

Original Research

# The Revision of Integumentary/Wound Management Education Recommendations for Entry-Level Physical Therapists: A Delphi Study.

Karen A. Gibbs, PT, PhD, DPT, CWS<sup>1</sup>; Kathryn Panasci, PT, DPT, CWS<sup>2</sup>; Hope A. Martinez, SPT<sup>1</sup>; John S. Mantanona, SPT<sup>1</sup>; Melinda G. Powers, SPT<sup>1</sup>; Rachael L. Sausman, SPT<sup>1</sup>; Deborah M. Wendland, PT, DPT, PhD, CPed<sup>3</sup>

- 1 Texas State University, Department of Physical Therapy
- 2 Texas Tech University Health Science Center, Department of Rehabilitation Sciences
- 3 Mercer University, Department of Physical Therapy

**Purpose:** The purpose of this report was to describe the process for developing a consensus-based update to previously published entry-level Doctor of Physical Therapy (DPT) integumentary/wound management curriculum recommendations.

**Methods:** Content items from the 2014 recommendations were populated into Qualtrics and over 3,000 email invitations were sent to academic educators, clinical instructors, and ACEWM Wound Management Special Interest Group members. Content items were reviewed through a 3- round Delphi process.

**Results:** Over 130 professionals participated in Round 1, 46 in Round 2, and 38 of those 46 in Round 3. Several new content items were recommended along with multiple laboratory instruction suggestions. Final data supported the removal of 17 original items, including whirlpool and factitious wounds, and the addition of 75 new items, including shockwave therapy and fluorescence imaging. Each content item was organized into "Need to Include" and "Nice to Include" sections with one example learning objective and one hands-on laboratory activity provided in each category.

**Conclusions:** Updated content, new suggested laboratory activities, and streamlined organization will make the consensus-based 2023 recommendations easier to utilize and more helpful to educators and clinicians in planning didactic and clinical content as they prepare future physical therapists to meet entry-level practice expectations.

**Keywords:** Physical therapist entry-level education, wound management, physical therapy, integumentary/wound management curriculum recommendations

Corresponding Author:

Karen A. Gibbs ; kgibbs@txstate.edu

Texas State University

Department of Physical Therapy

200 Bobcat Way,

Willow Hall, Suite 336,

Round Rock, TX 78665

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## 1. Introduction

Ever advancing knowledge and technology drives change in healthcare education and practice. Subsequently, integumentary/wound management-related knowledge and skill expectations for entry-level physical therapists continue to grow and expand.<sup>1-4</sup> The Academy of Clinical Electrophysiology & Wound Management's (ACEWM) Wound Management Special Interest Group (WMSIG) developed a list of 25 initial curriculum recommendations over 20 years ago (Table 1). In 2008, the document was updated<sup>5</sup> based on content included in the American Physical Therapy Association's (APTA) *Minimum Required Skills of Physical Therapist Graduates at Entry-Level*,<sup>6</sup> *A Normative Model of Physical Therapist Professional Education: Version 2004*,<sup>7</sup> and current Commission on Accreditation in Physical Therapy Education (CAPTE) accreditation expectations. Example objectives for classroom and clinical settings were also added. While the extra detail was beneficial, informal feedback from academic faculty indicated that the second version was somewhat overwhelming, moving from the original two-page document to over 15 pages of detailed content items and objectives. Considering that many Doctor of Physical Therapy (DPT) faculty have limited curricular hours in which to cover integumentary/wound management content,<sup>3</sup> this exhaustive list was not as useful as it could have been, as it failed to

indicate which items were recommended as “should be” included and which would be “nice” to include if time allowed.<sup>5</sup> The subsequent third update in 2014 did not make this designation either, perpetuating the somewhat cumbersome design and organization of the 2008 document.<sup>8</sup>

The purpose of this report was to describe the process for developing a consensus-based update to the entry-level DPT integumentary/wound management curriculum recommendation document and to introduce the new 2023 Entry-Level Physical Therapist Curriculum Recommendations for Integumentary/Wound Management. This update reflects the thoughts and opinions of WMSIG members, entry-level physical therapist educators, licensed practitioners, and clinical instructors (CIs) teaching and/or practicing in the area of integumentary care and wound management with recommendations organized into “Need to Include” and “Nice to Include” content item categories.

## 2. Materials and Methods

### *Survey Development*

A survey was developed to gather descriptive data about contemporary integumentary and wound management content recommendations for entry-level DPT education curricula. Questions were informed by the items included in the 2014 update of the ACEWM’s Guide for Integumentary/Wound Management Content in Professional Physical Therapist Education.<sup>8</sup> A 5-point Likert scale (i.e., Don’t Need to Know; Nice to Know, But Not Necessary; Absolutely Need to Know; Important But Considered General PT Content; More Appropriate for Post-Professional Education) was used to clarify the importance of content for inclusion into updated curricular recommendations. Nineteen demographic questions (Table 2) were included to identify participant geographical region, level of experience and expertise, and role in DPT integumentary/wound management education (e.g., didactic vs. clinical). Additionally, open-response questions were added to each content area (e.g., physiology of healing, vascular testing, various wound diagnoses, debridement) as a means for participants to identify additional topics which should be included to reflect updates in contemporary practice, as well as to capture ideas for lab activities to support presentation of the content. After Institutional Review Board (IRB) approval was received from all three researcher universities, the survey was piloted with six participants to assess clarity and content validity. Revisions were made according to feedback and a second survey was distributed to the same pilot group to test survey reliability. All Likert scale questions had complete reliability with identical responses between the first and second surveys. The survey was subsequently finalized, and 263 questions were populated into Qualtrics (Qualtrics, Provo, UT) as the Round 1 survey.

### *Survey Administration: A Delphi Approach*

Potential participants for this study were all current WMSIG members as of October 2022, all U.S. entry-level physical therapist education programs, current CIs for five entry-level physical therapist education programs, and anyone meeting inclusion criteria invited by another individual receiving an invitation. Inclusion criteria consisted of involvement in integumentary/wound management as an entry-level physical therapist educator or licensed clinical practitioner or having active WMSIG membership.

A Delphi approach was chosen for this study to develop consensus-based recommendations. The final question of the Round 1 survey inquired if the participant would

like to continue in the Delphi process. If the response was “YES”, they were redirected to a separate Qualtrics survey to enter their email address. If the response was “NO”, the survey ended. This extra step was included to separate any personally identifiable information from the Round 1 survey data. All rounds of data collection were anonymous.

The Round 2 survey provided a summary of all Round 1 content items reaching 75% agreement for inclusion (Absolutely Need to Know plus Important But Considered General PT Content). The 75% cutoff level was chosen for all rounds prior to survey distribution to be consistent with published literature.<sup>9-11</sup> The Likert scale was narrowed to three options (i.e., Don’t Need to Know; Nice to Know, But Not Necessary; and Absolutely Need to Know) to facilitate consensus on content items not reaching the threshold. Eighty-nine new content items recommended from participants in Round 1 were added using the original five-point Likert scale.

The Round 3 survey provided a summary of Round 2 items that reached 75% consensus for inclusion. The Likert scale for content items from Round 1 still not reaching consensus in Round 2 were further reduced to two options (i.e., Include in Entry-Level Education and Do Not Include in Entry-Level Education) to determine final consensus. Items reaching 75% consensus to “Include” were added as Need to Include content; items receiving  $\geq 50\%$  but  $< 75\%$  consensus to “Include” were added as Nice to Know. All items reaching 75% consensus for exclusion (31 total items across all rounds) were immediately eliminated.

The 89 newly suggested content items added to the Round 2 survey that did not reach consensus were presented with the same three-point Likert question as previously used. These items were subsequently rated a second time with the two-point Likert questions so these final items could be resolved in the Round 3 survey, just as with the original content items.

### 3. Results

The Qualtrics survey was directly emailed to 379 U.S. entry-level DPT education program contacts as listed on the APTA website and 601 WMSIG members. A total of 2,231 invitations were also emailed to CIs from two private west-coast DPT program, two south-central public DPT programs, and one southeast private DPT program. Potential participants were invited to share the anonymous email survey link with anyone they felt met the inclusion criteria. Based on this information, at least 3,211 survey invitations were sent by the researchers. Some individuals likely received the survey invitation multiple times, as they may have been included in more than one of the potential participant categories, but surveys could only be completed once on any given device. One hundred and thirty-seven physical therapists participated in Round 1 with 60 agreeing to participate in the Delphi project. Forty-six of the 60 that agreed to continue participated in Round 2; 38 of the 46 from Round 2 (83%) participated in Round 3.

Round 1 included participants from all five geographic regions (Figure 1). Rounds 2 and 3 had similar percentage representation except there were no participants from the Pacific region. The majority of participants in all three rounds reported more than 20 years of professional practice. In Round 1, 39% of the participants reported wound-related specialization; 54% in Round 2 and 60% in Round 3 had wound-related specializations. Seventy-one percent of participants in Round 1 reported some level of academic teaching

within the last three years with 83% in Round 2 and 86% in Round 3. Regarding clinical practice, 89% of Round 1, 84% of Round 2, and 83% of Round 3 participants reported some level of clinical practice within the last three years.

Figure 1: Participant geographical region.

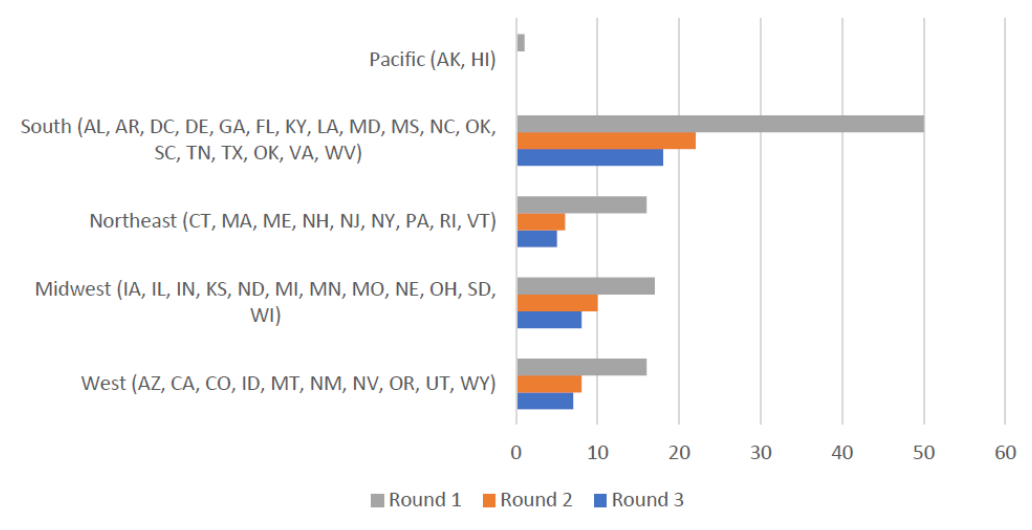


Figure 1. Participant geographical region

Two hundred thirteen items reached  $\geq 75\%$  agreement as “Absolutely Need to Know” or “Important but Considered General PT Content” in Rounds 1 and 2. An additional 20 items reached  $\geq 75\%$  consensus as “Include in Entry-Level Education” in Round 3. Eight of these items were merged to avoid redundancy (e.g., “general timeframes for healing” was merged with “normal physiology of tissue healing, including phases & general timeframes”) resulting in a total of 225 final consensus-based items. These 225 content items are listed as “Need to Include” in the 2023 curricular recommendations document. Regarding “Nice to Know” items, 24 received  $\geq 50\%$  consensus as “Nice to Know” and  $< 25\%$  for “Absolutely Need to Know” in Round 2 and 59 items received  $\geq 50\%$  but  $< 75\%$  as “Need to Include” in Round 3. After similar items were combined, 81 total items were listed as “Nice to Include” topics in the 2023 curricular recommendations document. Overall, data supported the removal of 17 content items from the 2014 recommendations and 14 (collapsed into seven unique items) of the 89 participant recommended items were not added (Table 3).

#### 4. Discussion

Considering the relatively small number of physical therapists teaching and/or practicing in integumentary/wound management, participation numbers in all three rounds were higher than anticipated. Additionally, averaging over 40 participants in Rounds 2 and 3 was especially surprising considering the length of these surveys (i.e., 283 questions in Round 1, 353 in Round 2, and 238 in Round 3). The number of wound care certified participants, years of professional practice, and high percentages of experience in both academic and clinical settings lend support that the revised 2023 integumentary/wound management curriculum recommendations are based on highly trained/expert opinion. Additionally, while the Southern region of the country represented about 50% of participants in all three survey rounds, there was representation from all U.S. geographic regions in Round 1, and all except for one (Pacific - AK, HI) in Rounds 2 and 3, indicating input from across the U.S.

The predetermined cutoff levels and participant responses were clear on items to be included as Absolutely Need to Know and on items to be excluded. However, there was inconsistency in determining Nice to Know items likely due to the less concrete nature of these topics. Researchers decided during data analysis that a simple majority consensus was acceptable for Nice to Know items as many participants agreed these were important, but not Absolutely Need to Know content.

Seventeen outdated content items from the 2014 document were eliminated in the 2023 update (e.g., ICD coding, non-thermal infrared, whirlpool). As the use of whirlpool for open wounds is no longer supported by the profession,<sup>12</sup> removal of this outdated modality was not surprising considering the experience and expertise of the participants. Seventy-five new items not included in previous recommendation documents were added (e.g., biofilm management, shockwave therapy, fluorescence imaging), reflecting recent scientific and technological advances in the field. While performing an ankle-brachial index reached the consensus threshold of "Need to Know," differentiating between biphasic and triphasic waveforms was deemed beyond entry-level practice. This could be related to a lack of access to more expensive Dopplers with waveform displays. The extra cost could prevent education programs from covering this level of content.

##### *Limitations*

While the number of directly emailed survey invitations is known, the final number of recipients that actually received the invitation is impossible to obtain. DPT program contacts listed on the APTA webpage may not have forwarded the invitation or may have sent it to more than one faculty member involved in integumentary/wound management instruction within their program. Initially, one Northeast private DPT program agreed to participate in the study but at the time the Round 1 survey was distributed, the program pulled out of the study, which likely negatively impacted participation from that region of the country. The Northeast (CT, MA, ME, NH, NJ, NY, PA, RI, VT) had the lowest number of participants in all survey rounds except for the Pacific region (AK, HI). Additionally, it is unknown how many of those that were directly emailed forwarded the invitation to others they knew who met inclusion criteria. The length of the surveys may have also been a limiting factor in participation. Surveys were administered October through December, which was not ideal as potential participants may have been involved in holiday and/or end of semester activities which prevented participation. Even though it was technically possible, we view survey length and timing, combined with no direct-pay incentive (e.g., gift card, etc.) as strong indicators that few, if any, participants would unethically respond to the surveys more than once. Lastly, the significant potential for overlap

between WMSIG members, CIs, and educators likely resulted in some potential participants falling into more than one participant category. Review of our data demonstrated 531 duplicate emails, however, recognizing participants could invite others to participate (snowballing), the potential exists for the actual number to be higher.

## 5. Conclusion

The newly revised Academy of Clinical Electrophysiology and Wound Management's 2023 Entry-Level Physical Therapist Curriculum Recommendations for Integumentary/Wound Management is consensus-based and organized into "Need to Include" and "Nice to Include" categories. A more streamlined list of possible course and content objectives, as well as sample lab activities, have also been included. We expect the new categories, lab activities, and updated organization will make this fourth version easier to utilize and more helpful to educators and clinicians in planning didactic and clinical content as they prepare future physical therapists to meet entry-level practice expectations.

## Acknowledgments

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**Table 1:** List of Early Academy Integumentary/Wound Management Curricular Recommendations

1. Describe the function of skin and its various appendages.
2. Identify the important aspects associated with the four phases of normal wound healing, including wound closure and ultimate healing.
3. Identify local, systemic, and comorbid factors that affect healing, and discuss the clinical significance of each factor.
4. Differentiate between various types of wounds and correlate wound type with possible etiologies (e.g., pressure, vascular/vasculitis, neuropathic, burn, traumatic, surgical, dermatologic, autoimmune).
5. Identify factors that predict risk of developing pressure ulcers and describe methods used to prevent them.
6. Using a case study model, conduct a complete wound examination/evaluation.
7. Recognize the need for and utilize the results of various diagnostic imaging procedures.
8. Discuss wound management interventions relevant to the treatment of periwound tissues, scar management and adjunctive interventions.
9. Discuss appropriate debridement strategies for acute and chronic wounds.
10. Develop a plan of care to include interventions for patients with acute and chronic wounds.
11. Based on specific wound characteristics, identify appropriate wound dressings that will assist in maintaining a moist healing environment.
12. Determine related pain interventions.
13. Assess the need for patient/family education and instruction.

14. Discuss the need for infection control and use infection control measures.
15. Discuss the various psychosocial issues involved in wound management.
16. Discuss the issues involved with latex sensitivity for both the patient and the health care professional.
17. Utilize available resources (journal, textbooks, etc.) to further the student's knowledge base.
18. Demonstrate wound documentation including objective, goal-oriented, functional, measurable outcomes.
19. Examine the various issues related to wound management reimbursement
20. Understand the roles of the various team members involved in transdisciplinary wound management.
21. Recognize the scope of physical therapy practice as it relates to the integument and wound management.
22. Differentiate between the subtle clinical signs of critical colonization and the signs of local wound infection.
23. Discuss the correct procedure for taking a semi-quantitative (SQ) swab culture and discuss advantages and disadvantages between the SQ and the quantitative biopsy culture.
24. Discuss the normal roles of growth factors and cytokines in acute wound healing and how these soluble mediator proteins are impaired in chronic wounds.
25. Demonstrate knowledge of contraindications and precautions of various wound interventions.

**Table 2:** Demographic Questions

1. Are you involved in wound management as an educator, in clinical practice, or as a member of the Academy of Clinical Electrophysiology & Wound Management (ACEWM)?
2. Indicate your geographical region
3. In what type of area do you work? (Urban, suburban, rural)
4. Are you a PT or a PTA?
5. Highest level of professional training
6. Years in professional practice
7. Which specialty certifications do you have? Select all that apply (CWS, CWCA, WCC, ABPTS Wound Management Clinical Specialist, None)
8. Considering your last 3 years of employment, select all that apply (Entry-level academic teaching full-time, entry-level academic teaching part-time, no entry-level academic teaching experience)
9. What is your role in delivering academic entry-level integumentary content? Select all that apply (Coordinating, lecturing, lab activities, guest lecturing, assisting with practical exams)
10. How is integumentary content delivered where you teach?
11. Total hours of integumentary instruction students receive across the academic program where you teach
12. In which semester(s) is integumentary content delivered?
13. Considering your last 3 years of employment, select all that apply (Clinical practice full-time, clinical practice part-time, per diem or as needed, no clinical practice in the last 3 years)
14. Which clinical setting is your current primary area of practice?
15. What percentage of time do you spend practicing wound management?
16. Are you a clinical instructor?
17. Current membership in the following (organizations), select all that apply
18. Have you used the APTA's Academy of Clinical Electrophysiology and Wound Management Guide for Integumentary/Wound Management Content in Professional Physical Therapist Education at any point in the past?
19. If yes, how have you used it?

**Table 3:** Removed Items

<b>2014 Recommendation Items Not Included</b>	<b>Participant Recommended Unique Items Not Included</b>
Arthritic Wounds	Animal and human bites
Biosynthetic dressings	Knowledge of aspiration procedures
Casting	Monophasic, biphasic, triphasic pulses
Coding - CPT	Pigmented foam dressing
Coding - ICD	Psoriasis
Elephantiasis	Ringworm
Engineering control	SurgiNet, Bandnet, Spandage
Factitial wounds	
lymphangitis	
Non-thermal infrared	
Overview of Medicare – PPS	
Perform Doppler US	
Scale	
SJS/TENS	
Specialized equipment	
Splinting	
Whirlpool	

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