lisinopril, and albuterol sulfate. The patient is married with two children and receives disability compensation. He is morbidly obese with a body mass index of 60.4 kg/m². Temperature is 36.5°C (97.7°F), heart rate is 106 beats/min and irregular, respiratory rate is 18 cycles/min, and blood pressure is 132/69 mmHg. Oxygen saturation is 92% on room air. Thoracic auscultation discloses decreased breath sounds throughout with no audible crackles. Edema of the lower extremities is noted. Laboratory studies show:

Blood

Leukocyte count	10,900
Erythrocyte count	5.02
Hemoglobin	13.4 g/dL
Hematocrit	40.6%
Platelets	220,000

Serum

Creatinine	1.1 mg/dL
Urea nitrogen	18 mg/dL
Sodium	138 mEq/L
Potassium	2.2 mEq/L
Calcium	9.4 mg/dL
Chloride	91 mEq/L
HCO ₂	32

Cardiac enzyme studies show troponin T of 0.06 and CK-MB of 2. Chest radiography shows moderate cardiomegaly and a centrally predominant diffuse interstitial prominence that is compatible with mild pulmonary vascular congestions without frank pulmonary edema. Twelve-lead ECG shows atrial rate of 109 and irregular, PR interval of 0.164, QRS interval of 0.106, and a rhythm with multifocal ventricular premature beats. ICD interrogation shows 10 shocks delivered during the past six weeks for nonsustained ventricular tachycardia at a rate of 150 to 200. Nitroprusside sodium by intravenous drip is administered in the emergency department. Four hours after admission, the patient is transferred to the coronary care unit. Repeat laboratory studies are performed, and furosemide is administered via intravenous drip. On hospital day four, he is switched to oral administration of bumetanide.

Case 2 Questions

1. On admission to the emergency department, which of the following would be the expected results of cardiac auscultation?
 - A. Early diastolic murmur
 - B. Pansystolic murmur
 - C. S₃ heart sound
 - D. S₄ heart sound
2. Which of the following best describes the physiologic intention of treatment with nitroprusside sodium?
 - A. Decreasing afterload
 - B. Decreasing cardiac output
 - C. Increasing myocardial VO₂ max
 - D. Increasing preload
3. Which of the following laboratory findings was most likely responsible for the delay in the initiation of furosemide until the patient arrived in the coronary care unit?
 - A. Decreased creatinine
 - B. Hypercalcemia
 - C. Hypokalemia
 - D. Increased troponin T
4. The patient begins physical therapy on hospital day three. He reports lower extremity weakness, low back pain, and right ankle pain. He rates the low back pain as a 3/10 and the ankle pain as a 7/10, which increases to 9/10 on weight bearing. On further questioning, he reports that the ankle pain has occurred during other hospitalizations, but not always in the same lower extremity or in the same location in the extremity. The pain does not occur at home. Which of the following best explains this patient's pain?
 - A. Hyperuricemia caused by rapid diuresis
 - B. Ischemic pain caused by gravity-minimized supine position for days
 - C. Osteoarthritic pain in the lower extremities caused by three days of bed rest
 - D. Restless leg syndrome causing trauma from the hospital bed rails
5. Which of the following is the most appropriate test to determine the patient's ability to take steps in his room with an assistive device?
 - A. Activity Measure for Post-Acute Care (AM-PAC)
 - B. Berg Balance Scale
 - C. Egress Test
 - D. Functional reach test

Case 3

A 74-year-old woman is admitted to the emergency department because of shortness of breath associated with chest tightness. She has a one-week history of dyspnea on exertion that occurs at 30 feet (9 m) of ambulation. She has had moderate improvement with sublingual administration of nitroglycerin. Medical history includes coronary artery disease, coronary artery bypass grafting 10 years ago, anterior myocardial infarction, angioplasty seven years ago, diastolic heart failure one year ago, and supraventricular tachycardia. Heart rate is 130 beats/min and irregular, respiratory rate is 24 cycles/min, and blood pressure is 148/76 mmHg.

Oxygen saturation is 92%. Physical examination shows jugular venous distention and a right carotid bruit. Auscultation of the chest discloses an irregular heart rhythm with a grade IV/VI systolic murmur heard best at the apex. An S₃ heart sound is present; no S₄ is noted. Crackles are heard in the lower lung fields that are greater on the left. Extremities show 2+ distal pulses bilaterally and no edema. ECG discloses atrial fibrillation with a rapid ventricular rate of approximately 130. There is evidence of depressed ST segments in leads II, III, and aVF. Echocardiography shows normal ventricular cavity size, 3+ mitral regurgitation, ejection fraction of 44%, and hypokinesis of the inferior wall.

Case 3 Questions

1. Which of the following is the best explanation of the auscultatory findings in this patient?
 - A. Hypertrophic cardiomyopathy as indicated by carotid bruit
 - B. Pneumonia as indicated by crackles in the lower lung fields
 - C. Pulmonary edema as indicated by the absence of an S₄ heart sound
 - D. Valvular structural abnormality as indicated by systolic murmur
2. Which of the following is the best rationale to explain this patient's cardiac dysfunction?
 - A. Decreased preload from inactivity resulting in altered jugular venous distention
 - B. Demand coronary ischemia from pulmonary pathology causing congestive heart failure
 - C. Hypoperfusion in the posterior descending coronary artery causing congestive heart failure
 - D. Mitral regurgitation from valvular insufficiency causing anterior descending coronary ischemia
3. Which of the following is the best indication for a coronary angiography at this time?
 - A. History of congestive heart failure and rapid ventricular response atrial fibrillation
 - B. History of coronary artery bypass grafting with current ST depression
 - C. History of myocardial infarction with systolic murmur over the left apex
 - D. History of supraventricular tachycardia with crackles in the lower lung fields

Case 4

A 45-year-old man receives outpatient physical therapy because of left calf pain that occurs with running at speeds of greater than 10 minutes per mile. The pain is relieved when he slows to a jog or stops. The physical therapist suspects that the pain is related to the peripheral arterial system. Ankle brachial indexes (ABIs) are performed correctly bilaterally: left ABI is 1:1 using the left dorsalis pedis systole, and right ABI is 1:3 using the right dorsalis pedis systole. He has 1+ pulses in the dorsalis pedis bilaterally and 2+ pulses in the posterior tibial arteries. Which of the following is the most appropriate next step to determine the cause of this patient's left lower extremity pain?

- A. Perform a capillary refill test
- B. Perform an exercise ABI test
- C. Perform a rubor of dependency test
- D. Retest both ABIs using the systole of the posterior tibial artery

Key:

Case 1. 1.c 2.a 3.b

Case 2. 1.c 2.a 3.b 4.c 5.b

Case 3. 1.d 2.c 3.b

Case 4. 1. b

11.4 Sample Cardiovascular & Pulmonary Data Analysis Form
(Required of Initial Certification Candidates Only)**The following 4 examples are provided to illustrate the kind of information that satisfies the data analysis requirement:****1. Description of Applicant's role:**

I first reviewed the literature to determine what information was available on the topic of cardiopulmonary content in entry-level physical therapist education programs. I asked colleagues about previous surveys of the content of physical therapy entry-level curricula. With the assistance of my co-workers, a 42 item survey instrument was developed and sent to 154 entry-level physical therapist education programs. I tallied, collated and conducted standard descriptive analysis of the information from those surveys returned.

Abstract of project:

Introduction Because of the high prevalence of cardiovascular and pulmonary disease in our society, these conditions are commonly encountered by physical therapists in clinical practice. Entry-level physical therapy (PT) education programs must prepare new graduates to manage cardiovascular and pulmonary disease as primary diagnoses or comorbidities, and in the development of preventive intervention strategies. There are no published reports of cardiopulmonary physical therapy content in entry-level physical therapist education programs. Therefore, the purpose of this study was to identify and describe cardiopulmonary curricular content in entry-level physical therapist education programs.

Methods A 42-item survey was developed and mailed to 154 entry-level physical therapist education programs in the United States. The survey addressed the following topics: instructional format, number of credit hours devoted to cardiopulmonary content, faculty characteristics, overall curricular characteristics.

Results Of the surveys returned, 105 were analyzed. Fifty-two percent of the responding programs are housed in public academic institutions; 47% in private institutions. In approximately 45% of the educational programs, cardiopulmonary curricular content is presented as discrete modules or as separate titled courses (=11% and 34%, respectively).

Discussion As regards the number of hours (semester equivalent) of curricular content devoted to the area of cardiopulmonary physical therapy, approximately 15% of PT programs devote fewer than 3 hours; 53% provide 3 to 4 hours; 12% provide 5 to 6 hours; and 19% provide more than 6 hours of cardiopulmonary content. This information may be useful in future deliberations regarding the structure and content of entry-level physical therapists educational curriculums.

Limitations of Project Issues that impacted the implementation of the project included e.g. subject availability, institutional limitations, time

constraints. While the data reported here provides preliminary report on quantity of time dedicated to cardiopulmonary content, it does not offer information about the quality of instruction or teaching methods used, which may be as important or more important to student learning objectives than the metrics reported here.

Dissemination of Results The results of the study were presented by me e.g. during an inservice within the institution, state meeting, national meeting, published in a journal, poster presentation.

Changes to Practice Changes that occurred in practice as a result of the study were e.g. departmental changes, institutional changes, changes in policies and procedures, or why changes in practice did not occur.

2. Description of Applicant's role:

I was responsible for implementing the exercise training of the four patients from our medical center. Additionally, I participated in the acquisition of data during the formal exercise testing of these same patients. I assisted in the analysis of the data and in the formulation of conclusions based on the data from these four, and other, patients in the study.

Abstract of project:

Introduction The use of left ventricular assist devices (LVAD) for end-stage heart failure (HF) has risen dramatically over the past five years. Patients with LVAD are active and participate in exercise training (ET) programs. However, little is known about the effects of ET upon the cardiorespiratory function (CRF) of this population. The purpose of this study was to evaluate the effects of ET upon CRF in patients with a LVAD.

Methods 6 patients with a LVAD (5 males, 1 female: mean age (SD) 50 (+8 years) with end-stage HF (LV EF = 19+4%) underwent a symptom limited treadmill test with respiratory gas analysis a mean of 8 weeks after LVAD implantation and again after a mean of 16+12 weeks of aerobic and strength ET at a Borg RPE of 11-16/20, for 20-30 minutes, 3-5 x/week.

Results Exercise test results demonstrated: 1) no significant change in peak VO₂; 2) 10% increase in exercise duration, 8% increase in peak ventilation, 8% increase in LVAD flow rate; and 3) 3% decrease in sub-maximal heart rate and 6% decrease in systolic blood pressure. VO₂ at the ventilatory threshold (VO₂VT) and VO₂VT as a percentage of peak VO₂ were significantly greater after ET (10.6+1 to 12.8+2 ml/kg/min; p=0.02 and 66+8 to 74+7%; p=0.04, respectively).

Discussion This study suggest that HF patients with LVAD elicit modest training effect, but are limited at maximal capacity due most likely to mechanical restraints from the LVAD.

Limitations of Project Issues that impacted the implementation of the project e.g. subject availability, institutional limitations, time constraints.

Dissemination of Results The results of the study were presented by me e.g. during an inservice within the institution, state meeting, national meeting, published in a journal.

Changes to Practice Changes to Practice Changes that occurred in practice as a result of the study were e. g. departmental changes, institutional changes, changes in policies and procedures, or why changes in practice did not occur.

3. Description of Applicant's role:

I participated in a study of the effect of aerobic exercise and weight training on the bone density of young women. My participation entailed recommending several testing tools and procedures to assess aerobic capacity (e.g., VO₂max) and peak torque generated by selected muscle groups. I was also responsible for conducting and interpreting those tests finally selected by the principal investigator.

Abstract of project:

Introduction It has been widely suggested that physical activity has a beneficial effect on bone mineral density in women. The purpose of this two-year, randomized, intervention trial was to investigate the effect of aerobic exercise and weight training on peak bone mass in young women.

Methods One hundred twenty-seven females (ages 20 to 35) were randomly assigned to either an aerobic exercise, weight training and stretching program (exercise group), or to a stretching program (non-exercise group). Sixty-three females (32 exercise, 31 non-exercise) completed the study. Spinal bone mineral density (spinal trabecular and spinal integral) was determined using quantitative computed tomography and dual x-ray absorptiometry. Aerobic capacity (VO₂max) was assessed by expired gas analysis in accordance with the recommendations of the American College of Sports Medicine using the Bruce treadmill protocol. Muscle performance (knee flexion/extension and trunk flexion/ extension peak torque) was assessed with commercially available isokinetic equipment.

Results The exercise group demonstrated a significant gain in bone mineral density of the spinal integral (1.3+2.8%, p<0.02) as compared with the non-exercise group. There were significant between-group differences (p<0.05) in spinal trabecular bone mineral density changes due to a 3% loss in the non-exercise group. The exercise group exhibited significant gains (p<0.05) in VO₂max (2.3+5.2 gain vs. 1.8+6.0 ml/kg/min loss) and knee flexion (4.6+4.7 vs. 2.1+4.9 ft. lbs), knee extension (4.8+6.4 vs. 0.89+5.8 ft.lbs), and trunk extension peak torques (11.7+12.9 vs. 4.4+12.1 ft. lbs) as compared to the non-exercise group.

Discussion This study suggests that over a 2-year period, a program of aerobic exercise, weight training and stretching has beneficial effects on bone mineral density, aerobic capacity, and muscle performance in young women.

Limitations of Project Issues that impacted the implementation of the project e.g. subject availability, institutional limitations, time constraints.

Dissemination of Results The results of the study were presented by me e.g. during an inservice within the institution, state meeting, national meeting, published in a journal.

Changes to Practice Changes that occurred in practice as a result of the study were e. g. departmental changes, institutional changes, changes in policies and procedures, or why changes in practice did not occur.

4. Description of Applicant's role:

I performed the physical therapy interventions and collected the information to be analyzed. In consultation with my peers, I performed the descriptive and comparative analysis. The results of this single-subject study were presented, by me, in an inservice on autogenic drainage to my co-workers.

Abstract of project:

AN ALTERNATE APPROACH TO THE TREATMENT OF CYSTIC FIBROSIS

Introduction The purpose of this study was to evaluate the effects of three forms of physical therapy (traditional chest physical therapy, aerobic exercise, and autogenic drainage) used to treat cystic fibrosis. Autogenic drainage is a three-phase, controlled breathing technique performed by the patient to generate the greatest possible air flow in different generations of bronchi, thereby promoting increased independence and responsibility.

Methods A single subject alternating treatment design was used in the care of a 37-year-old male who was hospitalized for intravenous antibiotic therapy and intensive physical therapy. Sputum production (cc) and quality (percentage of plugs) were measured after each treatment. A baseline for physical therapy treatment was established using traditional chest physical therapy, after which aerobic exercise and autogenic drainage were subsequently implemented.

Traditional chest physical therapy consisted of bronchial drainage, percussion, vibration, and breathing exercises. Aerobic exercise consisted of treadmill ambulation for 30 minutes at 75% of age-predicted maximal heart rate. Autogenic drainage was performed by breathing at low lung volumes to loosen the peripheral mucus, at mid-lung volumes (tidal volume) to collect mucus in the middle airways, and at high-lung volumes to move mucus from larger airways.

Results FEV₁ and FVC improved from 1.3 to 2.1 L and 2.7 to 4.8 L, respectively, between admission and discharge. Sputum quality, but not quantity, differed and the patient perceived autogenic drainage to be at least as effective as traditional chest physical therapy.

Discussion Although sputum quantity did not differ between the three interventions, for this patient, the use of autogenic drainage as treatment technique provided increased independence, responsibility and satisfaction

Limitations of Project Issues that impacted the implementation of the project e.g. subject availability, institutional limitations, time constraints. The alternating treatment design in a single subject does not confirm causality for the interventions provided. One should recognize that there are potentially many other factors that can be expected to contribute to this patient's pulmonary outcomes over the course of this hospitalization.

Dissemination of Results The results of the study were presented by me e.g. during an inservice within the institution, state meeting, national meeting, published in a journal.

Changes to Practice Changes that occurred in practice as a result of the study were e. g. departmental changes, institutional changes, changes in policies and procedures, or why changes in practice did not occur.

12. CARDIOVASCULAR AND PULMONARY SPECIALTY APPLICATION DATA ANALYSIS DO'S AND DONT'S:

Do:

1. Clearly define your role in the project
 - What activities did you do
 - What was your part of the team
2. Prepare your presentation as an abstract that you would submit for publication. It should be clear and concise in regards to:

Description of Applicant's role—what was your participation in the project? Were you the primary investigator, performed data collection, developed the tool used in the project, etc.

Introduction—what is the impact that this project have on the field of cardiovascular and pulmonary PT? What is the question you are attempting to answer?

Methods—please give some detail here in your explanation of your intervention

Results—proper statistical analysis

Discussion—include the outcomes of the results of the intervention and statistical analysis. How will the results of your project affect the field of cardiovascular and pulmonary PT in regards to other therapists, medical disciplines, patients, etc?

Limitations—what difficulties were present for the project? This can include the limited number of participants, lack of time to complete the project, constraints placed by the institution, etc.

Dissemination—how did you get this information out those that it will benefit? Did you give an inservice at your place of work, present the information at a meeting (i.e. district PT meeting, state or national conference), or was it published in a peer-reviewed journal?

Changes to practice—how did this project change the practice of cardiovascular and pulmonary PT at your institution/regionally/nationally, etc., or why your findings show no change in practice

3. Be concise in your writing
4. Clearly differentiate the sections of your presentation

Don't:

1. Cut and paste an entire article that you may have submitted for publication to a journal
2. Add information that does not directly address your project
3. Present your project as one thing when it is really something else
 - A case study/series that is being presented as a research project. This can be determined by the lack of data collection or statistical analysis, lack of inclusion/exclusion criteria, etc., as an example
4. Submit a project that has a conclusion date in the future
 - We would need to know that the project has been completed, regardless of your role
5. If you and another PT have both worked on the same project do not submit the exact same material
 - Even if you both had the same roles (i.e. data collection and analysis) you will need to submit in your own words what your role was and how you addressed your duties in the project

13. RESOURCE GUIDE INFORMATION

Resource guides are compiled by APTA sections and board-certified specialists to reflect current literature in the specialty area. They are provided for your information only. Neither the ABPTS nor the specialty councils has reviewed or endorsed the content of these lists. In addition, reviewing these resources does not guarantee that a candidate will receive a passing score on the specialist certification examination.

Cardiovascular & Pulmonary Physical Therapy Resource Information

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Specialist Certification Program

American Physical Therapy Association

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