



Analysis of Practice for the Physical Therapy Profession: Entry-Level Physical Therapist Assistants

Final Report

**Prepared
for:** Federation of State Boards of Physical Therapy
124 West Street South
Alexandria, VA 22314

Authors: Joseph Caramagno
Sarah Cogswell
Gordon Waugh

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Executive Summary

This report documents the process, methodology, and outcomes of the analysis of the practice of physical therapy conducted between 2015 and 2016 by the Federation of State Boards of Physical Therapy (FSBPT). The primary aim of this study was to examine the current state of physical therapy practice in the U.S. and update the test specifications for the National Physical Therapy Exam (NPTE) maintained by FSBPT. The approach involved gathering and integrating multiple sources of data about the profession to ensure the content of the exam (a) is relevant to current professional practice and (b) reflects the opinions and expertise of a diverse group of stakeholders. The focus of this report is on the Physical Therapist Assistant (PTA) analysis of practice.

The study was conducted with the help of multiple expert groups identified by FSBPT to play key roles in the process. A 14-member PTA Task Force contributed directly to the creation of test specifications for the NPTE exam blueprint. An 8-member Oversight Panel provided guidance and consultation to project staff and the PTA Task Force as they carried out their responsibilities. Finally, a 15-member Policy Group assessed the potential impact of the revised test specifications on the practice of physical therapy, considering both intended and unintended consequences.

The practice analysis involved the construction and administration of an occupational survey to a large, representative sample of PTAs. The purpose of the survey was to collect information on the work activities (WAs) and knowledge and skill requirements (KSRs) that define the practice of physical therapy at entry-level. Just over 1,400 PTAs representing every U.S. jurisdiction completed the survey. Respondents evaluated the criticality of the WAs and KSRs for safe and effective entry-level practice using one or more Likert-type rating scales. Response data were aggregated across respondents. Statistical analyses were performed to examine the distribution and magnitude of respondents' ratings.

The PTA Task Force reviewed the survey results to determine which WAs and KSRs are relevant and important for competent entry-level PTA practice and should be included in the NPTE content outline. In making the determination, they considered multiple pieces of information including the WA and KSR ratings, the number and variety of WAs and KSRs, and their own experience and knowledge of the profession. Of the 197 WAs included on the survey, the Task Force identified 89% as critical for entry-level PTA practice. Of the 134 KSR statements appearing on the survey, 92% were deemed critical for entry-level PTA practice. The WAs and KSRs omitted from the test specifications were generally consistent with statements omitted in the 2011 practice analysis. Based on their judgment of critical WAs and KSRs, the PTA Task Force updated the NPTE test blueprint to reflect the relative importance of each content domain.

The updated blueprint is very similar to the blueprint developed in 2011. The most salient structural change involved separating the Cardiovascular/Pulmonary & Lymphatic System into two distinct content domains. When the revised blueprint is implemented in 2018, knowledge related to the Lymphatic System; including examination, evaluation, differential diagnosis and prognosis, and interventions; will be covered as a stand-alone content domain.

Introduction and Overview

This report documents the process, methodology, and outcomes of the analysis of the practice of physical therapist assistants (PTAs) conducted between 2015 and 2016 by the Federation of State Boards of Physical Therapy (FSBPT). The primary aim of this study was to examine the current state of PTA practice in the U.S. and update the test materials for the National Physical Therapy Exam (NPTE) maintained by FSBPT. The study was carried out in partnership with the Human Resources Research Organization (HumRRO). HumRRO is a non-profit research and consulting firm dedicated to supporting quality testing and training programs that improve human, occupational, and organizational effectiveness.

The systematic process for determining the content of a licensure examination is commonly referred to as a *practice analysis*. Other names for this process include occupational analysis, job analysis, and role delineation study. This process begins with the identification of work requirements for entry-level practitioners and ends with the development of a formal set of test specifications, also known as a *test blueprint*, that identifies the knowledge topics that will be included on the licensure examination.

Because the practice of physical therapy is always evolving, it is important that the content of the licensure examinations be updated on an ongoing basis. Practice analysis data must be collected periodically to ensure that changes in entry-level requirements are incorporated into the licensure examinations (e.g., fewer test questions are included that assess skill areas of decreasing importance and greater numbers of test questions address skill areas of increasing importance). FSBPT has been conducting a new practice analysis based on the profession's rate of change; approximately every 5 years.

This report describes the steps completed to conduct an analysis of entry-level physical therapy practice and update the test blueprint for the NPTE. In the next section, we describe the subject matter expert (SME) groups that provided significant input to the process. The bulk of the report describes the development, implementation, and analysis of an occupational survey of currently-licensed Physical Therapist Assistants (PTAs). In the last part of the report, we describe the steps we followed to update the test blueprint based on the survey results.

The focus of this report is on the PTA analysis of practice; however, some description of activities relevant to both the PTAs and Physical Therapists (PTs) is included. This is because the efforts overlapped significantly in terms of design and methodology. Complete results of the analysis of practice for PTs are provided in a separate report.

Supporting Expert Groups

The physical therapy practice analysis update was conducted with the help of multiple expert groups identified by FSBPT to play key roles in the process: the Oversight Panel, PT and PTA Task Forces, and Policy Group. The individual members of these groups are listed in Appendix A.

Oversight Panel

The purpose of the Oversight Panel was to provide guidance to project staff and the PT and PTA Task Forces as they carried out their responsibilities. The Oversight Panel consisted of eight highly experienced PTs familiar with the NPTE test development process, test blueprint, and current professional issues. They had experience in PT or PTA education and/or clinical practice. All members had participated in exam development activities including item writing,

item review, item writer coordination, and standard-setting. Three members had received an Outstanding Service Award from FSBPT within the past six years.

PTA Task Force

The 14-member PTA Task Force was primarily charged with developing survey content and creating test specifications for the exam blueprints. Selection criteria were designed to ensure that the Task Force members were representative of the profession in terms of practice setting, specialty areas, geographic location, and demographic characteristics. For example, group members identified their primary practice settings as academic institution, private outpatient office or group practice, acute care hospital, health system or hospital-based outpatient facility/clinic, home care, or skilled nursing facility. Specialty areas included orthopedics, neurology, geriatrics, education, acute care, cardiopulmonary, women's health, sports physical therapy, administration, pediatrics, and oncology. Group members' total years of experience in practice ranged from fewer than five years ($n = 4$) to more than 20 years ($n = 3$). Five of the Task Force members held a doctoral degree, half of the Task Force members listed their professional level as PT while the other half listed PTA. Group members were over half male (57%); the racial composition of the group was Caucasian (71%), Asian (7%), African American (7%), and Biracial (7%).

Policy Group

The Policy Group was convened to obtain diverse stakeholder perspectives on the proposed test specifications in light of jurisdictional or policy issues expected to influence entry-level practice within the next 5 years. The group included 15 individuals representing PT and PTA licensing boards, employers, educators, and clinicians, as well as representatives from the American Physical Therapy Association (APTA), the Commission on Accreditation for Physical Therapy (CAPTE), and liaisons from the FSBPT Board and the Technical Advisory Panel. The goal of the Policy Group meeting was to better understand the potential effect of the revised specifications on the practice of physical therapy, such as identifying unintended consequences or issues that need special attention among the educational community. To that end, the Policy Group was asked to (a) review the practice analysis procedures and results (including the updated NPTE test content outlines that resulted from the practice analysis); (b) identify lingering editorial enhancements to improve clarity (e.g., rewording); (c) identify issues that need to be revisited by the Task Forces or that require special consideration when communicating to stakeholder groups; and (d) provide recommendations to FSBPT's Board of Directors regarding the integration and implementation of the updated content outlines. The Policy Group did not edit the content outlines directly.

Analysis of Practice

The overall approach to update the analysis of physical therapy practice in 2016 was similar to that taken in prior years (Bradley, Caramagno, Waters, & Koch, 2011a; Bradley, Caramagno, Waters, & Koch, 2011b; Knapp, Russell, Bynum, & Waters, 2007a; Knapp, Russell, Bynum, & Waters, 2007b). Figure 1 displays the basic steps that were followed. To begin, the project team examined background information, such as prior practice analysis reports and the existing examination blueprints, to prepare lists of work activities (WAs) and knowledge and skill requirements (KSRs). The PT and PTA Task Forces reviewed the lists to ensure they were comprehensive, clearly written, and technically accurate. Next, HumRRO prepared an electronic survey to gather ratings of the WAs and KSRs, and the survey was distributed to a large sample of PTs and PTAs across North America. HumRRO performed several statistical analyses on the responses and reviewed the results with the Task Forces to obtain their insights regarding current trends in the profession. Finally, the survey results were aggregated with judgments made by the Task Forces to update the content specifications for the examination blueprints.



Figure 1. 2016 Practice Analysis Process.

Information Gathering

Analysis of the Current Exam Content Outlines

The existing test blueprints and the 2011 WA and KSR lists served as the basis for the 2016 practice analysis survey. To ensure the information about entry-level physical therapy practice was current, the Oversight Panel reviewed the lists and provided recommendations related to their content and format. Panel members identified (a) emerging and diminishing practices; (b) topics or concepts that are, or should be, consistent across the PT and PTA licensing exams; and (c) editorial/structural revisions to enhance clarity and organization. The Oversight Panel also discussed methods for ensuring a suitable response rate, including incentives for completing the survey.

HumRRO documented and reviewed the recommended revisions to the lists and implemented minor editorial changes directly to the statements (e.g., adding examples to enhance clarity of a specific statement; substituting words). Changes that could potentially have a broader or substantive impact, such as restructuring the categorization of knowledge statements, required input from the PTA Task Force. HumRRO and FSBPT prepared a set of talking points to facilitate a rich discussion with the Task Force and obtain their feedback regarding whether and how to implement the changes.

Updates to the Current Work Activity and Knowledge and Skill Requirements Lists

The PTA Task Force met on March 18-19, 2016 to review the WA and KSR lists; identify content gaps and organizational enhancements; and edit the WAs and KSRs for clarity, currency, and accuracy. During the meeting, HumRRO and FSBPT staff facilitated group discussion to elicit feedback and ensure a comprehensive review of the statements. The facilitators asked questions similar to those listed below.

- Is the list comprehensive in terms of the WAs/KSRs plausibly required to perform successfully at the entry-level?
- If not, what additional WAs/KSRs contribute to successful performance at the entry-level?
- Are there any WAs/KSRs currently on the list that are clearly not required to perform successfully at the entry-level (e.g., obsolete or performed by other health care professionals)?

- Does the wording of each WA/KSR accurately reflect what is needed to perform successfully?
- Is the wording of each WA/KSR clear and succinct?
- Does the list reflect emerging practice areas?
- Are the WA/KSR statements written at a level of detail sufficient to identify emerging trends in the field (e.g., do we need more detail for some emerging areas, can we consolidate some declining areas)?

The PTA Task Force made numerous editorial changes to the existing lists including adding or removing examples and altering the grammatical or syntactical structure of the statements. They also added, dropped, combined, or moved a small number of statements. Some of the notable changes are shown below.

- Added WA related to gathering patient/client information related to health status (e.g., contraindications, pain, falls).
- Combined WAs related to performing and training procedural interventions (e.g., “Perform flexibility techniques” and “Train in flexibility techniques” became “Perform and/or instruct the patient/client/caregiver in flexibility techniques”)
- Revised statements that began with the phrase “Secondary effects or complications from” to “Therapeutic benefits and adverse effects of”
- Regrouped statements covering benefits and effects of PT interventions on other systems to Systems Interactions

After the meeting, HumRRO and FSBPT performed additional cleanup of the lists and categories. This included a follow-up teleconference with the Oversight Panel to review the changes made by the PTA Task Force. The nature of this review was to reconcile any inconsistencies in the changes made by the PT and PTA Task Forces and ensure that any differences between the PT and PTA lists reflected substantive differences between the two professions. The most salient change involved the creation of a new category for KSRs related to the Lymphatic System that were previously combined with items in the Cardiovascular/Pulmonary & Lymphatic Systems. This change was made by the PT Task Force and subsequently determined to also apply to the PTA KSR list.

Occupational Survey Development

Structure and Format

The purpose of the occupational survey was to collect information from current job incumbents about the job tasks/duties performed by entry-level PTAs and the knowledge and skills that are necessary for competent entry-level practice—including any areas of practice that are emerging, changing, or becoming obsolete. The survey was hosted on HumRRO’s web-based platform (a secure, customizable, mobile-friendly environment for electronic survey administration). To enhance usability, the user interface included a pause feature that allowed respondents to complete the survey in multiple, shorter, segments.

The survey had two main sections. The first section was composed of a set of questions about the demographic characteristics of the sample. All respondents were instructed to complete this section. The second section consisted of two components—a WA survey and a KSR survey. Each component consisted of a list of statements and one or more Likert-type rating scales. Respondents were assigned to complete either the WA or KSR survey based on their years of professional experience. Individuals with three or fewer years of experience were assigned to the WA survey. Individuals with five or more years of experience completed the KSR survey.¹ Individuals who possessed more than three but fewer than five years of experience were randomly assigned to one of the components. In addition, respondents with five or more years of experience who supervise the work of PTAs more than PTs completed the PTA KSR survey.

To shorten the completion time, each survey component was split into two forms composed of roughly equivalent numbers of statements (see Table 1).

Table 1. Distribution of PTA Work Activity and Knowledge and Skill Requirements Statements across Survey Forms

	Number of Statements	
	Form A	Form B
Work Activity Survey		
Information Gathering & Synthesis	21	
Tests & Measures	57	
Evaluation & Diagnosis	1	
Procedural Interventions		55
Therapeutic Modalities		18
Non-procedural Interventions		19
Patient/client & Staff Safety	20	6
Total	99	98
KSR Survey		
Cardiovascular/Pulmonary System	9	
Lymphatic System	8	
Musculoskeletal System		11
Neuromuscular & Nervous System		11
Integumentary System	9	
Metabolic & Endocrine Systems		6
Gastrointestinal System		9
Genitourinary System		8
System Interactions	14	
Equipment, Devices, & Technologies		3
Therapeutic Modalities	10	
Safety & Protection		5
Professional Responsibilities		12
Teaching & Learning Theories		3
Research & Evidence-Based Practice	4	
Skills	12	
Total	66	68

Rating Scales

¹ This approach considers two things: (a) entry-level professionals' familiarity with what they do on a day-to-day basis and (b) the wisdom and experience of more seasoned practitioners who are likely to be in a better position to identify the knowledge required to perform those tasks well (Raymond, 2002).

Respondents who completed the WA survey were instructed to provide two types of ratings for every WA statement—*frequency* of performance and *importance* for safe and effective practice. Respondents who indicated they do not perform a given WA were not asked to provide importance ratings for that WA. The WA survey rating scales are shown below.

How often do you perform this work activity? Please base your ratings on your general practice across all patients/clients.

0. Never
1. **Yearly** (a few times a year or less)
2. **Monthly** (a few times a month)
3. **Weekly** (a few times a week)
4. **Daily** (a few times a day)
5. **Hourly or more** (several times an hour or more)
6. I don't know

How important is the successful performance of this work activity for safe and effective entry-level practice?

1. **Not important** for safe and effective practice
2. **Minimally important** for safe and effective practice
3. **Moderately Important** for safe and effective practice
4. **Very important** for safe and effective practice
5. **Extremely important** for safe and effective practice

Respondents who completed the KSR survey were instructed to provide a rating of the *importance* of the knowledge or skill for entry-level practice. The KSR survey rating scale is shown below.

How **important** is this knowledge for successfully performing the job of an entry-level physical therapist assistant?

0. This knowledge is **not needed** by an entry-level PTA
1. **Not important** to successfully perform as an entry-level PTA
2. **Minimally important** to successfully perform as an entry-level PTA
3. **Moderately Important** to successfully perform as an entry-level PTA
4. **Very important** to successfully perform as an entry-level PTA
5. **Extremely important** to successfully perform as an entry-level PTA

Pilot Testing

HumRRO and FSBPT conducted several rounds of internal review and testing to identify and correct issues related to grammar (e.g., spelling, punctuation), functionality (e.g., navigation, data capture), and overall look and feel. Members of the Oversight Panel and PTA Task Force were asked to complete a pilot test of the survey and provide feedback to HumRRO about their experience. HumRRO reviewed the feedback and made a few additional minor editorial changes to the survey content.

Survey Sampling and Administration

Sample Identification and Selection

HumRRO used multiple statistical approaches to identify sample sizes (i.e., number of completed surveys) that would provide stable results. Although these estimates were not computed prior to the data collection, they are shown here for consistency with the 2011 practice analysis report. Using data from the 2011 practice analysis, HumRRO calculated the minimum sample size that would yield a standard error of the mean less than or equal to 0.10 raw score points. This was accomplished by rearranging the standard error formula and dividing the observed/anticipated standard deviation by the desired standard error (0.10) and squaring the result. In addition, HumRRO estimated the minimum sample size needed for the mean rating across respondents to yield an interrater reliability value equal to .99. This approach involved adjusting the intraclass correlations (ICCs) observed in the 2011 data, using the Spearman-Brown prophecy formula. The minimum required sample sizes based on these approaches are presented in Table 2. Note that fewer respondents were needed for the KSR survey than for the WA survey because the standard deviations of the importance ratings of the KSRs obtained from the 2011 practice analysis survey were smaller than the standard deviations of the WA frequency and importance ratings.

Table 2. Determination of Target Sample Sizes

Survey	Maximum <i>SD</i> 2011	Recommended <i>N</i> based on SE rule	Minimum ICC 2011	Recommended <i>N</i> based on reliability rule
PT WA	2.08	433	.26	282
PT Knowledge	1.29	166	.41	142
PTA WA	2.09	437	.22	351
PTA Knowledge	1.01	102	.38	162

Potential survey respondents were identified from a list of licensure candidates who had passed the NPTE (and presumably later became licensed). This master list, maintained by FSBPT, contained names, email addresses, license type (PT or PTA) and number, NPTE passing date, and jurisdiction from which the candidate applied ($n = 447,533$).² Candidates who passed in the current year and candidates with invalid email addresses were excluded from the list, bringing the eligible sample to 173,823. FSBPT selected a sample stratified by year of licensure and jurisdiction, and weighted to oversample older records (assuming older records are more likely to be affected by invalid emails) and smaller strata.³ The sample included 16,896 PTAs with a minimum of 1 year to a maximum of 23 years since passing the NPTE. The largest jurisdiction represented in the sample was Florida ($n = 1,516$), The next three largest states included Ohio ($n = 1,289$), Texas ($n = 1,062$), and California ($n = 949$). The average number of individuals from a jurisdiction was 319 and the median was 225.

Several weeks after the start of the survey, a second stratified sample of 7,190 PTAs was selected using the same criteria and process described above. A third sample was selected one week later that included 2,124 PTAs who had already completed one of the survey forms (e.g., Form A of the WA survey). These individuals were invited to complete the other form of the same survey. Table 3 displays the number of PTAs (and PTs) selected for each survey

² Although a sample of candidates who actually obtained a license would be preferable, not all jurisdictions provide complete lists of licensees. As such, our best source of population data were candidates who passed the NPTE. A small number of candidates were excluded from the sample if they did not have a valid email address.

³ The stratification process accounted for the proportion of missing email addresses to increase the sample size within sampling cells with high proportions of missing emails, up to the size of the cell.

component. The KSR survey samples are larger than the WA survey samples due to the different selection criteria for each (i.e., years of experience).

Table 3. Sample Selection by Survey

	WA		KSR		Total
	Form A	Form B	Form A	Form B	
1st Sample					
PT	3,351	3,351	13,227	13,227	33,156
PTA	2,253	2,254	6,195	6,194	16,896
Subtotal	5,604	5,605	19,422	19,421	50,052
2nd Sample					
PT	2,410	2,409	4,105	4,105	13,029
PTA	1,647	1,646	1,949	1,948	7,190
Subtotal	4,057	4,055	6,054	6,053	20,219
3rd Sample					
PT	289	245	730	746	2,010
PTA	222	194	837	871	2,124
Subtotal	511	439	1,567	1,617	4,134
Total Sample					
PT	6,050	6,005	18,062	18,078	48,195
PTA	4,122	4,094	8,981	9,013	26,210
Total	10,172	10,099	27,043	27,091	74,405

Communication and Administration

FSBPT sent a pre-invitation notification describing the purpose of the survey approximately 2 weeks prior to the launch on July 19, 2016. HumRRO sent email invitations to three samples of survey participants in separate batches. The first batch was sent on July 19, the second batch on August 4, and the third batch on August 10. Reminder emails were sent at approximately 1 week intervals for the first and second samples. During the administration, respondents could submit requests for technical assistance or ask questions about the survey via email. Throughout the administration window, HumRRO staff monitored incoming emails, answered respondents' questions, and provided technical support (e.g., help with logging in and out, retrieving access codes). The data collection ended on August 17, 2016.

Survey Samples

Data Cleaning and Screening

HumRRO took several steps to ensure the information presented to the PTA Task Force represented valid responses from the target population. HumRRO, FSBPT, and the Oversight Panel followed an iterative process to identify and exclude low quality data, such as out-of-range responses, missing information, and abnormal response patterns (e.g., flat responding, hasty responding). First, HumRRO examined the raw data to identify outliers and unexpected responses. Next, we constructed tentative thresholds for flagging instances of unusable responses based on psychometric, structural, and substantive considerations (e.g., the likelihood of various response patterns across different sets of items).⁴ HumRRO reviewed the thresholds with FSBPT and the Oversight Panel to obtain their feedback and make adjustments.

⁴ We considered multiple factors in establishing the tentative thresholds, including the distribution of values in the data, estimates of reading speed, and completeness of each data record.

Following this discussion, HumRRO created a set of data filters to screen out response sets that contained problematic data. For example, data were excluded if a respondent selected the same rating for 90% or more of the KSR statements.

In addition to data quality checks, HumRRO examined several demographic variables to identify factors that could impact the validity of the results. For example, individuals lacking recent professional experience in the practice of physical therapy were excluded from analysis. Table 4 displays the results of the data screening analyses. It is important to note that a single respondent's data might be screened out for multiple reasons. The values in the "Total" row account for overlap across the data screens and identify the absolute number of cases that were excluded (i.e., no double-counting). A summary of analysis filters is presented in Appendix C.

Table 4. Summary of Data Quality Screening Analysis

Data Screen	PT WA		PTA WA		PT KSR		PTA KSR	
	A	B	A	B	A	B	A	B
Flat Responding	9	2	33	19	60	53	20	5
Hasty Responding	10	5	21	15	--	--	--	--
Missing 100% of responses	125	85	124	100	--	--	80	49
Employment Status								
Retired	0	0	5	7	15	12	2	0
Unemployed and <i>not</i> looking for work as a PT or PTA	4	7	37	44	61	68	8	10
Total	144	97	209	176	133	133	105	62

Note. Flat Responding includes individuals who selected the same response value an unreasonably-high number of times in a row. Hasty Responding includes individuals who completed the survey too quickly to have been paying much attention to the survey questions.

Response Rates and Final Analysis Sample

Table 5 summarizes the overall response rates for the 2016 practice analysis survey. The "Opened" count is the number of the people who opened the invitation email. The "Accessed" count is the number who clicked the URL and accessed the survey site. The "Started" count is the number who completed at least the background questions. The "Valid" count reflects the number of respondents who completed the entire survey and provided response data of acceptable quality. The "Percentage" values in the table use the "Accessed" count as the denominator. Thus, among the people who accessed the survey's web site, between 80 and 89 percent started the survey, and about 40% completed the entire survey and provided valid responses. The final analysis sample included data from 3,025 respondents across all survey forms.

Table 5. Survey Distribution and Response Rates

	Count (n)				Percentage (%)			
	WA		KSR		WA		KSR	
	PT	PTA	PT	PTA	PT	PTA	PT	PTA
Opened	7,367	4,849	18,905	8,499	--	--	--	--
Accessed	1,217	780	2,445	2,810	100	100	100	100
Started	1,086	695	1,985	2,254	89	89	81	80
Valid	501	322	1,036	1,166	41	41	42	41

Sample Description and Representativeness

Overall, respondents tended to be female (71-72%), White (74-78%), and employed full time (74-76%). Not surprisingly, there were differences between the WA and KSR survey samples attributable to respondents' experience level (i.e., entry-level versus experienced) and the inclusion of PTs and PTAs in the KSR survey sample. For instance, there were fewer PTA respondents to the KSR survey with a terminal Associate's degree compared to the WA survey sample (51% versus 84%). However, entry-level and experienced PTAs were matched on the percentage of time they spend in many practice settings (e.g., health and wellness, inpatient rehab, school system, skilled nursing). Both groups reported spending 31% of their time in skilled nursing and long-term care facilities (the largest percentage for any of the practice settings). That being said, entry-level PTAs reported spending a greater portion of their time in private outpatient office or group practice settings (25% versus 18%, on average) and slightly less time in home care (10% versus 13%).

Because there is no independent description of the population⁵, HumRRO asked the Oversight Panel and PTA Task Force to review the sample composition and identify unexpected outcomes and/or salient differences between the sample and their experience with the profession. The purpose of this review was to ascertain the extent to which the sample is representative of the broader population. For the vast majority of characteristics, the results were consistent with expectations. The most common questions raised by the expert groups concerned the relative distribution of respondents across location of entry-level PTA education and jurisdiction of primary clinical work setting.

Data Analysis

Analysis of the WA survey data involved computing descriptive statistics to examine the distribution and magnitude of respondents' ratings. For each WA statement, HumRRO computed the sample size (i.e., number of respondents who made a frequency and/or importance rating), mean frequency and importance ratings, standard deviations, and response percent (i.e., proportion of respondents indicating they perform the WA at least annually). Mean frequency ratings exclude respondents who selected the option "I don't know". Mean importance ratings include any respondent who provided an importance rating, even if they indicated they do not perform the activity.

For each KSR statement, HumRRO computed the sample size (i.e., number of respondents who provided an importance rating), mean importance ratings, standard deviation, and response percent (i.e., proportion of respondents reporting the knowledge or skill is important). Mean importance ratings exclude respondents who indicated the knowledge is not needed for entry-level practice.

Work Activity Survey Results

Results from the WA survey are generally consistent with prior studies of entry-level PTA practice—respondents rated most of the WAs as important for safe and effective care. In

⁵ Most licensing boards collect limited information about their licensees and, in general, only release information in support of official licensing board activity. Similarly, FSBPT collects limited data about applicants for licensure and is not in a position to collect information from these individuals after they pass the NPTE. APTA collects information about its members, but APTA members are not necessarily an accurate representation of the population of all licensees.

addition, 67% of the WAs are, on average, performed monthly or more frequently. Full results are presented in Appendix D.

Of the small portion (33%) of WAs that are performed on an infrequent basis (i.e., on average, a few times per year or less), many are considered important for entry-level practice. For example, activities related to patient/client safety (e.g., performing first aid, reporting suspected cases of abuse or illegal/unethical acts) are performed infrequently, yet PTAs view these activities as very important for safe and effective practice ($\bar{X} = 4.01$ to 4.38). The six WAs that received low frequency ($\bar{X} \leq 1.50$) and low importance ($\bar{X} \leq 2.50$) ratings were similar to WAs rated low in prior studies (e.g., performing and/or training patient/client/caregiver in nonselective debridement, hyperbaric therapy, or paraffin bath thermotherapy).

Analysis of the results by subgroup suggests that the type of facility in which respondents spend their time had an impact on their ratings. For example, PTAs who spend a large portion of their time in acute care hospital settings tended to provide significantly higher importance ratings for WAs related to data collection (e.g., performing tests of perfusion and gas exchange, arousal and orientation, attention and cognition, communication, and recall). PTAs who spend more time in private outpatient settings tended to rate the importance of WAs related to manual therapy techniques higher than their peers in the sample.

Knowledge and Skill Requirements Survey Results

Results from the 2016 KSR survey are similar to those obtained from prior studies. Nearly all (99%) of the KSRs were rated as important for entry-level practice. Of these, 44% received average ratings greater than 4.00 (on a 5-point scale), indicating that respondents believe the KSRs are very or extremely important for providing safe and effective care. Full results are presented in Appendix E.

Two statements received mean importance ratings less than 2.50, meaning respondents believed the KSRs were not important for entry-level practice (“Knowledge of pharmacological management of the gastrointestinal system” and Knowledge of pharmacological management of the genitourinary system”). These statements are consistent with results from the previous practice analysis study.

Seven KSRs received mean ratings between 2.50 and 2.75, suggesting that the knowledge described by these statements may not be relevant to all entry-level PTAs. These statements are shown below.

- Knowledge of non-pharmacological medical management of the lymphatic system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)
- Knowledge of gastrointestinal system tests/measures, including outcome measures, and their applications according to current best evidence (e.g., bowel dysfunction impact questionnaires, Murphy test, Rovsing test, McBurney point sign)
- Knowledge of non-pharmacological medical management of the gastrointestinal system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)
- Knowledge of genitourinary system tests/measures, including outcome measures, and their applications according to current best evidence

- Knowledge of anatomy and physiology of the genitourinary system as related to tests/measures
- Knowledge of genitourinary system diseases/conditions and their pathophysiology to carry out the established plan of care
- Knowledge of non-pharmacological medical management of the genitourinary system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)

Interrater Consistency and Agreement

Two types of intraclass correlation coefficients (ICCs; McGraw & Wong, 1996; Shrout & Fleiss, 1979) were computed to estimate the degree of consistency and agreement among the survey respondents. In this context, consistency refers to the similarity of the pattern of ratings among the respondents (e.g., Task X is more important than Task Y and less important than Task Z). Agreement indicates the extent to which the respondents' ratings are exactly the same (e.g., Rater A and Rater B rated Task X as Extremely Important). Thus, agreement estimates are more stringent, requiring exact agreement across respondents.

Consistency and agreement ICCs estimated for a single rater (1-Rater) and for the average number of raters (Observed) are reported in Table 6. The single rater estimates can be interpreted as the level of consistency (or agreement) to be expected between the ratings provided by any single rater with any other randomly selected single rater. The Observed estimates indicate the degree of consistency (or agreement) to be expected between the average among the sample of survey participants and the average that would be obtained if another random sample were to be drawn from the population. In other words, if the study were repeated with another set of similarly sized samples, there is a strong expectation that the same results would be obtained. Because all the Observed estimates are at or near .99 (after rounding to two decimal places), it can be concluded that the data are highly consistent across raters and strengthen confidence in the results. The Observed ICCs are probably slightly lower when looking at results for subgroups of participants because of the reduced sample sizes.

Table 6. Estimates of Inter-rater Reliability and Agreement

Rating Scale/Exam Category	Number of Items	Type of ICC			
		Consistency		Agreement	
		1-Rater	Observed	1-Rater	Observed
WA Frequency					
Form A	99	.32	>.99	.24	>.99
Form B	98	.49	>.99	.33	>.99
WA Importance					
Form A	99	.35	.99	.26	.99
Form B	98	.26	.98	.20	.98
KSR Importance					
Form A	66	.52	>.99	.34	.99
Form B	68	.36	.99	.27	.98

Note. Consistency and agreement ICCs estimated for a single rater (1-Rater) and for the total number of raters (Observed).

Subject Matter Expert Review and Establishment of Test Blueprints

Oversight Panel Review

The Oversight Panel convened on August 21-22, 2016 to review the survey results, provide guidance regarding the rules for determining WA and KSR criticality, and identify special topics that require further investigation (e.g., analyses of specific breakout groups). The Panel reviewed the results of the demographic survey and discussed the makeup of the sample. They identified several subgroup characteristics that might influence the results, including practice setting (e.g., acute care hospital, skilled nursing facility) and age of the population served (e.g., 18 to 64, 65 and over).

Next, the Panel reviewed the results of the WA and KSR surveys. Because the surveys included an “oversampling” of WAs and KSRs that might be required of entry-level PTAs, the Panel provided recommendations for the establishment of a threshold to identify WAs and KSRs that are critical for safe and effective entry-level practice. To support their judgments, HumRRO calculated tentative “criticality indices” for each survey.

WA Survey

- 25% or more of the respondents perform the WA at least annually
- The average importance rating is greater than or equal to 2.50

KSR Survey

- The average importance rating is greater than or equal to 2.50

The Panel considered the conceptual meaning of the indices as well as the impact that parameter adjustments would have on the inclusion/exclusion of WAs and KSRs (e.g., decreasing the average importance rating threshold to 2.00). Ultimately, the Panel recommended the tentative cut-off values to identify WAs and KSRs that are critical for entry-level practice. Figures 2 and 3 illustrate the criticality indices recommended for the WA and KSR surveys. Both indices were subsequently reviewed by the Task Force.

For certain WAs and KSRs, the Oversight Panel identified specific issues they believed should be addressed by the Task Force, such as whether the frequency ratings indicated that a WA is trending out of practice. In addition, the Panel provided suggestions regarding the process and materials planned for the blueprint weighting exercise.

Task Force Review

The PTA Task Force convened on September 9-10, 2016 to review the survey results and establish new content area weights for the NPTE test blueprint. To begin, the Task Force reviewed the demographic results and discussed potential trends in the profession at large, such as how practice setting influences the work performed by entry-level PTAs. Next, the Task Force reviewed with the WA survey results and the criticality values recommended by the Oversight Panel. HumRRO and FSBPT facilitated a discussion with the Task Force to decide which WAs should be included in the content outline, with attention given to WAs that were near the criticality threshold. A similar procedure was followed with the KSR survey results to determine which KSRs should be included in the NPTE content outline.

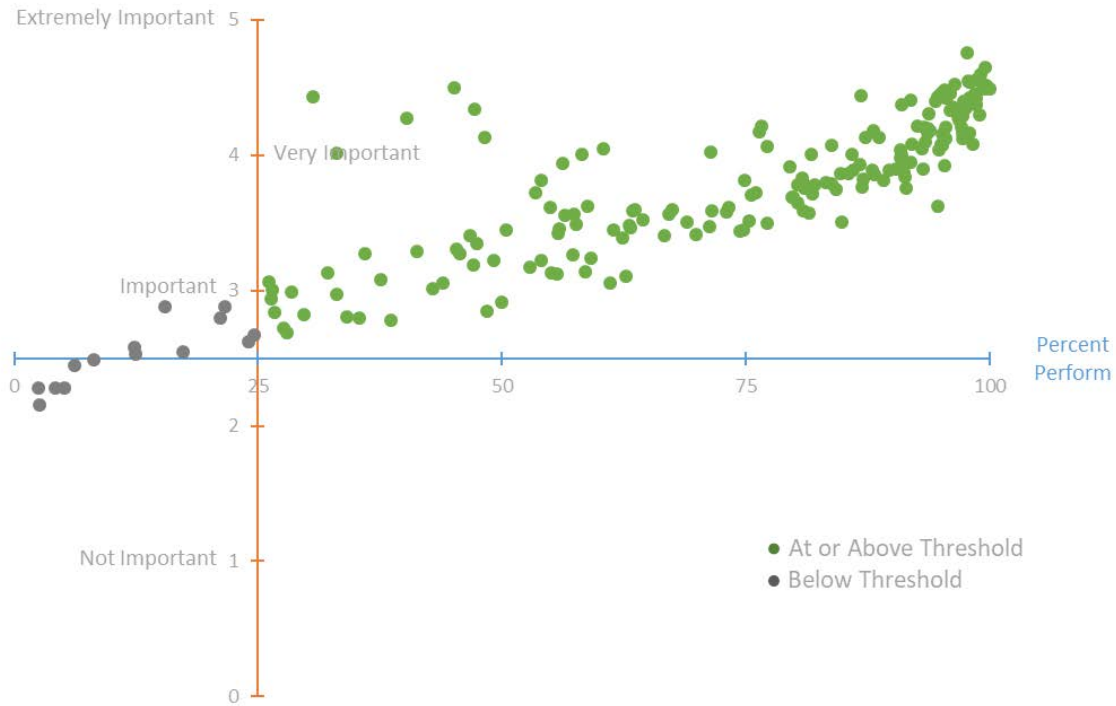


Figure 2. Graphic Depiction of the Work Activity Criticality Index

Note. Axes cross at the cutoff threshold values: x-axis (25% perform); y-axis (Importance mean=2.50)

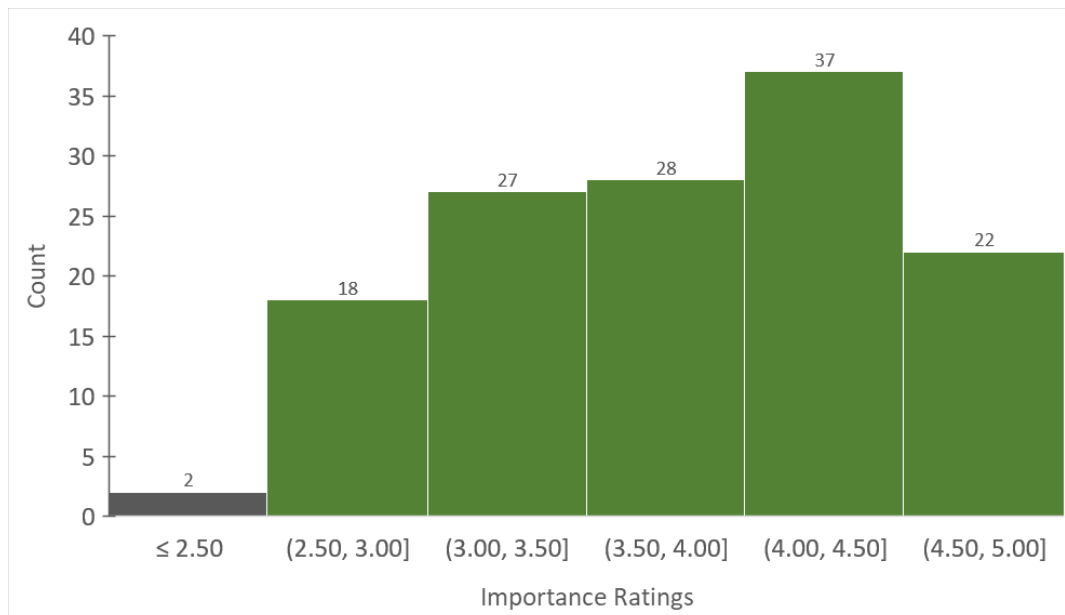


Figure 3. Graphic Depiction of the Knowledge and Skills Requirements Criticality Index

The final activity of the meeting was to establish new content weights for the PTA examination blueprint. Task Force members were instructed to independently assign the *number of items* that should be allocated for each content domain on the blueprint. Content domains include the eight body systems; System Interactions; Equipment, Devices, & Technologies; Therapeutic Modalities; Safety & Protection; Professional Responsibilities; and Research & Evidence-Based Practice. When making their judgments, they were reminded to consider the following pieces of information.

- Demographic questionnaire results
- The number and variety of WAs
- The depth and breadth of knowledge within each content domain (i.e., number of statements, level of specificity)
- Empirical weights based on the KSR ratings alone⁶
- Their own experience and knowledge of the profession
- The numbers assigned in the previous content outline

Next, a similar process was followed to assign numbers of items to the subcategories within each body system (i.e., Physical Therapy Examination; Foundations for Evaluation, Differential Diagnosis and Prognosis; and Interventions). Judgments were submitted and entered into a spreadsheet that was projected for the group to see. The PTA Task Force discussed the results, noting the range of points allocated to each area, and providing a rationale for their decisions. After the initial ratings were obtained, the empirical weights were provided as a point of comparison. If a Task Force member's point allocations were much lower than the number of items derived from the empirical weight for a given area, discussion was facilitated to understand why the difference occurred (e.g., assumptions, emerging professional issues).

Throughout the discussion, the Task Force was encouraged to work toward consensus, but individual members were allowed to disagree if they felt strongly about a particular topic or issue. Once the discussion was complete, Task Force members were instructed to make a second round of judgments to adjust their initial ratings up or down, or keep them the same. Final judgments were submitted and content weights were calculated based on the average of the point values allocated for each content domain and subcategory.

Critical and Non-Critical Work Activities for Entry-level PTA Practice

Of the 197 WAs included on the occupational survey, six failed to meet the criticality threshold and five were considered “borderline” (i.e., met the threshold for one of the criticality criteria—frequency or importance). The PTA Task Force identified 176 WAs (89%) as critical for entry-level PTA practice. Two borderline WAs were retained by the PTA Task Force because the potential for compromising patient safety is high if the activities are performed incorrectly. These WAs are shown below.

- Perform and/or train patient/client/caregiver in nonselective debridement (e.g., removal of nonselective areas of devitalized tissue)

⁶ Empirical weights are derived from a purely statistical approach using only the results of the practice analysis survey. The weights were computed by taking the sum of importance ratings for a given content domain, excluding any statements that did not meet the minimum threshold, and dividing it by the sum of importance ratings across the entire set of KSR statements.

- Apply and/or train patient/client/caregiver in intermittent pneumatic compression

Nine WAs that met the criticality threshold were flagged for omission because they are trending out of practice, not entry-level, and/or not exclusively PTA activities (i.e., patients or other non-PTA practitioners perform them). Table 7 displays the WAs that were deemed not critical to entry-level PTA practice by the PTA Task Force. In general, the WAs omitted in the current study mirror those activities deemed not critical in 2011, and for similar reasons. Three WAs were deemed non-critical in 2011 that were retained by the PTA Task Force in 2016. These are “Perform nonselective debridement”, “Perform ultraviolet light procedures”, and “Train patient/client in intermittent pneumatic compression”.

Table 7. Work Activities Deemed Not Critical

DATA COLLECTION	
Tests & Measures: <i>Anthropometric</i>	
Perform tests and measures of...	
...body composition (e.g., percent body fat, lean muscle mass)	The Task Force suggested that the underlying knowledge of this activity is needed for educating patients, but the work activity is not as important and this activity could be performed in many settings other than rehabilitation.
Tests & Measures: <i>Reflex Integrity</i>	
Perform tests and measures of...	
...superficial reflexes and reactions (e.g., cremasteric reflex, abdominal reflexes)	The Task Force felt this was not an entry-level activity.
INTERVENTIONS	
Procedural Interventions: <i>Manual Therapy Techniques</i>	
Perform manual lymphatic drainage	The Task Force felt this was not an entry-level activity.
Perform instrument-assisted soft tissue mobilization	The Task Force felt this was not an entry-level activity.
Perform peripheral mobilization/manipulation (thrust)	The Task Force felt this was not an entry-level activity. Additionally, this activity is not allowed in some states.
Perform spinal mobilization/manipulation (thrust)	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.
Apply taping for...	
...lymphatic drainage	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force. While the survey responses suggest that this activity is trending up from the 2011 survey, the Task Force felt that the evidence was not quite compelling enough to include the activity on the NPTE yet.

Table 7. (Continued)

Procedural Interventions: <i>Equipment and Devices</i>	
Apply and/or adjust...	
...mechanical neuromuscular reeducation devices/technologies (e.g., weighted vests, therapeutic suits, body weight supported treadmill, robotic exoskeletons)	The Task Force felt this was not an entry-level activity.
Train patient/client/caregiver in the use of...	
...mechanical neuromuscular re-education devices/technologies (e.g., weighted vests, therapeutic suits, body weight supported treadmill, robotic exoskeletons)	The Task Force suggested this activity be excluded based on the fact that this activity is highly equipment dependent (if the equipment is not available, the work activity will not be performed).
Procedural Interventions: <i>Integumentary Repair & Protection Techniques</i>	
Perform and/or train patient/client/caregiver in...	
...selective enzymatic or autolytic debridement (e.g., removal of specific areas of devitalized tissue)	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.
...sharp debridement (e.g., removal of specific areas of devitalized tissue)	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force. The Task Force noted that some practice acts do not allow this activity to be provided by a PTA.
...hyperbaric therapy	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.
...negative pressure wound therapy	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force. The Task Force felt this activity is probably being done by other clinicians (not PTAs).
Procedural Interventions: <i>Therapeutic Modalities</i>	
Perform and/or train patient/client/caregiver in...	
...hydrotherapy using contrast baths/pools	The Task Force suggested that this activity be excluded based on the fact that this activity is trending down compared to the 2011 survey.
...phototherapy (laser light)	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.
...monochromatic infrared agent procedures (e.g., light emitting diodes [LEDs])	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.

Table 7. (Continued)

...dry heat thermotherapy (e.g., Fluidotherapy)	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force. The Task Force suggested that general principles of superficial heat will be covered by other areas and there are limited unique safety issues with this activity.
...diathermy	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.
...shockwave therapy	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.
Non-procedural Interventions: Research & Evidence-Based Practice	
Design and/or direct research activities	This activity was excluded based on the empirical decision rule of the survey responses and the agreement of the Task Force.
Participate in research activities	The Task Force felt this should be excluded because this is infrequently performed and related knowledge will be covered by other work activities.

Knowledge and Skill Requirements Results

There is a direct link between the KSRs and the test blueprint for the licensure examination. As such, a key task for the PTA Task Force was to make decisions regarding which KSRs would be included on the NPTE content outline. Of the 134 KSR statements appearing on the survey, two failed to meet the criticality threshold (i.e., mean importance of at least 2.50) and seven were considered borderline (i.e., mean importance between 2.50 and 2.75). Ultimately, the PTA Task Force identified 123 (92%) as critical for entry-level PTA practice. One statement that did not meet the criticality threshold (“Knowledge of pharmacological management of the gastrointestinal system” was retained by the PTA Task Force because knowledge of the impact of pharmaceuticals on these systems is necessary for making safe and effective treatment decisions.

In the 2011 practice analysis, three statements were deemed not critical for entry-level PTAs. These were “Knowledge of pharmacological management of the lymphatic system”, “Knowledge of applications, indications, contraindications, and precautions of light modalities (e.g., laser, infrared, ultraviolet)”, and “Knowledge of applications, indications, contraindications, and precautions of hydrotherapy (e.g., pulsed lavage, whirlpool)”. In the current analysis, the PTA Task Force also dropped knowledge related to light modalities but retained knowledge pertaining to pharmacological management of the lymphatic system. The third KSR dropped in 2011 was not included on the 2016 survey because it is already covered by KSRs related to integumentary system interventions.

Three statements were dropped this time that were not dropped in 2011. These are “Knowledge of non-pharmacological medical management of the lymphatic system”, “Knowledge of pharmacological management of the genitourinary system”, and “Knowledge of the applications, indications, contraindications, and precautions of diathermy”. The Task Force argued for the removal of these statements because they did not meet the empirical decision rule or the WAs for which the knowledge would be needed had also been deemed not critical. Table 8 displays KSR statements excluded from the NPTE content outline.

Table 8. KSR Statements Excluded from NPTE Content Outline

LYMPHATIC SYSTEM: Diseases/Conditions that Impact Effective Treatment	
Non-pharmacological medical management of the lymphatic system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	The Task Force suggested this knowledge be excluded based on the empirical decision rule and because it may not be entry level.
GASTROINTESTINAL SYSTEM: Physical Therapy Data Collection	
Gastrointestinal system tests/measures, including outcome measures, and their applications according to current best evidence (e.g., bowel dysfunction impact questionnaires, Murphy test, Rovsing test, McBurney point sign)	The Task Force suggested this knowledge be excluded based on the empirical decision rule and because it may not be entry level and may require specialized knowledge.
Anatomy and physiology of the gastrointestinal system as related to tests/measures	The Task Force suggested this knowledge be excluded because it may not be entry level and may require specialized knowledge.
Movement analysis as related to the gastrointestinal system (e.g., obturator, psoas, positioning for bowel movement)	The Task Force suggested this knowledge be excluded because it may not be entry level and may require specialized knowledge.
GENITOURINARY SYSTEM: Physical Therapy Data Collection	
Genitourinary system tests/measures, including outcome measures, and their applications according to current best evidence	The Task Force suggested this knowledge be excluded based on the empirical decision rule and because it may not be entry level.
Anatomy and physiology of the genitourinary system as related to tests/measures	The Task Force suggested this knowledge be excluded based on the empirical decision rule and because it may not be entry level.
GENITOURINARY SYSTEM: Diseases/Conditions that Impact Effective Treatment	
Pharmacological management of the genitourinary system	The Task Force suggested this knowledge be excluded based on the empirical decision rule and because it may have limited applicability.
THERAPEUTIC MODALITIES	
Applications, indications, contraindications, and precautions of: ...light modalities (e.g., laser light therapy, LED light therapy) ...diathermy	The Task Force suggested this knowledge be excluded because the related work activities were excluded. The Task Force suggested this knowledge be excluded because the related work activities were excluded.

Table 8. (Continued)

TEACHING & LEARNING THEORIES ^a	
Teaching and learning theories and techniques	The Task Force suggested this knowledge is encompassed by multiple knowledge areas that are included throughout the content outline and doesn't require an individual statement.
Health behavior change models (e.g., social cognitive theory, health belief model)	The Task Force suggested this knowledge is encompassed by multiple knowledge areas that are included throughout the content outline and doesn't require an individual statement.
Communication methods and techniques (e.g., motivational interviewing, health information brochures/handouts, feedback techniques)	The Task Force suggested this knowledge is encompassed by multiple knowledge areas that are included throughout the content outline and doesn't require an individual statement.

^a *The Task Force acknowledged that teaching is an integral component of PTA work but knowledge of specific theories, models, methods, and techniques related to teaching and learning is specialized, falling more in the domain of learning and development occupations (e.g., trainers, instructional designers).*

The final list of KSRs included in the NPTE content outline can be found in Appendix G. It was this list that served as the basis for the blueprint exercise.

Final Test Blueprint Categories and Weights

Table 9 presents the final test blueprint as adopted by the Oversight Panel. Appendix H includes descriptions of these blueprint categories. The first column of Table 9 presents the broad (system) level topic area and the sub-system level topic areas. The second column indicates the target percentage of the test that will be represented by test questions in each topic area. For example, 15.8% of the test will consist of items representing knowledge of the Cardiovascular/Pulmonary System. The 28.8% for Cardiovascular/Pulmonary System: Physical Therapy Examination indicates that just under one-third of the Cardiovascular/Pulmonary System will be represented by knowledge of Physical Therapy Examination.

The third column indicates the target number of items that will be drawn from each topic area. At the system level, the target number of items is the product of 200 (the total number of scored questions on the NPTE) and the percentage weight, rounded to the nearest integer. The sub-system weights are the product of 150, the system percentage weight, and the sub-system percentage weight, rounded to the nearest integer.

The final column in Table 9 indicates a suggested range around the target number of items to be drawn from each topic area on each assembled test form. Several options for establishing item ranges were explored to provide FSBPT and the FSBPT exam committees some flexibility in assembling test forms, while ensuring that form-to-form differences in the number of items drawn from each topic area would not be excessive.

Table 9. PTA Test Blueprint

Content Domain	%	Items	Range
CARDIOVASCULAR/PULMONARY SYSTEM	15.8	24	21 – 26
Physical Therapy Examination	28.8	7	6 – 8
Foundations for Evaluation, Differential Diagnosis and Prognosis	28.5	7	6 – 7
Interventions	42.6	10	9 – 11
MUSCULOSKELETAL SYSTEM	25.8	39	36 – 41
Physical Therapy Examination	32.6	13	12 – 14
Foundations for Evaluation, Differential Diagnosis and Prognosis	27.0	10	9 – 11
Interventions	40.4	16	15 – 16
NEUROMUSCULAR & NERVOUS SYSTEM	20.8	31	28 – 34
Physical Therapy Examination	28.8	9	8 – 10
Foundations for Evaluation, Differential Diagnosis and Prognosis	28.5	9	8 – 10
Interventions	42.7	13	12 – 14
INTEGUMENTARY SYSTEM	4.9	7	5 – 10
Physical Therapy Examination	31.7	2	2 – 3
Foundations for Evaluation, Differential Diagnosis and Prognosis	27.2	2	1 – 3
Interventions	41.1	3	2 – 4
METABOLIC & ENDOCRINE SYSTEMS	4.0	6	5 – 7
Foundations for Evaluation, Differential Diagnosis and Prognosis	53.8	3	3 – 4
Interventions	46.2	3	2 – 3
GASTROINTESTINAL SYSTEM	1.5	2	0 – 4
Foundations for Evaluation, Differential Diagnosis and Prognosis	50.0	1	0 – 2
Interventions	50.0	1	0 – 2
GENITOURINARY SYSTEM	1.5	2	0 – 4
Foundations for Evaluation, Differential Diagnosis and Prognosis	50.0	1	0 – 2
Interventions	50.0	1	0 – 2
LYMPHATIC SYSTEM	2.7	4	3 – 6
Physical Therapy Examination	35.4	1	1 – 2
Foundations for Evaluation, Differential Diagnosis and Prognosis	29.3	1	1 – 2
Interventions	35.4	1	1 – 2
SYSTEM INTERACTIONS	3.9	6	5 – 7
Foundations for Evaluation, Differential Diagnosis and Prognosis	3.9	6	5 – 7
EQUIPMENT, DEVICES, & TECHNOLOGIES	5.6	8	7 – 9
THERAPEUTIC MODALITIES	6.5	10	9 – 11
SAFETY & PROTECTION	3.4	5	4 – 6
PROFESSIONAL RESPONSIBILITIES	2.4	4	3 – 4
RESEARCH & EVIDENCE-BASED PRACTICE	1.4	2	2 – 3

Note. Values in the “%” column may not appear to sum to 100% due to rounding.

Linkage Exercise: Process and Results

As noted earlier, the lists of WAs and KSRs that appeared on the practice analysis survey were generated by the PTA Task Force, with support from the Oversight Panel. While there is an assumed relationship between the WAs and KSRs (i.e., for each WA there is a corresponding set of KSRs), an additional activity was carried out to establish a formal link between them. The activity, called a linkage exercise, provides additional content validity evidence for the PTA

licensure exam by ensuring that the knowledge areas tested on the exam are necessary for the successful performance of critical activities. Results of this exercise can also be used to guide item writers on the appropriate content to be assessed.

FSBPT recruited participants for this activity. Participants included PTA Task Force members and additional SMEs presenting a wide range of practice settings, demographics, and geographic locations. Participants were asked to rate which KSRs are required to perform each WA effectively using a dichotomous “required” versus “not required” scale. The total number of judgments needed was very large (i.e., 19,800; 180 WAs by 110 KSRs). In 2011, every judgement in the combined matrix was based on five SME’s ratings. To minimize the burden on each participant, the linkage matrix was divided by content domain into 117 parts so that each of the 10 SME linked approximately 11 KSRs to approximately 18 WAs.

The exercise was adapted to incorporate linkage information obtained during the 2011 practice analysis linkage exercise. In the first step, participants reviewed the 2011 linkage results and either confirmed the linkages or provided new ratings. For the 19 WAs and 8 KSRs that were new or significantly revised in 2016, participants were asked to provide novel judgments. All ratings from 2011 that were confirmed by this group were considered final and complete. Ratings that were identified as possibly erroneous, as well as ratings of the new or revised statements, were reviewed by a second group of participants. Linkages for which two or more raters disagreed were rated by a third participant.

Few linkage ratings changed since 2011. Of the 19,800 ratings obtained, only 712 (4%) were adjusted. The revised linkages tended to cluster around an individual WA or KSR. For example, 37 linkages related to the KSR “Standards of billing, coding, and reimbursement” were revised, and 32 linkages related to “Factors influencing safety and injury prevention (e.g., safe patient handling, fall prevention, equipment maintenance, environmental safety)” were revised. Each WA and KSR had at least four linkages. Because the linkage results would require many pages to print, they are provided to FSBPT in a separate file.

Summary and Final Remarks

The new test blueprints are highly similar to the blueprints developed in 2011. The general organizing framework of the existing test blueprint was carried forward and maintained throughout this process. The majority of the changes are quantitative (i.e., some areas will carry slightly more weight than they do now, while other areas will carry slightly less weight). For a comparison of the number of scored questions drawn from each content area under the existing and new test blueprints, see Table 10 on the next page. The most salient structural change involved separating the Cardiovascular/Pulmonary & Lymphatic System into two distinct content domains. When the revised blueprint is implemented in 2018, knowledge related to the Lymphatic System, including examination, evaluation, differential diagnosis and prognosis, and interventions, will be covered as a stand-alone content domain.

In closing, the 2016 PTA practice analysis update resulted in a NPTE blueprint that is a valid representation of entry-level PTA requirements that are testable on a well-constructed multiple-choice examination. The updated test blueprint reflects the input of a large and representative sample of practitioners and the careful review and consideration by stakeholder groups.

Table 10. Comparison of New and Existing PTA Test Blueprints

Content Domain	# Items 2018-2022	# Items 2013-2017
CARDIOVASCULAR/PULMONARY SYSTEM*	24	25
Physical Therapy Examination	7	7
Foundations for Evaluation, Differential Diagnosis and Prognosis	7	8
Interventions	10	10
MUSCULOSKELETAL SYSTEM	39	39
Physical Therapy Examination	13	13
Foundations for Evaluation, Differential Diagnosis and Prognosis	10	11
Interventions	16	15
NEUROMUSCULAR & NERVOUS SYSTEM	31	33
Physical Therapy Examination	9	9
Foundations for Evaluation, Differential Diagnosis and Prognosis	9	10
Interventions	13	14
INTEGUMENTARY SYSTEM	7	7
Physical Therapy Examination	2	2
Foundations for Evaluation, Differential Diagnosis and Prognosis	2	2
Interventions	3	3
METABOLIC & ENDOCRINE SYSTEMS	6	6
Foundations for Evaluation, Differential Diagnosis and Prognosis	3	4
Interventions	3	2
GASTROINTESTINAL SYSTEM	2	2
Foundations for Evaluation, Differential Diagnosis and Prognosis	1	1
Interventions	1	1
GENITOURINARY SYSTEM	2	2
Foundations for Evaluation, Differential Diagnosis and Prognosis	1	1
Interventions	1	1
LYMPHATIC SYSTEM*	1	--
Physical Therapy Examination	1	--
Foundations for Evaluation, Differential Diagnosis and Prognosis	1	--
Interventions	1	--
SYSTEM INTERACTIONS	6	5
Foundations for Evaluation, Differential Diagnosis and Prognosis	6	5
EQUIPMENT, DEVICES, & TECHNOLOGIES	8	10
THERAPEUTIC MODALITIES	10	12
SAFETY & PROTECTION	5	4
PROFESSIONAL RESPONSIBILITIES	4	3
RESEARCH & EVIDENCE-BASED PRACTICE	2	2

*Prior to 2017, Lymphatic System was combined with Cardiovascular/Pulmonary System. The exact number of items that measured knowledge of the Lymphatic System is not known.

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Appendices

Appendix A. Oversight Panel, Task Force, and Policy Group Members

Oversight Panel

- Rebecca Porter, PT, PhD
- Robert Friberg, PT, PhD
- Mary Jane Rapport, PT, DPT, PhD
- Christine Nikki Snyder, PT, DPT, OCS, CSCS
- Linda Carlson, PT
- Kelly King, PT, MA
- Susan Howard, PT, MEd
- Janice Haas, PTA, MS

PTA Task Force

- Anthony Kadenzy, PTA
- Barbara Behrens, PTA
- Brad Thuringer, PTA
- Bruce Danner, PTA
- Carol Sawyer, PT
- Jennifer Whitney, PT
- Jerrold Hess, PTA
- Kellie Johnson, PTA
- Leona Rodriguez, PT
- Liyongo Tolin, PT
- Melissa Ramos, PTA
- Mike Little, PT
- Rick Young, PTA
- Tawny Chamberlain, PTA

Policy Group

- Harvey Aikman (PT Licensing Board Member)
- Peggy Hunter (PTA Licensing Board Member)
- Thomas Herrmann (PT Educator)
- Scott Thompson (PTA Educator)
- Kristen Carlblom (PT Clinician)
- Amy Newton (PTA Clinician)
- Becky Porter (Practice Analysis Oversight Task Force Member – PT)
- Jan Haas (Practice Analysis Oversight Task Force Member – PTA)
- Anne Reicherter (Representative from the American Physical Therapy Association)
- Gary Chleboun (Representative from the American Council of Academic Physical Therapy)
- Claire Peel (Representative from the Commission on Accreditation in Physical Therapy Education – PT)
- Lucinda (Cindy) Mihelich (Representative from the Commission on Accreditation in Physical Therapy Education – PTA)
- Scott Oppler (Observer from the NPTE Technical Advisory Panel)
- Dave Relling (FSBPT Board liaison)
- Lorin Mueller (FSBPT Staff)
- Richard Woolf (FSBPT Staff)
- Colleen Lettvin (FSBPT Staff)
- Gordon Waugh (HumRRO Staff)

Appendix B. Survey Invitation Letter

FSBPT Practice Analysis Survey

The Federation of State Boards of Physical Therapy (FSBPT) invites you to complete a survey of physical therapy practice. Your input will help define the entry level competence standards for PTs and PTAs, including developing standards for the National Physical Therapy Examinations (NPTE).

The information you provide in this survey is confidential; it will not be released and will be reviewed only when statistically summarized with the responses of others.

We expect that it will take approximately 20 minutes to complete the survey.

To access the survey, click the link below, or copy and paste the link into the navigation bar of your Web browser. If you prefer to complete the survey in multiple sessions, use the link below to log back in to the survey.

Appendix C. Filter Variables Summary

Flat Responding

Respondent selected the same response across 90% or more of the statements. The analysis evaluates the number of times respondent selected each response option (i.e., rating scale point) and divides that by the total number of statements on the survey.

Hasty Responding

Respondent's average time spent rating each statement is less than the expected average time to read the statements. Respondent's average time is calculated as the total elapsed time on survey divided by the number of statements the respondent completed. The expected average time is based on the optimal college-level reading rate (4.16 words per second; Anderson, N. J. [2008]) and the average number of words per statement, per form.

Table C1. Hasty Responding Rate Estimation

	PT WA		PTA WA		PT KSR		PTA KSR	
	A	B	A	B	A	B	A	B
Number of statements	120	120	99	98	75	76	66	68
Average words per statement	10.27	9.81	5.77	4.06	12.17	12.69	5.96	5.01
Expected reading rate	2.47	2.36	1.39	0.97	2.93	3.05	1.43	1.20

Note. Expected reading rate values represent the mean elapsed time (in seconds) to read each statement.

Missing 100% of responses

Respondent did not provide ratings to any item.

Employment Status

Respondent selected "Retired" or "Unemployed and not looking for work as a PT or PTA" when responding to "What is your employment status as a physical therapist?"

Appendix D. Work Activity Survey Results

Table D1. PTA WA Descriptive Statistics

	n	M	SD	%Perf	n	M	SD	%Imp
DATA COLLECTION								
Information Gathering & Synthesis								
Interview patients/clients, caregivers, and family to obtain patient/client history and current information (e.g., medical, surgical, medications, social, cultural, language preference, economic) to...								
...review prior and current level of function	284	3.37	1.29	93.3	263	4.21	0.84	96.2
...establish general health status	282	3.37	1.34	92.6	259	4.21	0.85	96.1
...identify red flags (e.g., fever, malaise, unexplained weight change) and contraindications	286	3.46	1.27	94.4	263	4.40	0.81	96.6
...identify patient/client's, family/caregiver's goals, values, and preferences	286	3.34	1.22	95.1	262	4.16	0.83	95.8
...determine impact of medications on plan of care (e.g., medication reconciliation, timing of intervention delivery, adherence)	285	2.98	1.38	90.9	262	3.98	0.96	92.4
Administer standardized questionnaires (e.g., pain inventory, falls scale)	286	3.34	1.45	93.0	264	4.05	0.92	93.6
Review medical records (e.g., lab values, diagnostic tests, imaging, specialty reports, narrative, consults, physical therapy documentation) prior to carrying out the PT plan of care	288	3.66	1.15	98.6	268	4.42	0.76	97.8
Gather information/discuss patient/client's current health status with interprofessional/interdisciplinary team members	288	3.58	1.12	97.6	267	4.35	0.77	98.1
Identify signs/symptoms of change in patient/client's health status that require intervention by physical therapist	288	3.65	1.07	99.3	266	4.52	0.65	98.9
Identify signs/symptoms of change in patient/client's health status that require intervention by interprofessional/interdisciplinary team members	285	3.35	1.23	97.9	263	4.40	0.75	98.1
Systems Review								
Check patient/client's current affect, cognition, communication, and learning preferences (e.g., ability to make needs known, consciousness, orientation, expected emotional/behavioral responses)								
Recognize changes in status of the...								
...patient/client's quality of speech, hearing, and vision (e.g., dysarthria, pitch/tone, use of corrective lenses, use of hearing aids)	244	3.32	1.39	93.9	228	4.18	0.84	96.1
...vestibular system (e.g., dizziness, vertigo)	246	3.22	1.32	95.5	232	4.21	0.77	97.4
...gastrointestinal system (e.g., difficulty swallowing, nausea, change in appetite/diet, change in bowel function)	243	2.80	1.51	89.7	227	3.89	0.94	93.4
...genitourinary system (e.g., changes in bladder function, catheter complications)	242	2.39	1.62	81.0	215	3.78	1.07	88.8
...reproductive system (e.g., sexual and/or menstrual dysfunction, menopause status)	233	0.85	1.36	38.6	196	2.78	1.42	54.1
...cardiovascular/pulmonary system (e.g., blood pressure, heart rate, respiration rate)	245	3.60	1.21	98.0	231	4.54	0.63	99.6
...lymphatic system (e.g., primary and/or secondary edema)	245	3.04	1.30	95.1	230	4.07	0.91	95.2
...integumentary system (e.g., presence of scar formation, skin integrity, discoloration)	246	3.45	1.20	98.0	232	4.16	0.83	94.8
...musculoskeletal system (e.g., gross symmetry, strength, range of motion)	246	4.16	0.87	99.6	233	4.52	0.62	99.6
...neuromuscular system (e.g., gross coordination, motor function, balance, locomotion, gross sensory function)	237	4.00	0.89	100.0	223	4.49	0.63	99.6

	n	M	SD	%Perf	n	M	SD	%Imp
Tests & Measures								
Cardiovascular/Pulmonary								
Perform tests and measures of...								
...cardiovascular function (e.g., blood pressure, heart rate, heart sounds)	223	3.31	1.35	96.0	210	4.33	0.83	96.7
...pulmonary function (e.g., respiratory rate, breathing patterns, breath sounds, chest excursion)	222	2.62	1.63	83.8	200	4.08	0.98	90.5
...perfusion and gas exchange (e.g., airway protection, oxygen saturation)	224	2.76	1.84	77.2	197	4.07	1.09	91.4
...peripheral circulation (e.g., capillary refill, blood pressure in upper versus lower extremities)	223	1.55	1.60	61.4	182	3.45	1.19	78.0
...critical limb ischemia (e.g., peripheral pulses, skin perfusion pressure)	219	1.44	1.43	63.0	178	3.48	1.17	76.4
...physiological responses to position change (e.g., orthostatic hypotension, skin color, blood pressure, heart rate)	224	2.92	1.46	92.0	206	4.08	0.92	93.2
...aerobic capacity under maximal and submaximal conditions (e.g., endurance, exercise tolerance, metabolic equivalents, perceived exertion)	223	2.47	1.69	79.8	197	3.69	1.18	82.7
Anthropometric								
Perform tests and measures of...								
...body composition (e.g., percent body fat, lean muscle mass)	224	0.58	1.12	27.7	161	2.72	1.39	52.8
...body dimensions (e.g., height, weight, girth, limb length, head circumference/shape)	225	1.30	1.32	62.7	183	3.10	1.22	68.3
Quantify and qualify edema (e.g., pitting, volume, circumference)	224	2.03	1.35	84.8	202	3.51	1.02	85.6
Arousal, Attention, & Cognition								
Perform tests and measures of...								
...arousal and orientation (e.g., level of consciousness, time, person, place, situation)	208	2.52	1.67	83.2	186	3.80	1.05	90.3
...attention and cognition (e.g., ability to process commands, delirium, confusion)	208	2.49	1.71	80.3	181	3.78	1.01	89.0
...communication (e.g., expressive and receptive skills, following instructions)	208	2.43	1.77	76.0	178	3.72	1.03	89.3
...recall (including memory and retention)	207	2.06	1.68	71.5	173	3.59	1.13	84.4
Nerve Integrity								
Perform tests and measures of...								
...cranial nerve integrity (e.g., facial asymmetry, oculomotor function, hearing)	206	0.95	1.33	45.6	155	3.27	1.27	72.3
...spinal nerve integrity (e.g., dermatome, myotome)	209	1.40	1.43	63.2	169	3.46	1.16	78.1
...peripheral nerve integrity (e.g. sensation, strength)	209	2.35	1.54	84.2	185	3.75	0.98	89.2
...neural provocation (e.g., tapping, tension, stretch)	209	1.85	1.55	71.3	169	3.47	1.09	82.8
Environmental & Community Integration/Reintegration (Home, Work, Job, School, Play, & Leisure)								
Collect data on patient/client's ability to perform activities of daily living (ADL) (e.g., bed mobility, transfers, household mobility, dressing, self-care, toileting, sexual relations)	211	3.87	1.19	98.6	196	4.37	0.71	98.5
Collect data on patient/client's ability to perform instrumental activities of daily living (IADL) (e.g., household chores, hobbies)	210	3.26	1.36	94.8	195	4.04	0.95	92.3
Collect data on patient/client's ability to perform skills needed for integration or reintegration into the community, work, or school	200	2.74	1.57	86.0	175	3.89	1.03	91.4
Collect data on barriers (e.g., social, economic, physical, psychological, environmental, work conditions and activities) to home, community, work, or school integration/reintegration	200	2.56	1.65	82.0	171	3.78	1.03	89.5
Collect data on safety in home, community, work, or school environments	200	2.74	1.54	88.0	176	3.89	1.02	90.3

	n	M	SD	%Perf	n	M	SD	%Imp
Collect data on patient/client's ability to participate in activities with or without the use of devices, equipment, or technologies	200	3.25	1.42	93.0	181	4.06	0.87	94.5
Ergonomics and Body Mechanics								
Perform tests and measures of...								
...ergonomics and body mechanics during functional activities	197	3.10	1.49	91.9	183	3.95	0.96	90.2
...postural alignment and position (static and dynamic)	200	3.42	1.42	95.0	183	4.08	0.88	93.4
Functional Mobility, Balance, & Vestibular								
Perform tests and measures of...								
...balance (dynamic and static) with or without the use of specialized equipment	200	3.77	1.10	97.0	185	4.30	0.67	98.9
...gait and locomotion (e.g., ambulation, wheelchair mobility) with or without the use of specialized equipment	199	3.94	1.08	98.0	185	4.42	0.63	98.9
...mobility during functional activities and transitional movements (e.g., transfers, bed mobility)	200	3.90	1.19	97.5	187	4.39	0.67	98.4
...vestibular function (e.g., peripheral dysfunction, central dysfunction, BPPV)	194	1.86	1.56	73.2	159	3.62	1.10	82.4
Integumentary Integrity								
Observe skin characteristics (e.g., continuity of skin color, sensation, temperature, texture, turgor)	194	3.34	1.31	95.4	173	3.92	0.84	94.8
Collect data on wound characteristics (e.g., tissue involvement, depth, tunneling, burn degree, ulcer classification)	193	1.33	1.49	54.9	139	3.61	1.19	84.2
Observe scar tissue characteristics (e.g., banding, pliability, sensation, and texture)	193	2.17	1.49	80.8	162	3.59	1.04	85.8
Collect data on patient/client's activities, positioning, and postures that produce or relieve trauma to the skin	193	2.73	1.58	85.5	163	3.87	0.99	91.4
Identify devices and equipment that produce or relieve trauma to the patient/client's skin	191	2.32	1.53	83.8	164	3.79	1.02	89.6
Joint Integrity & Range of Motion								
Perform tests and measures of...								
...spinal joint stability (e.g., ligamentous integrity, joint structure)	191	1.70	1.61	63.4	146	3.59	1.20	82.9
...peripheral joint stability (e.g., ligamentous integrity, joint structure)	192	2.17	1.60	75.5	157	3.71	1.06	86.6
...spinal joint mobility (e.g., glide, end feel)	192	1.71	1.74	58.9	143	3.62	1.21	82.5
...peripheral joint mobility (e.g., glide, end feel)	192	2.41	1.62	80.7	163	3.83	1.01	88.3
...range of motion (e.g., passive, active, functional)	193	3.84	1.00	99.0	180	4.30	0.75	98.9
...flexibility (e.g., muscle length, soft tissue extensibility)	178	3.19	1.45	91.0	157	4.00	0.85	94.9
Motor Function								
Perform tests and measures of...								
...muscle tone (e.g., hypertonicity, hypotonicity, dystonia)	178	2.70	1.48	88.2	152	3.85	0.91	93.4
...dexterity, coordination, and agility (e.g., rapid alternating movement, finger to nose)	176	2.12	1.49	81.8	145	3.72	0.99	87.6
...ability to initiate, modify and control movement patterns and postures (e.g., catching a ball, gait)	179	3.54	1.15	98.3	164	4.08	0.81	97.0
...ability to change movement performance with practice (e.g., motor learning)	175	3.12	1.29	93.1	156	3.90	0.84	96.2
...movement quality (e.g., purpose, precision, efficiency, biomechanics, kinematics)	177	2.95	1.47	90.4	151	3.90	0.89	94.7
Muscle Performance								
Perform tests and measures of...								
...muscle strength, power, and endurance without specialized equipment (e.g., manual muscle test, functional strength testing)	179	3.22	1.24	95.5	162	4.12	0.83	96.3
...muscle strength, power, and endurance with specialized equipment (e.g., isokinetic testing, dynamometry)	178	1.89	1.71	67.4	137	3.60	1.21	81.8

	n	M	SD	%Perf	n	M	SD	%Imp
Neuromotor Development & Sensory Integration								
Perform tests and measures of...								
...acquisition and evolution of motor skills throughout the lifespan	172	1.09	1.41	47.1	114	3.19	1.34	69.3
...sensorimotor integration	171	1.33	1.41	59.1	125	3.24	1.30	68.0
...developmental reflexes and reactions (e.g., asymmetrical tonic neck reflex, righting reactions)	174	1.03	1.47	41.4	115	3.29	1.26	69.6
Reflex Integrity								
Perform tests and measures of...								
...deep tendon/muscle stretch reflexes (e.g., quadriceps, biceps)	174	1.68	1.58	66.7	134	3.40	1.10	76.9
...upper motor neuron integrity (e.g., Babinski reflex, Hoffman sign)	175	0.90	1.18	49.1	119	3.22	1.26	69.7
...superficial reflexes and reactions (e.g., cremasteric reflex, abdominal reflexes)	173	0.73	1.17	37.6	108	3.07	1.36	64.8
Pain & Sensory Integrity								
Perform tests and measures of...								
...pain (e.g., location, intensity, frequency, central, peripheral, psychogenic)	175	3.07	1.84	81.7	148	4.01	0.88	95.9
...deep sensation (e.g., proprioception, kinesthesia, pressure)	174	2.00	1.57	75.3	143	3.51	1.03	84.6
...superficial sensation (e.g., touch, temperature discrimination)	175	1.93	1.45	77.1	147	3.50	0.93	85.7
Plan of Care & Goals								
Modify and/or progress within the plan of care based on patient/client's resources (e.g., financial, transportation, time, insurance benefits, available technologies)	176	3.27	1.57	88.1	156	4.18	0.96	94.2
INTERVENTIONS								
Procedural Interventions								
Therapeutic Exercise/Therapeutic Activities								
Perform and/or train patient/client/caregiver in...								
...aerobic capacity/endurance conditioning	320	3.40	1.35	93.4	269	4.10	0.80	96.3
...balance, coordination, and agility activities	321	4.09	0.91	98.8	278	4.55	0.57	100.0
...body mechanics and postural stabilization techniques	321	4.09	0.88	99.4	279	4.49	0.62	99.6
...flexibility techniques	320	3.68	1.14	97.2	276	4.12	0.80	98.2
...neuromotor techniques (e.g., movement pattern training, neuromuscular education or reeducation)	320	3.43	1.16	97.2	276	4.16	0.80	97.5
...relaxation techniques	319	2.82	1.23	94.7	271	3.62	0.91	90.8
...strength, power, and endurance exercises	322	4.20	0.99	98.4	273	4.46	0.66	99.3
...genitourinary management (e.g., pelvic floor exercises, bladder strategies)	316	1.29	1.37	61.1	249	3.06	1.18	65.5
...gastrointestinal management (e.g., bowel strategies, positioning to avoid reflux)	316	0.94	1.25	48.4	240	2.85	1.18	55.4
...manual/mechanical airway clearance techniques (e.g., assistive devices, assistive cough, incentive spirometer, flutter valve, postural drainage, percussion, vibration, postural drainage)	318	1.12	1.38	52.8	247	3.17	1.26	64.8
...techniques to maximize ventilation and perfusion (e.g., positioning, active cycle breathing, autogenic drainage, paced breathing, pursed-lip breathing)	282	2.19	1.66	73.0	228	3.58	1.16	83.8
...mechanical repositioning for vestibular dysfunction	280	1.15	1.34	55.0	211	3.13	1.27	68.2
...habituation/adaptation exercises for vestibular dysfunction	280	1.14	1.25	58.6	206	3.14	1.26	66.5
Functional Training								
Perform and/or train patient/client in...								
...the use of environmental modifications (e.g., ramps, grab bars, raised toilet, environmental control units)	282	2.79	1.57	88.7	236	4.13	0.86	96.2

	n	M	SD	%Perf	n	M	SD	%Imp
...activities of daily living (ADL) (e.g., bed mobility, transfers, household mobility, dressing, self-care, toileting, sexual relations)	283	3.57	1.38	94.7	245	4.43	0.77	97.6
...community and leisure integration or reintegration (e.g., work/school/play)	279	2.30	1.49	81.0	224	3.76	1.06	89.7
...Instrumental Activities of Daily Living (IADL) (e.g., household chores, hobbies)	282	2.61	1.54	84.8	229	3.86	0.98	91.7
...mobility techniques	282	3.84	1.15	97.2	245	4.33	0.79	98.0
...fall prevention and fall recovery strategies	282	3.52	1.37	95.0	242	4.45	0.72	98.8
...behavior modification and strategies that enhance functioning (e.g., energy conservation, pacing, pre-activity planning, reminder schedules)	283	3.08	1.44	90.8	237	4.04	0.88	94.5
Manual Therapy Techniques								
Perform manual lymphatic drainage	268	0.51	1.00	26.5	174	3.00	1.29	64.4
Perform spinal manual traction	270	1.24	1.49	50.4	186	3.45	1.26	78.0
Perform peripheral manual traction	268	1.10	1.46	47.4	183	3.34	1.33	72.1
Perform and/or train patient/client/caregiver in soft tissue mobilization (e.g., connective tissue massage, therapeutic massage, foam rolling)	269	2.93	1.50	91.1	227	3.90	0.93	94.7
Perform instrument-assisted soft tissue mobilization	269	1.65	1.76	55.8	193	3.42	1.19	78.8
Perform peripheral joint range of motion	269	3.53	1.42	93.7	227	4.31	0.81	96.9
Perform peripheral mobilization/manipulation (thrust)	264	0.75	1.44	26.1	166	3.06	1.47	62.7
Perform peripheral mobilization/manipulation (non-thrust)	266	1.71	1.81	56.4	188	3.55	1.22	80.9
Perform spinal mobilization/manipulation (thrust)	265	0.39	1.04	15.5	153	2.88	1.44	58.2
Perform spinal mobilization/manipulation (non-thrust)	267	1.07	1.62	36.0	170	3.27	1.39	70.0
Apply taping for...								
...neuromuscular reeducation	248	1.38	1.45	57.3	176	3.26	1.13	77.3
...lymphatic drainage	249	0.45	0.98	21.7	150	2.87	1.35	60.7
...pain management	248	1.31	1.45	54.0	174	3.22	1.17	74.1
Equipment & Devices								
Apply and/or adjust...								
...adaptive devices (e.g., utensils, seating and positioning devices, steering wheel devices)	247	1.57	1.54	62.3	187	3.39	1.21	78.1
...protective devices (e.g., braces, cushions, helmets, protective taping)	249	2.13	1.43	80.3	203	3.65	1.08	86.7
...supportive devices (e.g., compression garments, corsets, elastic wraps, neck collars serial casts, short-stretch bandages)	248	1.97	1.36	81.5	207	3.57	1.05	84.5
...orthotic devices (e.g., braces, shoe inserts, splints)	247	2.32	1.28	89.1	211	3.82	0.97	91.5
Apply and/or adjust...								
...assistive devices/technologies (e.g., canes, crutches, walkers, wheelchairs, tilt tables, standing frames)	248	3.43	1.26	97.2	221	4.29	0.75	98.6
...prosthetic devices/technologies (e.g., lower extremity and upper-extremity, microprocessor-controlled prosthetic devices)	247	1.06	1.20	55.9	179	3.46	1.18	77.1
...mechanical neuromuscular reeducation devices/technologies (e.g., weighted vests, therapeutic suits, body weight supported treadmill, robotic exoskeletons)	246	0.62	1.15	28.5	149	2.99	1.33	62.4
...prescribed oxygen during interventions	231	2.19	1.75	71.4	186	4.02	1.13	89.8
Train patient/client/caregiver in the use of...								
...adaptive devices (e.g., utensils, seating and positioning devices, steering wheel devices)	231	1.52	1.57	57.6	167	3.49	1.20	81.4
...assistive devices/technologies (e.g., canes, crutches, walkers, wheelchairs, tilt tables, standing frames)	232	3.40	1.28	96.1	206	4.35	0.72	99.5

	n	M	SD	%Perf	n	M	SD	%Imp
...orthotic devices (e.g., braces, shoe inserts, splints)	232	2.28	1.34	87.1	193	3.82	0.91	93.8
...prosthetic devices/technologies (e.g., lower extremity and upper-extremity, microprocessor-controlled prosthetic devices)	229	0.90	1.23	46.7	154	3.40	1.28	77.3
...protective devices (e.g., braces, cushions, helmets, protective taping)	232	1.50	1.40	69.0	175	3.50	1.12	81.1
...supportive devices (e.g., compression garments, corsets, elastic wraps, neck collars serial casts, short-stretch bandages)	230	1.76	1.39	74.8	187	3.45	1.05	85.6
...mechanical neuromuscular re-education devices/technologies (e.g., weighted vests, therapeutic suits, body weight supported treadmill, robotic exoskeletons)	229	0.55	1.12	26.6	133	2.83	1.36	55.6
Integumentary Repair & Protection Techniques								
Perform and/or train patient/client/caregiver in...								
...nonselective debridement (e.g., removal of nonselective areas of devitalized tissue)	231	0.24	0.77	12.6	127	2.53	1.44	46.5
...selective enzymatic or autolytic debridement (e.g., removal of specific areas of devitalized tissue)	230	0.16	0.66	8.3	122	2.48	1.45	43.4
...sharp debridement (e.g., removal of specific areas of devitalized tissue)	232	0.08	0.45	4.3	117	2.27	1.38	34.2
...application of topical agents (e.g., cleansers, creams, moisturizers, ointments, sealants) and dressings (e.g., hydrogels, wound coverings)	232	0.55	1.05	28.0	135	2.68	1.33	48.9
...desensitization techniques (e.g., brushing, tapping, use of textures)	230	0.91	1.09	50.0	159	2.91	1.20	61.6
...hyperbaric therapy	231	0.04	0.25	2.6	118	2.28	1.37	38.1
...negative pressure wound therapy	231	0.08	0.38	5.2	118	2.28	1.33	35.6
Therapeutic Modalities								
Perform and/or train patient/client/caregiver in...								
...biofeedback therapy (e.g., relaxation techniques, muscle reeducation, EMG)	226	1.62	1.43	69.9	170	3.41	1.05	82.9
...iontophoresis	226	0.79	1.11	42.9	147	3.01	1.30	66.7
...phonophoresis	226	0.58	1.08	29.6	133	2.82	1.40	60.2
...electrical stimulation therapy (e.g., neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS), functional electrical stimulation (FES), interferential therapy, high-voltage pulsed current)	226	2.62	1.65	86.7	191	3.93	0.98	91.1
...cryotherapy (e.g., cold pack, ice massage, vapocoolant spray)	226	3.08	1.52	91.2	195	3.87	0.97	92.8
...hydrotherapy using contrast baths/pools	227	0.67	1.18	33.0	126	2.98	1.31	61.9
...hydrotherapy (e.g., aquatic exercise, underwater treadmill)	227	0.78	1.39	32.2	134	3.13	1.30	64.9
...phototherapy (laser light)	226	0.29	0.91	12.4	120	2.58	1.39	46.7
...monochromatic infrared agent procedures (e.g., light emitting diodes [LEDs])	226	0.11	0.48	6.2	116	2.44	1.35	43.1
...ultrasound procedures	227	2.12	1.58	79.7	185	3.69	1.05	87.0
...diathermy	224	0.46	1.02	24.1	128	2.62	1.30	50.8
...dry heat thermotherapy (e.g., Fluidotherapy)	224	0.32	0.83	17.4	118	2.54	1.31	46.6
...hot pack thermotherapy	222	2.81	1.58	86.9	185	3.76	1.02	91.4
...paraffin bath thermotherapy	223	0.62	1.01	35.4	138	2.80	1.29	56.5
...shockwave therapy	223	0.06	0.40	2.7	111	2.15	1.32	33.3
Mechanical Modalities								
Apply and/or train patient/client/caregiver in...								
...intermittent pneumatic compression	223	0.48	1.00	24.7	127	2.67	1.33	52.8
...assisted movement devices (e.g., continuous passive motion devices, dynamic splint)	223	1.02	1.16	55.6	152	3.13	1.24	69.7

	n	M	SD	%Perf	n	M	SD	%Imp
...mechanical spinal traction	223	0.99	1.30	45.3	138	3.30	1.28	73.2
Non-procedural Interventions								
Communication								
Discuss physical therapy evaluation findings, interventions, goals, prognosis, discharge planning, and plan of care with...								
...supervising physical therapist	222	3.88	0.79	99.5	201	4.65	0.61	99.5
...interprofessional/interdisciplinary team members	221	3.40	1.13	96.4	194	4.52	0.71	99.0
...patient/client and caregiver	220	3.72	0.99	98.6	198	4.56	0.62	99.5
Provide written, oral, and electronic information to the patient/client and/or caregiver	221	3.59	1.35	95.5	192	4.43	0.80	97.9
Documentation								
Document...								
...data collection results	222	3.77	1.50	91.9	188	4.41	0.85	96.3
...intervention(s) and patient/client response(s) to intervention	222	4.42	0.87	99.1	198	4.60	0.62	99.5
...patient/client and caregiver education	222	4.14	1.05	97.7	196	4.55	0.62	99.5
...communication with the interdisciplinary/interprofessional team related to the patient/client's care	221	3.65	1.29	95.9	194	4.46	0.68	99.0
...rationale for billing and reimbursement	220	3.76	1.67	86.8	188	4.44	0.84	96.8
...disclosure and consent (e.g., disclosure of medical information, consent for treatment)	205	2.84	1.90	76.6	170	4.21	1.00	93.5
Assign billing codes for physical therapy treatment provided	217	2.63	2.25	60.4	157	4.04	1.19	88.5
Education								
Educate patient/client and/or caregiver about...								
...patient/client's current condition and health status (e.g., nature of the condition, potential benefits of physical therapy interventions, potential treatment outcomes)	221	3.83	1.17	97.3	197	4.40	0.73	99.0
...role of the physical therapist and/or physical therapist assistant in patient/client management	221	3.58	1.19	96.8	197	4.26	0.84	97.0
...lifestyle and behavioral changes to promote wellness (e.g., nutrition, physical activity, tobacco cessation)	220	3.38	1.34	93.6	194	4.20	0.84	97.4
...the role of physical therapy in transitional planning (e.g., hospice, palliative care, setting changes)	219	2.00	1.61	74.9	170	3.82	1.08	89.4
Educate the healthcare team about...								
...the role of the physical therapist and/or physical therapist assistant in patient/client management	219	2.26	1.61	79.5	171	3.92	1.03	90.1
...safe patient handling (e.g., injury prevention, ergonomics, use of equipment)	219	2.57	1.55	87.2	181	4.13	0.89	96.7
Educate community groups on lifestyle and behavioral changes to promote wellness (e.g., nutrition, physical activity, tobacco cessation)	219	1.33	1.62	53.4	140	3.72	1.19	85.0
Participate in the clinical education of students	222	1.00	1.36	54.1	149	3.81	1.18	85.9
Patient/client & Staff Safety								
Emergency Procedures								
Implement emergency procedures (e.g., CPR, AED, calling a code)	221	0.52	0.78	40.3	144	4.27	0.97	94.4
Perform first aid	220	0.71	0.93	48.2	145	4.13	1.00	93.8
Implement disaster response procedures	218	0.44	0.81	33.0	131	4.02	1.08	90.1
Environmental Safety								
Perform risk assessment of the physical environment (e.g., barrier-free environment, outlets, windows, floors, lighting)	220	1.36	1.55	58.2	149	4.01	1.12	89.3

	n	M	SD	%Perf	n	M	SD	%Imp
Prepare and maintain a safe working environment for performing interventions (e.g., unobstructed walkways, equipment availability)	221	3.38	1.63	91.0	191	4.38	0.78	97.9
Perform regular equipment inspections and/or maintenance (e.g., modalities, assistive devices)	220	2.09	1.59	76.4	171	4.18	0.95	94.7
Infection Control								
Perform and/or train patient/client and/or caregiver on appropriate infection control practices (e.g., universal precautions, hand hygiene, isolation, airborne precautions, equipment cleaning)	177	2.59	1.64	85.9	152	4.01	0.95	93.4
Research & Evidence-Based Practice								
Search the literature for current best evidence	176	1.96	1.04	91.5	160	3.76	1.00	87.5
Evaluate the quality of published data	176	1.46	1.16	74.4	147	3.44	1.13	77.6
Integrate current best evidence, clinical experience, and patient values in clinical practice (e.g., clinical prediction rules, patient preference)	173	2.64	1.47	91.3	160	3.84	0.99	86.9
Design and/or direct research activities	175	0.43	0.99	21.1	103	2.80	1.37	57.3
Participate in research activities	174	0.42	0.84	26.4	110	2.94	1.34	58.2
Compare intervention outcomes with normative data	175	0.89	1.25	44.0	117	3.05	1.27	65.8
Professional Responsibilities								
Supervise support personnel (e.g., physical therapy aides)	176	2.27	2.00	63.6	137	3.60	1.13	83.2
Assign tasks to other personnel (e.g., physical therapy aides) to assist with patient/client care	176	2.32	1.95	67.0	143	3.57	1.20	80.4
Disclose financial interest in recommended products or services to patient/client	167	0.83	1.34	34.1	114	2.81	1.39	56.1
Communicate with the physical therapist when the expectations of the PTA are beyond their knowledge, skills, and abilities	172	2.69	1.36	95.3	162	4.48	0.65	99.4
Report health care providers that are suspected to not perform their professional responsibilities with reasonable skill and safety to the appropriate authorities	161	0.99	1.37	47.2	125	4.34	0.91	96.0
Report suspected cases of abuse to the appropriate authority	164	0.76	1.17	45.1	126	4.50	0.81	96.8
Report suspected illegal or unethical acts performed by health care professionals to the relevant authority	160	0.55	1.10	30.6	117	4.44	0.93	95.7
Advocate for public access to physical therapy and other healthcare services	162	1.09	1.31	56.2	124	3.94	1.14	87.9
Determine own need for professional development	171	2.26	1.18	97.1	163	4.21	0.81	96.9
Participate in learning and/or development activities (e.g., journal clubs, self-directed reading, continuing competence activities) to maintain the currency of knowledge, skills, and abilities	172	1.85	1.02	93.6	160	4.17	0.84	96.9
Practice within the federal and jurisdiction regulations and professional standards.	172	4.54	1.09	97.7	162	4.76	0.50	99.4
Participate in professional organizations	166	1.09	1.23	64.5	134	3.52	1.01	82.8
Participate in performance improvement and quality reporting activities (e.g., Physician Quality Reporting System, standardized outcomes measurement, application of health informatics)	162	1.36	1.55	57.4	122	3.57	1.07	85.2

Appendix E. Knowledge and Skill Requirements Results

Table E1. PTA KSR Descriptive Statistics

	n	M	SD	%Imp
CARDIOVASCULAR/PULMONARY SYSTEM				
Physical Therapy Data Collection				
Cardiovascular/pulmonary system tests/measures, including outcome measures, and their applications according to current best evidence	1,123	3.59	1.06	81.8
Anatomy and physiology of the cardiovascular/pulmonary system as related to tests/measures	1,126	3.64	1.04	84.8
Movement analysis as related to the cardiovascular/pulmonary system (e.g., rib cage excursion, breathing pattern)	1,127	3.60	1.01	84.4
Diseases/Conditions that Impact Effective Treatment				
Cardiovascular/pulmonary system diseases/conditions and their pathophysiology to carry out the established plan of care	1,129	3.84	0.94	90.7
Non-pharmacological medical management of the cardiovascular/pulmonary system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	1,116	3.02	1.03	66.3
Pharmacological management of the cardiovascular/pulmonary system.	1,099	2.84	0.99	57.7
Interventions				
Cardiovascular/pulmonary system PT interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence	1,127	4.00	0.96	91.7
Anatomy and physiology of the cardiovascular/pulmonary system as related to PT interventions, daily activities, and environmental factors	1,130	4.08	0.91	93.8
Adverse effects or complications on the cardiovascular/pulmonary system from PT interventions	1,130	4.33	0.83	96.9
Adverse effects or complications on the cardiovascular/pulmonary system from PT interventions used on other systems	1,044	4.12	0.89	95.4
LYMPHATIC SYSTEM				
Physical Therapy Data Collection				
Lymphatic system tests/measures, including outcome measures, and their applications according to current best evidence	1,063	2.79	1.05	54.9
Anatomy and physiology of the lymphatic system as related to tests/measures	1,074	2.95	1.05	62.5
Movement analysis as related to the lymphatic system (e.g., posture, compensatory movement, extremity range of motion)	1,078	3.32	1.07	74.2
Diseases/Conditions that Impact Effective Treatment				
Lymphatic system diseases/conditions and their pathophysiology to carry out the established plan of care	1,082	3.24	1.06	72.7
Non-pharmacological medical management of the lymphatic system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	1,064	2.70	0.98	52.7
Interventions				
Lymphatic system interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence	1,076	3.26	1.06	72.4
Anatomy and physiology of the lymphatic system as related to interventions, daily activities, and environmental factors	1,083	3.36	1.08	75.1
Adverse effects or complications on the lymphatic system from PT interventions	1,086	3.70	1.09	82.5
Adverse effects or complications on the lymphatic system from PT interventions used on other systems	1,042	3.72	1.06	85.2

	n	M	SD	%Imp
MUSCULOSKELETAL SYSTEM				
Physical Therapy Data Collection				
Musculoskeletal system tests/measures, including outcome measures, and their applications according to current best evidence	1,162	4.31	0.85	95.8
Anatomy and physiology of the musculoskeletal system as related to tests/measures	1,164	4.51	0.73	97.9
Movement analysis as related to the musculoskeletal system	1,164	4.38	0.77	98.1
Joint biomechanics and their applications	1,165	4.33	0.80	97.0
Diseases/Conditions that Impact Effective Treatment				
Musculoskeletal system diseases/conditions and their pathophysiology to carry out the established plan of care	1,164	4.26	0.81	97.0
Connective tissue diseases/conditions and their pathophysiology to carry out the established plan of care	1,164	4.07	0.90	94.7
Non-pharmacological medical management of the musculoskeletal system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	1,156	3.37	1.00	80.3
Pharmacological management of the musculoskeletal system	1,145	3.06	1.03	68.8
Interventions				
Musculoskeletal system PT interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence	1,165	4.49	0.72	98.5
Anatomy and physiology of the musculoskeletal system as related to PT interventions, daily activities, and environmental factors	1,166	4.63	0.62	99.1
Adverse effects or complications on the musculoskeletal system from PT interventions	1,153	4.50	0.68	99.0
Adverse effects or complications on the musculoskeletal system from PT interventions used on other systems	1,045	4.38	0.77	97.8
NEUROMUSCULAR & NERVOUS SYSTEM				
Physical Therapy Data Collection				
Neuromuscular/nervous system tests/measures, including outcome measures, and their applications according to current best evidence	1,076	3.99	0.91	93.1
Anatomy and physiology of the neuromuscular/nervous system as related to tests/measures	1,078	4.09	0.88	95.1
Movement analysis as related to the neuromuscular/nervous system	1,078	4.12	0.87	95.6
Diseases/Conditions that Impact Effective Treatment				
Nervous system (CNS, PNS, ANS) diseases/conditions and their pathophysiology to carry out the established plan of care	1,079	4.00	0.91	94.2
Non-pharmacological medical management of the neuromuscular/nervous system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	1,074	3.32	1.03	77.7
Pharmacological management of the neuromuscular/nervous system	1,061	3.09	1.05	67.7
Interventions				
Neuromuscular/nervous system PT interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence	1,078	4.25	0.86	95.5
Anatomy and physiology of the neuromuscular/nervous system as related to PT interventions, daily activities, and environmental factors	1,079	4.34	0.79	97.4

	n	M	SD	%Imp
Adverse effects or complications on the neuromuscular/nervous system from PT interventions	1,079	4.38	0.78	97.3
Adverse effects or complications on the neuromuscular/nervous system from PT interventions used on other systems	1,045	4.36	0.78	97.6
Motor control as related to neuromuscular/nervous system PT interventions	1,079	4.33	0.76	98.0
Motor learning as related to the neuromuscular/nervous system PT intervention:	1,069	4.11	0.86	95.9
INTEGUMENTARY SYSTEM				
Physical Therapy Data Collection				
Integumentary system tests/measures, including outcome measures, and their applications according to current best evidence	1,056	3.22	1.06	72.3
Anatomy and physiology of the integumentary system as related to tests/measures	1,061	3.35	1.03	77.2
Movement analysis as related to the integumentary system (e.g., friction, shear, pressure, and scar mobility)	1,065	3.77	0.96	89.8
Diseases/Conditions that Impact Effective Treatment				
Integumentary system diseases/conditions and their pathophysiology to carry out the established plan of care	1,063	3.58	0.98	84.9
Non-pharmacological medical management of the integumentary system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	1,050	2.97	1.04	64.2
Pharmacological management of the integumentary system	1,041	2.77	1.06	54.8
Interventions				
Integumentary system PT interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence	1,065	3.66	1.01	86.6
Anatomy and physiology of the integumentary system as related to PT interventions, daily activities, and environmental factors	1,066	3.75	1.00	88.0
Adverse effects or complications on the integumentary system from PT and medical/surgical interventions	1,066	3.88	1.00	89.4
Adverse effects or complications on the integumentary system from PT interventions used on other systems	1,043	3.95	0.97	92.1
METABOLIC & ENDOCRINE SYSTEMS				
Diseases/Conditions that Impact Effective Treatment				
Metabolic and endocrine system diseases/conditions and their pathophysiology to carry out the established plan of care	1,038	3.21	0.99	76.4
Non-pharmacological medical management of the metabolic and endocrine systems (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	1,029	2.92	0.97	64.9
Pharmacological management of the metabolic and endocrine systems	1,019	2.77	0.98	56.8
Interventions				
Metabolic and endocrine systems PT interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence	1,039	3.40	1.06	79.6
Anatomy and physiology of the metabolic and endocrine systems as related to PT interventions, daily activities, and environmental factors	1,041	3.42	1.06	79.3
Adverse effects or complications on the metabolic and endocrine systems from PT interventions	1,042	3.65	1.06	84.6
Adverse effects or complications on the metabolic and endocrine systems from PT interventions used on other systems	1,041	3.70	1.09	84.2
GASTROINTESTINAL SYSTEM				

	n	M	SD	%Imp
Physical Therapy Data Collection				
Gastrointestinal system tests/measures, including outcome measures, and their applications according to current best evidence (e.g., bowel dysfunction impact questionnaires, Murphy test, Rovsing test, McBurney point sign)	980	2.64	1.04	49.4
Anatomy and physiology of the gastrointestinal system as related to tests/measures	989	2.77	1.06	53.6
Movement analysis as related to the gastrointestinal system (e.g., obturator, psoas, positioning for bowel movement)	996	2.93	1.04	61.1
Diseases/Conditions that Impact Effective Treatment				
Gastrointestinal system diseases/conditions and their pathophysiology to carry out the established plan of care	1,000	2.92	1.01	63.1
Non-pharmacological medical management of the gastrointestinal system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	984	2.63	0.98	49.3
Pharmacological management of the gastrointestinal system	974	2.48	0.93	42.9
Interventions				
Gastrointestinal system PT interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., positioning for reflux prevention, bowel programs)	1,003	3.06	1.07	66.6
Anatomy and physiology of the gastrointestinal system as related to PT interventions, daily activities, and environmental factors	1,006	3.17	1.10	68.7
Adverse effects or complications on the gastrointestinal system from PT interventions	1,008	3.35	1.11	74.1
Adverse effects or complications on the gastrointestinal system from PT interventions used on other systems	1,041	3.57	1.14	79.9
GENITOURINARY SYSTEM				
Physical Therapy Data Collection				
Genitourinary system tests/measures, including outcome measures, and their applications according to current best evidence	963	2.57	1.00	45.2
Anatomy and physiology of the genitourinary system as related to tests/measures	971	2.70	1.04	50.0
Diseases/Conditions that Impact Effective Treatment				
Genitourinary system diseases/conditions and their pathophysiology to carry out the established plan of care	977	2.74	1.03	52.0
Non-pharmacological medical management of the genitourinary system (e.g., diagnostic imaging, lab values, other medical tests, surgical procedures)	964	2.52	0.97	44.3
Pharmacological management of the genitourinary system	951	2.40	0.95	38.4
Interventions				
Genitourinary system PT interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., bladder programs, biofeedback, pelvic floor retraining)	978	2.94	1.08	59.2
Anatomy and physiology of the genitourinary system as related to PT interventions, daily activities, and environmental factors	982	3.01	1.11	61.0
Adverse effects or complications on the genitourinary system from PT interventions	983	3.13	1.15	65.1
Adverse effects or complications on the genitourinary system from PT interventions used on other systems	1,040	3.50	1.19	76.3
SYSTEM INTERACTIONS				
Diseases/Conditions that Impact Effective Treatment				

	n	M	SD	%Imp
Diseases/conditions where the primary impact is on more than one system (e.g., cancer, multi-trauma, sarcoidosis, autoimmune disorders, pregnancy) to carry out the established plan of care	1,044	4.03	0.92	93.7
The impact of co-morbidities/co-existing conditions on patient/client management (e.g., diabetes and hypertension; obesity and arthritis; dementia and hip fracture)	1,045	4.31	0.79	97.3
Psychological and psychiatric conditions that impact patient/client management (e.g., grief, depression, schizophrenia)	1,041	3.73	0.91	89.9
Dimensions of pain that impact patient/client management (e.g., psychological, social, physiological, neurological, mechanical)	1,042	4.00	0.87	95.3
Non-pharmacological medical management of multiple systems (e.g., diagnostic imaging and other medical tests, surgical procedures)	1,031	3.29	1.01	77.4
Pharmacological management of multiple systems, including polypharmacy	1,018	3.06	1.00	68.9
EQUIPMENT, DEVICES, & TECHNOLOGIES				
Applications and adjustments, indications, contraindications, and precautions of:				
...assistive and adaptive devices/technologies (e.g., walkers, wheelchairs, adaptive seating systems and positioning devices, mechanical lifts)	998	4.64	0.63	99.3
...prosthetic devices/technologies (e.g., lower extremity and upper-extremity, microprocessor-controlled prosthetic devices)	994	4.18	0.98	92.5
...protective, supportive, and orthotic devices/technologies (e.g., braces, helmets, taping, compression garments, serial casts, shoe inserts, splints, robotic exoskeleton)	997	4.20	0.93	94.3
THERAPEUTIC MODALITIES				
Applications, indications, contraindications, and precautions of:				
...thermal modalities	1,037	4.48	0.78	96.8
...iontophoresis	1,022	4.01	1.15	85.1
...electrotherapy modalities, excluding iontophoresis (e.g., electrical muscle stimulation (EMS), TENS, functional electrical stimulation (FES), interferential therapy, hi-volt)	1,033	4.49	0.77	96.8
...light modalities (e.g., laser light therapy, LED light therapy)	1,015	3.75	1.27	77.6
...phonophoresis	1,007	3.76	1.28	76.7
...ultrasound modalities, excluding phonophoresis	1,027	4.31	0.94	92.6
...mechanical modalities (e.g., mechanical motion devices, traction devices)	1,028	4.24	0.98	91.7
...biofeedback	1,022	3.76	1.19	80.8
...diathermy	987	3.65	1.34	72.2
...intermittent compression	1,028	3.83	1.17	83.2
SAFETY & PROTECTION				
Factors influencing safety and injury prevention (e.g., safe patient handling, fall prevention, equipment maintenance, environmental safety)	996	4.78	0.50	99.5
The function and implications and related precautions of intravenous lines, tubes, catheters, monitoring devices, and mechanical ventilators/oxygen delivery devices	995	4.34	0.89	94.8
Emergency preparedness (e.g., CPR, first aid, disaster response)	996	4.51	0.77	97.3
Infection control procedures (e.g., standard/universal precautions, isolation techniques, sterile technique)	995	4.72	0.60	99.1
Signs/symptoms of physical, sexual, and psychological abuse and neglect	995	4.39	0.86	95.8
PROFESSIONAL RESPONSIBILITIES				

	n	M	SD	%Imp
Standards of documentation	994	4.68	0.58	99.7
Standards of professional ethics	994	4.79	0.47	99.9
Standards of billing, coding, and reimbursement	993	4.21	0.98	92.4
Patient/client rights (e.g., ADA, IDEA, HIPAA, patient bill of rights)	994	4.63	0.66	98.6
Obligations for reporting illegal, unethical, or unprofessional behaviors (e.g., fraud, abuse, neglect)	994	4.65	0.63	99.1
State and federal laws, rules, regulations, and industry standards set by state and accrediting bodies (e.g., state licensing entities, Joint Commission, CARF, CMS)	994	4.50	0.80	96.4
Risk management and quality assurance (e.g., policies and procedures, incident reports, peer chart review)	991	4.14	0.98	91.9
Human resource legal issues (e.g., OSHA, sexual harassment)	990	4.09	0.99	91.4
Roles and responsibilities of the PT, PTA, other healthcare professionals, and support staff	994	4.64	0.65	99.1
Cultural factors and/or characteristics that affect patient/client management (e.g., language differences, disability, ethnicity, customs, demographics, religion)	993	4.26	0.89	95.1
Socioeconomic factors that affect patient/client management	992	3.79	0.97	90.0
Health information technology (e.g., electronic medical records, telemedicine)	992	3.86	0.99	89.7
TEACHING & LEARNING THEORIES				
Teaching and learning theories and techniques	987	3.61	1.03	84.7
Health behavior change models (e.g., social cognitive theory, health belief model)	984	3.35	1.07	77.8
Communication methods and techniques (e.g., motivational interviewing, health information brochures/handouts, feedback techniques)	989	3.64	1.09	84.2
RESEARCH & EVIDENCE-BASED PRACTICE				
Techniques for accessing evidence (e.g., peer-reviewed publications, scientific proceedings, guidelines, clinical prediction rules)	1,018	3.29	1.11	74.3
Research methodology and interpretation (e.g., qualitative, quantitative, levels of evidence)	1,017	3.07	1.07	69.2
Measurement science (e.g., reliability, validity)	1,021	3.29	1.10	75.0
Data collection techniques (e.g., surveys, direct observation)	1,021	3.12	1.12	69.3
SKILLS				
Active listening - Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times	1,032	4.75	0.53	99.5
Speaking - Talking to others to convey information effectively	1,032	4.73	0.53	99.5
Reading Comprehension - Understanding written sentences and paragraphs in work related documents	1,032	4.63	0.62	99.2
Critical Thinking - Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems	1,032	4.70	0.56	99.8
Social Perceptiveness - Being aware of others' reactions and understanding why they react as they do	1,032	4.60	0.66	99.2
Time Management - Managing one's own time and the time of others	1,032	4.62	0.62	99.5
Coordination - Adjusting actions in relation to others' actions	1,032	4.52	0.69	99.3
Writing - Communicating effectively in writing as appropriate for the needs of the audience	1,032	4.54	0.70	98.9

	n	M	SD	%Imp
Active Learning - Understanding the implications of new information for both current and future problem solving and decision-making	1,032	4.55	0.66	99.3
Persuasion – Persuading others to change their minds or behavior	1,028	3.89	1.06	88.8
Negotiation – Bringing others together and trying to reconcile differences	1,022	3.84	1.03	88.0
Service Orientation — Actively looking for ways to help people	1,029	4.30	0.84	96.4

Appendix F. Final List of Critical Work Activities

DATA COLLECTION

Information Gathering & Synthesis

Interview patients/clients, caregivers, and family to obtain patient/client history and current information (e.g., medical, surgical, medications, social, cultural, language preference, economic) to...

- ...review prior and current level of function
- ...establish general health status
- ...identify red flags (e.g., fever, malaise, unexplained weight change) and contraindications
- ...identify patient/client's, family/caregiver's goals, values, and preferences
- ...determine impact of medications on plan of care (e.g., medication reconciliation, timing of intervention delivery, adherence)

Administer standardized questionnaires (e.g., pain inventory, falls scale)

Review medical records (e.g., lab values, diagnostic tests, imaging, specialty reports, narrative, consults, physical therapy documentation) prior to carrying out the PT plan of care

Gather information/discuss patient/client's current health status with interprofessional/interdisciplinary team members

Identify signs/symptoms of change in patient/client's health status that require intervention by physical therapist

Identify signs/symptoms of change in patient/client's health status that require intervention by interprofessional/interdisciplinary team members

Systems Review

Check patient/client's current affect, cognition, communication, and learning preferences (e.g., ability to make needs known, consciousness, orientation, expected emotional/behavioral responses)

Recognize changes in status of the...

- ...patient/client's quality of speech, hearing, and vision (e.g., dysarthria, pitch/tone, use of corrective lenses, use of hearing aids)
 - ...vestibular system (e.g., dizziness, vertigo)
 - ...gastrointestinal system (e.g., difficulty swallowing, nausea, change in appetite/diet, change in bowel function)
 - ...genitourinary system (e.g., changes in bladder function, catheter complications)
 - ...reproductive system (e.g., sexual and/or menstrual dysfunction, menopause status)
 - ...cardiovascular/pulmonary system (e.g., blood pressure, heart rate, respiration rate)
 - ...lymphatic system (e.g., primary and/or secondary edema)
 - ...integumentary system (e.g., presence of scar formation, skin integrity, discoloration)
 - ...musculoskeletal system (e.g., gross symmetry, strength, range of motion)
 - ...neuromuscular system (e.g., gross coordination, motor function, balance, locomotion, gross sensory function)
-

Tests & Measures

Cardiovascular/Pulmonary

Perform tests and measures of...

- ...cardiovascular function (e.g., blood pressure, heart rate, heart sounds)
 - ...pulmonary function (e.g., respiratory rate, breathing patterns, breath sounds, chest excursion)
 - ...perfusion and gas exchange (e.g., airway protection, oxygen saturation)
 - ...peripheral circulation (e.g., capillary refill, blood pressure in upper versus lower extremities)
 - ...critical limb ischemia (e.g., peripheral pulses, skin perfusion pressure)
 - ...physiological responses to position change (e.g., orthostatic hypotension, skin color, blood pressure, heart rate)
 - ...aerobic capacity under maximal and submaximal conditions (e.g., endurance, exercise tolerance, metabolic equivalents, perceived exertion)
-

Anthropometric

Perform tests and measures of...

- ...body dimensions (e.g., height, weight, girth, limb length, head circumference/shape)

Quantify and qualify edema (e.g., pitting, volume, circumference)

Arousal, Attention, & Cognition

Perform tests and measures of...

- ...arousal and orientation (e.g., level of consciousness, time, person, place, situation)
 - ...attention and cognition (e.g., ability to process commands, delirium, confusion)
 - ...communication (e.g., expressive and receptive skills, following instructions)
 - ...recall (including memory and retention)
-

Nerve Integrity

Perform tests and measures of...

- ...cranial nerve integrity (e.g., facial asymmetry, oculomotor function, hearing)
 - ...spinal nerve integrity (e.g., dermatome, myotome)
 - ...peripheral nerve integrity (e.g. sensation, strength)
 - ...neural provocation (e.g., tapping, tension, stretch)
-

Environmental & Community Integration/Reintegration (Home, Work, Job, School, Play, & Leisure)

Collect data on patient/client's ability to perform activities of daily living (ADL) (e.g., bed mobility, transfers, household mobility, dressing, self-care, toileting, sexual relations)

Collect data on patient/client's ability to perform instrumental activities of daily living (IADL) (e.g., household chores, hobbies)

Collect data on patient/client's ability to perform skills needed for integration or reintegration into the community, work, or school

Collect data on barriers (e.g., social, economic, physical, psychological, environmental, work conditions and activities) to home, community, work, or school integration/reintegration

Collect data on safety in home, community, work, or school environments

Collect data on patient/client's ability to participate in activities with or without the use of devices, equipment, or technologies

Ergonomics and Body Mechanics

Perform tests and measures of...

- ...ergonomics and body mechanics during functional activities
 - ...postural alignment and position (static and dynamic)
-

Functional Mobility, Balance, & Vestibular

Perform tests and measures of...

- ...balance (dynamic and static) with or without the use of specialized equipment
 - ...gait and locomotion (e.g., ambulation, wheelchair mobility) with or without the use of specialized equipment
 - ...mobility during functional activities and transitional movements (e.g., transfers, bed mobility)
 - ...vestibular function (e.g., peripheral dysfunction, central dysfunction, BPPV)
-

Integumentary Integrity

Observe skin characteristics (e.g., continuity of skin color, sensation, temperature, texture, turgor)

Collect data on wound characteristics (e.g., tissue involvement, depth, tunneling, burn degree, ulcer classification)

Observe scar tissue characteristics (e.g., banding, pliability, sensation, and texture)

Collect data on patient/client's activities, positioning, and postures that produce or relieve trauma to the skin

Identify devices and equipment that produce or relieve trauma to the patient/client's skin

Joint Integrity & Range of Motion

Perform tests and measures of...

- ...spinal joint stability (e.g., ligamentous integrity, joint structure)
 - ...peripheral joint stability (e.g., ligamentous integrity, joint structure)
 - ...spinal joint mobility (e.g., glide, end feel)
 - ...peripheral joint mobility (e.g., glide, end feel)
 - ...range of motion (e.g., passive, active, functional)
 - ...flexibility (e.g., muscle length, soft tissue extensibility)
-

Motor Function

Perform tests and measures of...

- ...muscle tone (e.g., hypertonicity, hypotonicity, dystonia)
-

- ...dexterity, coordination, and agility (e.g., rapid alternating movement, finger to nose)
- ...ability to initiate, modify and control movement patterns and postures (e.g., catching a ball, gait)
- ...ability to change movement performance with practice (e.g., motor learning)
- ...movement quality (e.g., purpose, precision, efficiency, biomechanics, kinematics)

Muscle Performance

Perform tests and measures of...

- ...muscle strength, power, and endurance without specialized equipment (e.g., manual muscle test, functional strength testing)
- ...muscle strength, power, and endurance with specialized equipment (e.g., isokinetic testing, dynamometry)

Neuromotor Development & Sensory Integration

Perform tests and measures of...

- ...acquisition and evolution of motor skills throughout the lifespan
- ...sensorimotor integration
- ...developmental reflexes and reactions (e.g., asymmetrical tonic neck reflex, righting reactions)

Reflex Integrity

Perform tests and measures of...

- ...deep tendon/muscle stretch reflexes (e.g., quadriceps, biceps)
- ...upper motor neuron integrity (e.g., Babinski reflex, Hoffman sign)

Pain & Sensory Integrity

Perform tests and measures of...

- ...pain (e.g., location, intensity, frequency, central, peripheral, psychogenic)
- ...deep sensation (e.g., proprioception, kinesthesia, pressure)
- ...superficial sensation (e.g., touch, temperature discrimination)

Plan of Care & Goals

Modify and/or progress within the plan of care based on patient/client's resources (e.g., financial, transportation, time, insurance benefits, available technologies)

INTERVENTIONS

Procedural Interventions

Therapeutic Exercise/Therapeutic Activities

Perform and/or train patient/client/caregiver in...

- ...aerobic capacity/endurance conditioning
- ...balance, coordination, and agility activities
- ...body mechanics and postural stabilization techniques
- ...flexibility techniques
- ...neuromotor techniques (e.g., movement pattern training, neuromuscular education or reeducation)
- ...relaxation techniques
- ...strength, power, and endurance exercises
- ...genitourinary management (e.g., pelvic floor exercises, bladder strategies)
- ...gastrointestinal management (e.g., bowel strategies, positioning to avoid reflux)
- ...manual/mechanical airway clearance techniques (e.g., assistive devices, assistive cough, incentive spirometer, flutter valve, postural drainage, percussion, vibration, postural drainage)
- ...techniques to maximize ventilation and perfusion (e.g., positioning, active cycle breathing, autogenic drainage, paced breathing, pursed-lip breathing)
- ...mechanical repositioning for vestibular dysfunction
- ...habituation/adaptation exercises for vestibular dysfunction

Functional Training

Perform and/or train patient/client in...

- ...the use of environmental modifications (e.g., ramps, grab bars, raised toilet, environmental control units)
- ...activities of daily living (ADL) (e.g., bed mobility, transfers, household mobility, dressing, self-care, toileting, sexual relations)
- ...community and leisure integration or reintegration (e.g., work/school/play)
- ...Instrumental Activities of Daily Living (IADL) (e.g., household chores, hobbies)

- ...mobility techniques
- ...fall prevention and fall recovery strategies
- ...behavior modification and strategies that enhance functioning (e.g., energy conservation, pacing, pre-activity planning, reminder schedules)

Manual Therapy Techniques

- Perform spinal manual traction
- Perform peripheral manual traction
- Perform and/or train patient/client/caregiver in soft tissue mobilization (e.g., connective tissue massage, therapeutic massage, foam rolling)
- Perform peripheral joint range of motion
- Perform peripheral mobilization/manipulation (non-thrust)
- Perform spinal mobilization/manipulation (non-thrust)
- Apply taping for...
 - ...neuromuscular reeducation
 - ...pain management

Equipment & Devices

- Apply and/or adjust...
 - ...adaptive devices (e.g., utensils, seating and positioning devices, steering wheel devices)
 - ...protective devices (e.g., braces, cushions, helmets, protective taping)
 - ...supportive devices (e.g., compression garments, corsets, elastic wraps, neck collars serial casts, short-stretch bandages)
 - ...orthotic devices (e.g., braces, shoe inserts, splints)
- Apply and/or adjust...
 - ...assistive devices/technologies (e.g., canes, crutches, walkers, wheelchairs, tilt tables, standing frames)
 - ...prosthetic devices/technologies (e.g., lower extremity and upper-extremity, microprocessor-controlled prosthetic devices)
 - ...prescribed oxygen during interventions
- Train patient/client/caregiver in the use of...
 - ...adaptive devices (e.g., utensils, seating and positioning devices, steering wheel devices)
 - ...assistive devices/technologies (e.g., canes, crutches, walkers, wheelchairs, tilt tables, standing frames)
 - ...orthotic devices (e.g., braces, shoe inserts, splints)
 - ...prosthetic devices/technologies (e.g., lower extremity and upper-extremity, microprocessor-controlled prosthetic devices)
 - ...protective devices (e.g., braces, cushions, helmets, protective taping)
 - ...supportive devices (e.g., compression garments, corsets, elastic wraps, neck collars serial casts, short-stretch bandages)

Integumentary Repair & Protection Techniques

- Perform and/or train patient/client/caregiver in...
 - ...nonselective debridement (e.g., removal of nonselective areas of devitalized tissue)
 - ...application of topical agents (e.g., cleansers, creams, moisturizers, ointments, sealants) and dressings (e.g., hydrogels, wound coverings)
 - ...desensitization techniques (e.g., brushing, tapping, use of textures)

Therapeutic Modalities

- Perform and/or train patient/client/caregiver in...
 - ...biofeedback therapy (e.g., relaxation techniques, muscle reeducation, EMG)
 - ...iontophoresis
 - ...phonophoresis
 - ...electrical stimulation therapy (e.g., neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS), functional electrical stimulation (FES), interferential therapy, high-voltage pulsed current)
 - ...cryotherapy (e.g., cold pack, ice massage, vapocoolant spray)
 - ...hydrotherapy (e.g., aquatic exercise, underwater treadmill)
 - ...ultrasound procedures
 - ...hot pack thermotherapy

...paraffin bath thermotherapy
Mechanical Modalities
Apply and/or train patient/client/caregiver in...
...intermittent pneumatic compression
...assisted movement devices (e.g., continuous passive motion devices, dynamic splint)
...mechanical spinal traction
Non-procedural Interventions
Communication
Discuss physical therapy evaluation findings, interventions, goals, prognosis, discharge planning, and plan of care with...
...supervising physical therapist
...interprofessional/interdisciplinary team members
...patient/client and caregiver
Provide written, oral, and electronic information to the patient/client and/or caregiver
Documentation
Document...
...data collection results
...intervention(s) and patient/client response(s) to intervention
...patient/client and caregiver education
...communication with the interdisciplinary/interprofessional team related to the patient/client's care
...rationale for billing and reimbursement
...disclosure and consent (e.g., disclosure of medical information, consent for treatment)
Assign billing codes for physical therapy treatment provided
Education
Educate patient/client and/or caregiver about...
...patient/client's current condition and health status (e.g., nature of the condition, potential benefits of physical therapy interventions, potential treatment outcomes)
...role of the physical therapist and/or physical therapist assistant in patient/client management
...lifestyle and behavioral changes to promote wellness (e.g., nutrition, physical activity, tobacco cessation)
...the role of physical therapy in transitional planning (e.g., hospice, palliative care, setting changes)
Educate the healthcare team about...
...the role of the physical therapist and/or physical therapist assistant in patient/client management
...safe patient handling (e.g., injury prevention, ergonomics, use of equipment)
Educate community groups on lifestyle and behavioral changes to promote wellness (e.g., nutrition, physical activity, tobacco cessation)
Participate in the clinical education of students
Patient/Client & Staff Safety
Emergency Procedures
Implement emergency procedures (e.g., CPR, AED, calling a code)
Perform first aid
Implement disaster response procedures
Environmental Safety
Perform risk assessment of the physical environment (e.g., barrier-free environment, outlets, windows, floors, lighting)
Prepare and maintain a safe working environment for performing interventions (e.g., unobstructed walkways, equipment availability)
Perform regular equipment inspections and/or maintenance (e.g., modalities, assistive devices)
Infection Control
Perform and/or train patient/client and/or caregiver on appropriate infection control practices (e.g., universal precautions, hand hygiene, isolation, airborne precautions, equipment cleaning)
Research & Evidence-Based Practice
Search the literature for current best evidence
Evaluate the quality of published data

Integrate current best evidence, clinical experience, and patient values in clinical practice (e.g., clinical prediction rules, patient preference)

Compare intervention outcomes with normative data

Professional Responsibilities

Supervise support personnel (e.g., physical therapy aides)

Assign tasks to other personnel (e.g., physical therapy aides) to assist with patient/client care

Disclose financial interest in recommended products or services to patient/client

Communicate with the physical therapist when the expectations of the PTA are beyond their knowledge, skills, and abilities

Report health care providers that are suspected to not perform their professional responsibilities with reasonable skill and safety to the appropriate authorities

Report suspected cases of abuse to the appropriate authority

Report suspected illegal or unethical acts performed by health care professionals to the relevant authority

Advocate for public access to physical therapy and other healthcare services

Determine own need for professional development

Participate in learning and/or development activities (e.g., journal clubs, self-directed reading, continuing competence activities) to maintain the currency of knowledge, skills, and abilities

Practice within the federal and jurisdiction regulations and professional standards.

Participate in professional organizations

Participate in performance improvement and quality reporting activities (e.g., Physician Quality Reporting System, standardized outcomes measurement, application of health informatics)

Appendix G. Final list of Critical Knowledge and Skill Requirements

CARDIOVASCULAR & PULMONARY SYSTEMS

Cardiovascular & pulmonary systems tests/measures, including outcome measures, and their applications according to current best evidence

Anatomy and physiology of the cardiovascular & pulmonary systems as related to tests/measures

Movement analysis as related to the cardiovascular & pulmonary systems (e.g., rib cage excursion, breathing pattern)

Cardiovascular & pulmonary systems diseases/conditions and their pathophysiology to carry out the established plan of care

Nonpharmacological medical management of the cardiovascular & pulmonary systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Pharmacological management of the cardiovascular & pulmonary systems

Cardiovascular & pulmonary systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence

Anatomy and physiology of the cardiovascular & pulmonary systems as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the cardiovascular & pulmonary systems from physical therapy interventions

Adverse effects or complications on the cardiovascular & pulmonary systems from physical therapy interventions used on other systems

MUSCULOSKELETAL SYSTEM

Musculoskeletal system tests/measures, including outcome measures, and their applications according to current best evidence

Anatomy and physiology of the musculoskeletal system as related to tests/measures

Movement analysis as related to the musculoskeletal system

Joint biomechanics and their applications

Musculoskeletal system diseases/conditions and their pathophysiology to carry out the established plan of care

Nonpharmacological medical management of the musculoskeletal system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Pharmacological management of the musculoskeletal system

Connective tissue diseases/conditions and their pathophysiology to carry out the established plan of care

Musculoskeletal system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence

Anatomy and physiology of the musculoskeletal system as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the musculoskeletal system from physical therapy interventions

Adverse effects or complications on the musculoskeletal system from physical therapy interventions used on other systems

NEUROMUSCULAR & NERVOUS SYSTEMS

Neuromuscular & nervous systems tests/measures, including outcome measures, and their applications according to current best evidence

Anatomy and physiology of the neuromuscular & nervous systems as related to tests/measures

Movement analysis as related to the neuromuscular & nervous systems

Neuromuscular & nervous systems (CNS, PNS, ANS) diseases/conditions and their pathophysiology to carry out the established plan of care

Nonpharmacological medical management of the neuromuscular & nervous systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Pharmacological management of the neuromuscular & nervous systems

Neuromuscular & nervous systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence

Anatomy and physiology of the neuromuscular & nervous systems as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the neuromuscular & nervous systems from physical therapy interventions

Adverse effects or complications on the neuromuscular & nervous systems from physical therapy interventions used on other systems

Motor control as related to neuromuscular & nervous systems physical therapy interventions

Motor learning as related to neuromuscular & nervous systems physical therapy interventions

INTEGUMENTARY SYSTEM

Integumentary system tests/measures, including outcome measures, and their applications according to current best evidence

Anatomy and physiology of the integumentary system as related to tests/measures

Movement analysis as related to the integumentary system (e.g., friction, shear, pressure, and scar mobility)

Integumentary system diseases/conditions and their pathophysiology to carry out the established plan of care

Nonpharmacological medical management of the integumentary system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Pharmacological management of the integumentary system

Integumentary system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence

Anatomy and physiology of the integumentary system as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the integumentary system from physical therapy and medical/surgical interventions

Adverse effects or complications on the integumentary system from physical therapy interventions used on other systems

METABOLIC & ENDOCRINE SYSTEMS

Metabolic & endocrine systems diseases/conditions and their pathophysiology to carry out the established plan of care

Nonpharmacological medical management of the metabolic & endocrine systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Pharmacological management of the metabolic & endocrine systems

Metabolic & endocrine systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence

Anatomy and physiology of the metabolic & endocrine systems as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the metabolic & endocrine systems from physical therapy interventions

Adverse effects or complications on the metabolic & endocrine systems from physical therapy interventions used on other systems

GASTROINTESTINAL SYSTEM

Gastrointestinal system diseases/conditions and their pathophysiology to carry out the established plan of care

Nonpharmacological medical management of the gastrointestinal system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Pharmacological management of the gastrointestinal system

Gastrointestinal system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., positioning for reflux prevention, bowel programs)

Anatomy and physiology of the gastrointestinal system as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the gastrointestinal system from physical therapy interventions

Adverse effects or complications on the gastrointestinal system from physical therapy interventions used on other systems

GENITOURINARY SYSTEM

Genitourinary system diseases/conditions and their pathophysiology to carry out the established plan of care

Nonpharmacological medical management of the genitourinary system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Genitourinary system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., bladder programs, biofeedback, pelvic floor retraining)

Anatomy and physiology of the genitourinary system as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the genitourinary system from physical therapy interventions

Adverse effects or complications on the genitourinary system from physical therapy interventions used on other systems

LYMPHATIC SYSTEM

Lymphatic system tests/measures, including outcome measures, and their applications according to current best evidence

Anatomy and physiology of the lymphatic system as related to tests/measures

Movement analysis as related to the lymphatic system (e.g., posture, compensatory movement, extremity range of motion)

Lymphatic system diseases/conditions and their pathophysiology to carry out the established plan of care

Lymphatic system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence

Anatomy and physiology of the lymphatic system as related to physical therapy interventions, daily activities, and environmental factors

Adverse effects or complications on the lymphatic system from physical therapy interventions

Adverse effects or complications on the lymphatic system from physical therapy interventions used on other systems

SYSTEM INTERACTIONS

Diseases/conditions where the primary impact is on more than one system (e.g., cancer, multitrauma, sarcoidosis, autoimmune disorders, pregnancy) to carry out the established plan of care

Nonpharmacological medical management of multiple systems (e.g., diagnostic imaging, other medical tests, surgical procedures)

Pharmacological management of multiple systems, including polypharmacy

Impact of comorbidities/coexisting conditions on patient/client management (e.g., diabetes and hypertension; obesity and arthritis; dementia and hip fracture)

Psychological and psychiatric conditions that impact patient/client management (e.g., grief, depression, schizophrenia)

Dimensions of pain that impact patient/client management (e.g., psychological, social, physiological, neurological, mechanical)

EQUIPMENT, DEVICES, & TECHNOLOGIES

Application and adjustments, indications, contraindications, and precautions of assistive and adaptive devices/technologies (e.g., walkers, wheelchairs, adaptive seating systems and positioning devices, mechanical lifts)

Application and adjustments, indications, contraindications, and precautions of prosthetic devices/technologies (e.g., lower-extremity and upper-extremity, microprocessor-controlled prosthetic devices)

THERAPEUTIC MODALITIES

Applications, indications, contraindications, and precautions of thermal modalities

Applications, indications, contraindications, and precautions of iontophoresis

Applications, indications, contraindications, and precautions of electrotherapy modalities, excluding iontophoresis (e.g., neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS), functional electrical stimulation (FES), interferential therapy, high-voltage pulsed current)

Applications, indications, contraindications, and precautions of phonophoresis

Applications, indications, contraindications, and precautions of ultrasound modalities, excluding phonophoresis

Applications, indications, contraindications, and precautions of mechanical modalities (e.g., mechanical motion devices, traction devices)

Applications, indications, contraindications, and precautions of biofeedback

Applications, indications, contraindications, and precautions of intermittent compression

SAFETY & PROTECTION

Factors influencing safety and injury prevention (e.g., safe patient handling, fall prevention, equipment maintenance, environmental safety)

Function, implications, and related precautions of intravenous lines, tubes, catheters, monitoring devices, and mechanical ventilators/oxygen delivery devices

Emergency preparedness (e.g., CPR, first aid, disaster response)

Infection control procedures (e.g., standard/universal precautions, isolation techniques, sterile technique)

Signs/symptoms of physical, sexual, and psychological abuse and neglect

PROFESSIONAL RESPONSIBILITIES

Standards of documentation

Patient/client rights (e.g., ADA, IDEA, HIPAA, patient bill of rights)

Human resource legal issues (e.g., OSHA, sexual harassment)

Roles and responsibilities of the physical therapist, physical therapist assistant, other health-care professionals, and support staff

Standards of professional ethics

Standards of billing, coding, and reimbursement

Obligations for reporting illegal, unethical, or unprofessional behaviors (e.g., fraud, abuse, neglect)

State and federal laws, rules, regulations, and industry standards set by state and accrediting bodies (e.g., state licensing entities, Joint Commission, CARF, CMS)

Risk management and quality assurance (e.g., policies and procedures, incident reports, peer chart review)

Cultural factors and/or characteristics that affect patient/client management (e.g., language differences, disability, ethnicity, customs, demographics, religion)

Socioeconomic factors that affect patient/client management

Health information technology (e.g., electronic medical records, telemedicine)

RESEARCH & EVIDENCE-BASED PRACTICE

Research methodology and interpretation (e.g., qualitative, quantitative, levels of evidence)

Data collection techniques (e.g., surveys, direct observation)

Measurement science (e.g., reliability, validity)

Techniques for accessing evidence (e.g., peer-reviewed publications, scientific proceedings, guidelines, clinical prediction rules)

Appendix H. Descriptions of Final Test Blueprint Categories

PHYSICAL THERAPIST

LICENSURE EXAMINATION

DETAILED EXAMINATION BLUEPRINT DESCRIPTIONS

CARDIOVASCULAR & PULMONARY SYSTEMS

Physical Therapy Data Collection. This category refers to knowledge of the types and applications of cardiovascular & pulmonary systems tests/measures, including outcome measures, according to current best evidence. The category includes the reaction of the cardiovascular & pulmonary systems to tests/measures and the mechanics of body movement as related to the cardiovascular & pulmonary systems. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Cardiovascular & pulmonary systems tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the cardiovascular & pulmonary systems as related to tests/measures
- Movement analysis as related to the cardiovascular & pulmonary systems (e.g., rib cage excursion, breathing pattern)

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the cardiovascular & pulmonary systems to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Cardiovascular & pulmonary systems diseases/conditions and their pathophysiology to carry out the established plan of care
- Nonpharmacological medical management of the cardiovascular & pulmonary systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the cardiovascular & pulmonary systems

Interventions. This category refers to cardiovascular & pulmonary systems interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the cardiovascular & pulmonary systems of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Cardiovascular & pulmonary systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the cardiovascular & pulmonary systems as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the cardiovascular & pulmonary systems from physical therapy interventions
- Adverse effects or complications on the cardiovascular & pulmonary systems from physical therapy interventions used on other systems

MUSCULOSKELETAL SYSTEM

Physical Therapy Data Collection. This category refers to knowledge of the types and applications of musculoskeletal system tests/measures, including outcome measures, according to current best evidence. The category includes the reaction of the musculoskeletal system to tests/measures and the mechanics of body movement as related to the musculoskeletal system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Musculoskeletal system tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the musculoskeletal system as related to tests/measures
- Movement analysis as related to the musculoskeletal system
- Joint biomechanics and their applications

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the musculoskeletal system to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Musculoskeletal system diseases/conditions and their pathophysiology to carry out the established plan of care
- Nonpharmacological medical management of the musculoskeletal system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the musculoskeletal system
- Connective tissue diseases/conditions and their pathophysiology to carry out the established plan of care

Interventions. This category refers to musculoskeletal system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the musculoskeletal system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Musculoskeletal system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the musculoskeletal system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the musculoskeletal system from physical therapy interventions
- Adverse effects or complications on the musculoskeletal system from physical therapy interventions used on other systems

NEUROMUSCULAR & NERVOUS SYSTEMS

Physical Therapy Data Collection. This category refers to knowledge of the types and applications of neuromuscular & nervous systems tests/measures, including outcome measures, according to current best evidence. The category includes the reaction of the neuromuscular & nervous systems to tests/measures and the mechanics of body movement as related to the neuromuscular & nervous systems. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Neuromuscular & nervous systems tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the neuromuscular & nervous systems as related to tests/measures
- Movement analysis as related to the neuromuscular & nervous systems

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the neuromuscular & nervous systems to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Neuromuscular & nervous systems (CNS, PNS, ANS) diseases/conditions and their pathophysiology to carry out the established plan of care
- Nonpharmacological medical management of the neuromuscular & nervous systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the neuromuscular & nervous systems

Interventions. This category refers to neuromuscular & nervous systems interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the neuromuscular & nervous systems of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Neuromuscular & nervous systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the neuromuscular & nervous systems as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the neuromuscular & nervous systems from physical therapy interventions
- Adverse effects or complications on the neuromuscular & nervous systems from physical therapy interventions used on other systems
- Motor control as related to neuromuscular & nervous systems physical therapy interventions
- Motor learning as related to neuromuscular & nervous systems physical therapy interventions

INTEGUMENTARY SYSTEM

Physical Therapy Data Collection. This category refers to knowledge of the types and applications of integumentary system tests/measures, including outcome measures, according to current best evidence. The category includes the reaction of the integumentary system to tests/measures and the mechanics of body movement as related to the integumentary system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Integumentary system tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the integumentary system as related to tests/measures
- Movement analysis as related to the integumentary system (e.g., friction, shear, pressure, and scar mobility)

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the integumentary system to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Integumentary system diseases/conditions and their pathophysiology to carry out the established plan of care
- Nonpharmacological medical management of the integumentary system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the integumentary system

Interventions. This category refers to integumentary system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the integumentary system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Integumentary system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the integumentary system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the integumentary system from physical therapy and medical/surgical interventions
- Adverse effects or complications on the integumentary system from physical therapy interventions used on other systems

METABOLIC & ENDOCRINE SYSTEMS

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the metabolic & endocrine systems to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Metabolic & endocrine systems diseases/conditions and their pathophysiology to carry out the established plan of care
- Nonpharmacological medical management of the metabolic & endocrine systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the metabolic & endocrine systems

Interventions. This category refers to metabolic & endocrine systems interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the metabolic & endocrine systems of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Metabolic & endocrine systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the metabolic & endocrine systems as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the metabolic & endocrine systems from physical therapy interventions
- Adverse effects or complications on the metabolic & endocrine systems from physical therapy interventions used on other systems

GASTROINTESTINAL SYSTEM

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the gastrointestinal system to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Gastrointestinal system diseases/conditions and their pathophysiology to carry out the established plan of care
- Nonpharmacological medical management of the gastrointestinal system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the gastrointestinal system

Interventions. This category refers to gastrointestinal system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the gastrointestinal system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Gastrointestinal system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., positioning for reflux prevention, bowel programs)
- Anatomy and physiology of the gastrointestinal system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the gastrointestinal system from physical therapy interventions
- Adverse effects or complications on the gastrointestinal system from physical therapy interventions used on other systems

GENITOURINARY SYSTEM

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the genitourinary system to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Genitourinary system diseases/conditions and their pathophysiology to carry out the established plan of care
- Nonpharmacological medical management of the genitourinary system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)

Interventions. This category refers to genitourinary system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the genitourinary system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Genitourinary system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., bladder programs, biofeedback, pelvic floor retraining)
- Anatomy and physiology of the genitourinary system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the genitourinary system from physical therapy interventions
- Adverse effects or complications on the genitourinary system from physical therapy interventions used on other systems

LYMPHATIC SYSTEM

Physical Therapy Data Collection. This category refers to knowledge of the types and applications of lymphatic system tests/measures, including outcome measures, according to current best evidence. The category includes the reaction of the lymphatic system to tests/measures and the mechanics of body movement as related to the lymphatic system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Lymphatic system tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the lymphatic system as related to tests/measures
- Movement analysis as related to the lymphatic system (e.g., posture, compensatory movement, extremity range of motion)

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions of the lymphatic system to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Lymphatic system diseases/conditions and their pathophysiology to carry out the established plan of care

Interventions. This category refers to lymphatic system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the lymphatic system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Lymphatic system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the lymphatic system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the lymphatic system from physical therapy interventions
- Adverse effects or complications on the lymphatic system from physical therapy interventions used on other systems

SYSTEM INTERACTIONS

Diseases/Conditions that Impact Effective Treatment. This category refers to foundational scientific principles and knowledge of diseases and conditions involving system interactions to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Diseases/conditions where the primary impact is on more than one system (e.g., cancer, multitrauma, sarcoidosis, autoimmune disorders, pregnancy) to carry out the established plan of care
- Nonpharmacological medical management of multiple systems (e.g., diagnostic imaging, other medical tests, surgical procedures)
- Pharmacological management of multiple systems, including polypharmacy
- Impact of comorbidities/coexisting conditions on patient/client management (e.g., diabetes and hypertension; obesity and arthritis; dementia and hip fracture)
- Psychological and psychiatric conditions that impact patient/client management (e.g., grief, depression, schizophrenia)
- Dimensions of pain that impact patient/client management (e.g., psychological, social, physiological, neurological, mechanical)

EQUIPMENT, DEVICES, & TECHNOLOGIES

This category refers to the different types of equipment, devices, & technologies, use requirements, and/or contextual determinants, according to current best evidence, as well as any other influencing factors involved in the application of equipment, devices, & technologies, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Application and adjustments, indications, contraindications, and precautions of assistive and adaptive devices/technologies (e.g., walkers, wheelchairs, adaptive seating systems and positioning devices, mechanical lifts)
- Application and adjustments, indications, contraindications, and precautions of prosthetic devices/technologies (e.g., lower-extremity and upper-extremity, microprocessor-controlled prosthetic devices)

THERAPEUTIC MODALITIES

This category refers to the different types of therapeutic modalities, use requirements, and/or contextual determinants, according to current best evidence, as well as any other influencing factors involved in the application of therapeutic modalities, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Applications, indications, contraindications, and precautions of thermal modalities
- Applications, indications, contraindications, and precautions of iontophoresis
- Applications, indications, contraindications, and precautions of electrotherapy modalities, excluding iontophoresis (e.g., neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS), functional electrical stimulation (FES), interferential therapy, high-voltage pulsed current)
- Applications, indications, contraindications, and precautions of phonophoresis
- Applications, indications, contraindications, and precautions of ultrasound modalities, excluding phonophoresis
- Applications, indications, contraindications, and precautions of mechanical modalities (e.g., mechanical motion devices, traction devices)
- Applications, indications, contraindications, and precautions of biofeedback
- Applications, indications, contraindications, and precautions of intermittent compression

SAFETY & PROTECTION

This category refers to the critical issues involved in patient/client safety and protection and the responsibilities of health-care providers to ensure that patient/client management and health-care decisions take place in a secure environment.

- Factors influencing safety and injury prevention (e.g., safe patient handling, fall prevention, equipment maintenance, environmental safety)
- Function, implications, and related precautions of intravenous lines, tubes, catheters, monitoring devices, and mechanical ventilators/oxygen delivery devices
- Emergency preparedness (e.g., CPR, first aid, disaster response)
- Infection control procedures (e.g., standard/universal precautions, isolation techniques, sterile technique)
- Signs/symptoms of physical, sexual, and psychological abuse and neglect

PROFESSIONAL RESPONSIBILITIES

This category refers to the responsibilities of health-care providers to ensure that patient/client management and health-care decisions take place in a trustworthy environment.

- Standards of documentation
- Patient/client rights (e.g., ADA, IDEA, HIPAA, patient bill of rights)
- Human resource legal issues (e.g., OSHA, sexual harassment)
- Roles and responsibilities of the physical therapist, physical therapist assistant, other health-care professionals, and support staff
- Standards of professional ethics
- Standards of billing, coding, and reimbursement
- Obligations for reporting illegal, unethical, or unprofessional behaviors (e.g., fraud, abuse, neglect)
- State and federal laws, rules, regulations, and industry standards set by state and accrediting bodies (e.g., state licensing entities, Joint Commission, CARF, CMS)
- Risk management and quality assurance (e.g., policies and procedures, incident reports, peer chart review)
- Cultural factors and/or characteristics that affect patient/client management (e.g., language differences, disability, ethnicity, customs, demographics, religion)
- Socioeconomic factors that affect patient/client management
- Health information technology (e.g., electronic medical records, telemedicine)

RESEARCH & EVIDENCE-BASED PRACTICE

This category refers to the knowledge of basic research methods and data collection techniques necessary for interpretation of information sources and practice research to support patient/client management decisions fundamental to evidence-based practice.

- Research methodology and interpretation (e.g., qualitative, quantitative, levels of evidence)
- Data collection techniques (e.g., surveys, direct observation)
- Measurement science (e.g., reliability, validity)
- Techniques for accessing evidence (e.g., peer-reviewed publications, scientific proceedings, guidelines, clinical prediction rules)

MUSCULOSKELETAL SYSTEM

Physical Therapy Examination. This category refers to knowledge of the types and applications of musculoskeletal system tests/measures, including outcome measures, according to current best evidence, and their relevance to information collected from the history and systems review. The category includes the reaction of the musculoskeletal system to tests/measures and the mechanics of body movement as related to the musculoskeletal system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Musculoskeletal system tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the musculoskeletal system as related to tests/measures
- Movement analysis as related to the musculoskeletal system
- Joint biomechanics and their applications

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions of the musculoskeletal system according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Musculoskeletal system diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of the musculoskeletal system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the musculoskeletal system
- Differential diagnoses related to diseases/conditions of the musculoskeletal system
- Connective tissue diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Differential diagnoses related to diseases/conditions of the connective tissue

Interventions. This category refers to musculoskeletal system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the musculoskeletal system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Musculoskeletal system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the musculoskeletal system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the musculoskeletal system from physical therapy interventions
- Adverse effects or complications on the musculoskeletal system from physical therapy interventions used on other systems

NEUROMUSCULAR & NERVOUS SYSTEMS

Physical Therapy Examination. This category refers to knowledge of the types and applications of neuromuscular & nervous systems tests/measures, including outcome measures, according to current best evidence, and their relevance to information collected from the history and systems review. The category includes the reaction of the neuromuscular & nervous systems to tests/measures and the mechanics of body movement as related to the neuromuscular & nervous systems. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Neuromuscular & nervous systems tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the neuromuscular & nervous systems as related to tests/measures
- Movement analysis as related to the neuromuscular & nervous systems

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions of the neuromuscular & nervous systems according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Neuromuscular & nervous systems (CNS, PNS, ANS) diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of the neuromuscular & nervous systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the neuromuscular & nervous systems
- Differential diagnoses related to diseases/conditions of the neuromuscular & nervous systems (CNS, PNS, ANS)

Interventions. This category refers to neuromuscular & nervous systems interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the neuromuscular & nervous systems of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Neuromuscular & nervous systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the neuromuscular & nervous systems as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the neuromuscular & nervous systems from physical therapy interventions
- Adverse effects or complications on the neuromuscular & nervous systems from physical therapy interventions used on other systems
- Motor control as related to neuromuscular & nervous systems physical therapy interventions
- Motor learning as related to neuromuscular & nervous systems physical therapy interventions

INTEGUMENTARY SYSTEM

Physical Therapy Examination. This category refers to knowledge of the types and applications of integumentary system tests/measures, including outcome measures, according to current best evidence, and their relevance to information collected from the history and systems review. The category includes the reaction of the integumentary system to tests/measures and the mechanics of body movement as related to the integumentary system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Integumentary system tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the integumentary system as related to tests/measures
- Movement analysis as related to the integumentary system (e.g., friction, shear, pressure, and scar mobility)

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions of the integumentary system according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Integumentary system diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of the integumentary system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the integumentary system
- Differential diagnoses related to diseases/conditions of the integumentary system

Interventions. This category refers to integumentary system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the integumentary system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Integumentary system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the integumentary system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the integumentary system from physical therapy and medical/surgical interventions
- Adverse effects or complications on the integumentary system from physical therapy interventions used on other systems

METABOLIC & ENDOCRINE SYSTEMS

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions of the metabolic & endocrine systems according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Metabolic & endocrine systems diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of the metabolic & endocrine systems (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the metabolic & endocrine systems
- Differential diagnoses related to diseases/conditions of the metabolic & endocrine systems

Interventions. This category refers to metabolic & endocrine systems interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the metabolic & endocrine systems of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Metabolic & endocrine systems physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the metabolic & endocrine systems as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the metabolic & endocrine systems from physical therapy interventions
- Adverse effects or complications on the metabolic & endocrine systems from physical therapy interventions used on other systems

GASTROINTESTINAL SYSTEM

Physical Therapy Examination. This category refers to knowledge of the types and applications of gastrointestinal system tests/measures, including outcome measures, according to current best evidence, and their relevance to information collected from the history and systems review. The category includes the reaction of the gastrointestinal system to tests/measures and the mechanics of body movement as related to the gastrointestinal system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Gastrointestinal system tests/measures, including outcome measures, and their applications according to current best evidence (e.g., bowel dysfunction impact questionnaires, Murphy test, Roving test, McBurney point sign)
- Anatomy and physiology of the gastrointestinal system as related to tests/measures
- Movement analysis as related to the gastrointestinal system (e.g., obturator, psoas, positioning for bowel movement)

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions of the gastrointestinal system according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Gastrointestinal system diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of the gastrointestinal system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the gastrointestinal system
- Differential diagnoses related to diseases/conditions of the gastrointestinal system

Interventions. This category refers to gastrointestinal system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the gastrointestinal system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Gastrointestinal system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., positioning for reflux prevention, bowel programs)
- Anatomy and physiology of the gastrointestinal system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the gastrointestinal system from physical therapy interventions
- Adverse effects or complications on the gastrointestinal system from physical therapy interventions used on other systems

GENITOURINARY SYSTEM

Physical Therapy Examination. This category refers to knowledge of the types and applications of genitourinary system tests/measures, including outcome measures, according to current best evidence, and their relevance to information collected from the history and systems review. The category includes the reaction of the genitourinary system to tests/measures and the mechanics of body movement as related to the genitourinary system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Genitourinary system tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the genitourinary system as related to tests/measures

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions of the genitourinary system according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Genitourinary system diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of the genitourinary system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Pharmacological management of the genitourinary system
- Differential diagnoses related to diseases/conditions of the genitourinary system

Interventions. This category refers to genitourinary system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the genitourinary system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Genitourinary system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence (e.g., bladder programs, biofeedback, pelvic floor retraining)
- Anatomy and physiology of the genitourinary system as related to physical therapy interventions, daily activities, and environmental factors
- Adverse effects or complications on the genitourinary system from physical therapy interventions
- Adverse effects or complications on the genitourinary system from physical therapy interventions used on other systems

LYMPHATIC SYSTEM

Physical Therapy Examination. This category refers to knowledge of the types and applications of lymphatic system tests/measures, including outcome measures, according to current best evidence, and their relevance to information collected from the history and systems review. The category includes the reaction of the lymphatic system to tests/measures and the mechanics of body movement as related to the lymphatic system. Information covered in these areas supports appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Lymphatic system tests/measures, including outcome measures, and their applications according to current best evidence
- Anatomy and physiology of the lymphatic system as related to tests/measures
- Movement analysis as related to the lymphatic system (e.g., posture, compensatory movement, extremity range of motion)

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions of the lymphatic system according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Lymphatic system diseases/conditions and their pathophysiology to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of the lymphatic system (e.g., diagnostic imaging, laboratory test values, other medical tests, surgical procedures)
- Differential diagnoses related to diseases/conditions of the lymphatic system

Interventions. This category refers to lymphatic system interventions (including types, applications, responses, and potential complications), according to current best evidence, as well as the impact on the lymphatic system of interventions performed on other systems in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Lymphatic system physical therapy interventions and their applications for rehabilitation, health promotion, and performance according to current best evidence
- Anatomy and physiology of the lymphatic system as related to interventions, daily activities, and environmental factors
- Adverse effects or complications on the lymphatic system from physical therapy interventions
- Adverse effects or complications on the lymphatic system from physical therapy interventions used on other systems

SYSTEM INTERACTIONS

Foundations for Evaluation, Differential Diagnosis, & Prognosis. This category refers to the interpretation of knowledge about diseases/conditions involving system interactions according to current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Diseases/conditions where the primary impact is on more than one system (e.g., cancer, multitrauma, sarcoidosis, autoimmune disorders, pregnancy) to establish and carry out a plan of care, including prognosis
- Nonpharmacological medical management of multiple systems (e.g., diagnostic imaging, other medical tests, surgical procedures)
- Pharmacological management of multiple systems, including polypharmacy
- Differential diagnoses related to diseases/conditions where the primary impact is on more than one system
- Impact of comorbidities/coexisting conditions on patient/client management (e.g., diabetes and hypertension; obesity and arthritis; dementia and hip fracture)
- Psychological and psychiatric conditions that impact patient/client management (e.g., grief, depression, schizophrenia)
- Dimensions of pain that impact patient/client management (e.g., psychological, social, physiological, neurological, mechanical)

EQUIPMENT, DEVICES, & TECHNOLOGIES

This category refers to the different types of equipment, devices, & technologies, use requirements, and/or contextual determinants, as well as any other influencing factors involved in the selection and application of equipment, devices, & technologies, including consideration of current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Applications and adjustments, indications, contraindications, and precautions of assistive and adaptive devices/technologies (e.g., walkers, wheelchairs, adaptive seating systems and positioning devices, mechanical lifts)
- Applications and adjustments, indications, contraindications, and precautions of prosthetic devices/technologies (e.g., lower-extremity and upper-extremity, microprocessor-controlled prosthetic devices)
- Applications and adjustments, indications, contraindications, and precautions of protective, supportive, and orthotic devices/technologies (e.g., braces, helmets, taping, compression garments, serial casts, shoe inserts, splints, robotic exoskeleton)

THERAPEUTIC MODALITIES

This category refers to the underlying principles for the use of therapeutic modalities as well as the justification for the selection and use of various types of therapeutic modalities, including consideration of current best evidence, in order to support appropriate and effective patient/client management for rehabilitation, health promotion, and performance across the lifespan.

- Applications, indications, contraindications, and precautions of thermal modalities
- Applications, indications, contraindications, and precautions of iontophoresis
- Applications, indications, contraindications, and precautions of electrotherapy modalities, excluding iontophoresis (e.g., neuromuscular electrical stimulation (NMES), transcutaneous electrical nerve stimulation (TENS), functional electrical stimulation (FES), interferential therapy, high-voltage pulsed current)
- Applications, indications, contraindications, and precautions of phonophoresis
- Applications, indications, contraindications, and precautions of ultrasound modalities, excluding phonophoresis
- Applications, indications, contraindications, and precautions of mechanical modalities (e.g., mechanical motion devices, traction devices)
- Applications, indications, contraindications, and precautions of biofeedback
- Applications, indications, contraindications, and precautions of intermittent compression

SAFETY & PROTECTION

This category refers to the critical issues involved in patient/client safety and protection and the responsibilities of health-care providers to ensure that patient/client management and health-care decisions take place in a secure environment.

- Factors influencing safety and injury prevention (e.g., safe patient handling, fall prevention, equipment maintenance, environmental safety)
- Function, implications, and related precautions of intravenous lines, tubes, catheters, monitoring devices, and mechanical ventilators/oxygen delivery devices
- Emergency preparedness (e.g., CPR, first aid, disaster response)
- Infection control procedures (e.g., standard/universal precautions, isolation techniques, sterile technique)
- Signs/symptoms of physical, sexual, and psychological abuse and neglect

PROFESSIONAL RESPONSIBILITIES

This category refers to the responsibilities of health-care providers to ensure that patient/client management and health-care decisions take place in a trustworthy environment.

- Standards of documentation
- Patient/client rights (e.g., ADA, IDEA, HIPAA, patient bill of rights)
- Human resource legal issues (e.g., OSHA, sexual harassment)
- Roles and responsibilities of the physical therapist, physical therapist assistant, other health-care professionals, and support staff
- Standards of professional ethics
- Standards of billing, coding, and reimbursement
- Obligations for reporting illegal, unethical, or unprofessional behaviors (e.g., fraud, abuse, neglect)
- State and federal laws, rules, regulations, and industry standards set by state and accrediting bodies (e.g., state licensing entities, Joint Commission, CARF, CMS)
- Risk management and quality assurance (e.g., policies and procedures, incident reports, peer chart review)
- Cultural factors and/or characteristics that affect patient/client management (e.g., language differences, disability, ethnicity, customs, demographics, religion)
- Socioeconomic factors that affect patient/client management
- Health information technology (e.g., electronic medical records, telemedicine)

RESEARCH & EVIDENCE-BASED PRACTICE

This category refers to the application of measurement principles and research methods to make reasoned and appropriate assessment and to the interpretation of information sources and practice research to support patient/client management decisions fundamental to evidence-based practice.

- Research methodology and interpretation (e.g., qualitative, quantitative, levels of evidence)
- Data collection techniques (e.g., surveys, direct observation)
- Measurement science (e.g., reliability, validity)
- Techniques for accessing evidence (e.g., peer-reviewed publications, scientific proceedings, guidelines, clinical prediction rules)
- Statistics (e.g., t-test, chi-square, correlation coefficient, ANOVA, likelihood ratio, effect size, confidence interval)