A Trauma-Informed Approach to Peer Physical Examination
Sadie Elisseou, MD*, Emily Adams, Maya Adler, MPH
*Corresponding author: Sadie.Elisseou@va.gov

Abstract

Introduction: The majority of medical schools utilize peer physical examination (PPE) as a teaching tool. In recent years, trauma-informed care (TIC) has been applied as a framework for physical examination to prevent patient retraumatization. Although medical students experience rates of trauma comparable to those of the general population, trauma-informed principles have not been integrated into PPE curricula. Methods: We created a novel trauma-informed PPE (TIPPE) curriculum grounded in core principles of TIC for first-year medical students. Perceptions of safety, trust, and autonomy in PPE practice were compared between the 152 students participating in the TIPPE curriculum and a control group from the prior year. Results: Twenty-nine percent of the 42 first-year medical student respondents in our sample endorsed a prior diagnosis with a mental health condition, and 33% endorsed a trauma history. Approximately 5% of student respondents (n = 5) in the interventional and control groups reported that PPE triggered recall of a prior traumatic event. Following participation in the TIPPE curriculum, familiarity with TIC principles rose significantly, although overall rating of the experience did not change. Thematic analysis of qualitative data highlighted students’ desire for earlier and increased inclusion of TIC principles in the curriculum. Discussion: Our results demonstrate the necessity of adapting the standard PPE model in medical education in response to the real risk of student retraumatization. In sharing our curriculum, associated resources, and student-derived suggestions for further improvement, we provide a blueprint for other institutions seeking to train trauma-informed clinicians.

Keywords
Trauma-Informed Care, Clinical Teaching/Bedside Teaching, Clinical/Procedural Skills Training, Communication Skills, Physical Examination

Educational Objectives

By the end of this activity, learners will be able to:

1. Define trauma and trauma-informed care.
2. Explain the relevance of a trauma-informed approach to peer physical examination.
3. Identify key principles of performing a trauma-informed physical examination.
4. Describe how trauma-informed language and behaviors can be used throughout the physical examination for both patients and peers.
5. List potential modifications and alternatives to peer physical examination.

Introduction

For decades, peer physical examination (PPE) has been used as an experiential learning tool to help medical students understand living anatomy and hone clinical skills. In PPE, medical students serve as patients for one another. Existing literature has emphasized the advantages of PPE: It features peer learning, offers insight into the patient experience, is cost-effective, teaches largely normal anatomy in a low-stakes environment, and facilitates professional development. According to national survey data, accredited medical schools in the U.S. rely on PPE for an average of 30% of total physical examination teaching time and in 28% of formative assessments. Despite high utilization rates of PPE, there is no widespread or standardized protocol to ensure student safety while practicing it.

Studies suggest that medical students overall benefit from and are willing to participate in PPE, excluding examinations involving the breasts, anus/rectum, or genitalia, which are largely viewed as inappropriate. Even when PPE is limited to body parts traditionally perceived as less sensitive, students commonly report feeling exposed, embarrassed, or anxious. An array of social and demographic factors may mediate this discomfort. Multiple studies have identified increased preference among students identifying as female for same-gender peer examiners, while students identifying
as male may experience undue pressure to serve as models for other students.\textsuperscript{13,16} Student boundaries for peer examination may also vary in accordance with certain religious or cultural traditions.\textsuperscript{8,16,18,19}

To date, a personal history of trauma has been underrecognized as a factor contributing to medical students’ experience of PPE. The risk of distress when being physically exposed and touched by a classmate may be amplified for students who have experienced prior maltreatment, including physical, sexual, or psychological abuse.\textsuperscript{6,8} Furthermore, there is a dearth of literature exposing the potential for PPE to cause true harm. In the first author’s personal experience in supervising PPE, potentially retraumatizing language and behaviors are common. For example, “Just move her bra,” “Close your eyes and tell me where I’m touching you,” and (reaching into underwear) “I’m going to check your femoral pulses now.” Amidst the COVID-19 pandemic, personal protective equipment may further disconcert students with trauma histories, as face masks may simulate restraint or limit sensory cues that might otherwise facilitate grounding and reorientation.

Although health care professionals generally discuss trauma as it relates to patients, medical students are not immune from trauma. Adverse childhood experiences, including abuse, neglect, and household dysfunction, are prevalent in over 60% of U.S. adults and have a dose-dependent relationship with negative health outcomes, such as cardiovascular disease, substance use disorder, cancer, and early mortality.\textsuperscript{20,21} In a study of one student body, rates of adverse childhood experiences in medical students were comparable to those of the general population, suggesting that childhood adversity has the potential to negatively impact students’ mental health, academic performance, and future medical practice.\textsuperscript{22} Medical schools have a responsibility to design an educational experience that is cognizant of the trauma burden in students and that aims to prevent retraumatization and foster resilience.

Trauma-informed care (TIC) is an established organizational framework and growing social movement offering solutions for supporting survivors of various forms of trauma. In undergraduate medical education, recent efforts to incorporate TIC have included advocacy for trauma-informed physical examination practices in patient care.\textsuperscript{23,24} However, these initiatives do not provide a trauma-informed approach for medical students engaging in PPE. Outside the TIC framework, prior studies have recommended enhancing student agency in PPE by including a formal informed-consent process, self-assembled peer groups, standardized patients as substitutes for PPE, and protocols for the reporting and management of incidental findings.\textsuperscript{4,15,16} However, these studies were largely conducted outside the U.S., and reported uptake of these practices by academic institutions is lacking.

Medical educators have a timely opportunity to reinforce a learning environment that is physically and psychologically safe, in which all students can thrive. The goal of the present publication is to share a novel curriculum for trauma-informed PPE (TIPPE) for first-year medical students that is firmly rooted in TIC principles. To the best of our knowledge, this is the first TIPPE curriculum that has been developed, implemented, and studied in a medical school setting.

**Methods**

The Substance Abuse and Mental Health Services Administration has identified six key principles for a trauma-informed approach: (1) safety; (2) trustworthiness and transparency; (3) peer support; (4) collaboration and mutuality; (5) empowerment, voice, and choice; and (6) cultural, historical, and gender issues.\textsuperscript{25} Within each of these six domains, we proposed specific strategies to ensure that PPE was conducted in a sensitive manner for all students, particularly those who were trauma exposed (Table). We collaborated with institutional leadership to incorporate these practices at the Boston University School of Medicine in this pilot of a TIPPE curriculum. We acknowledge that not all strategies in the Table may be feasible at other institutions given variations in resources (e.g., lack of funding for standardized patients, physical space limitations). However, the proposed approach provides a practical means of integrating core trauma-informed principles into clinical skills education.

First-year medical students at the Boston University School of Medicine take a doctoring clinical skills course in which small groups of eight students and one Academy of Medical Educators (AME) faculty member meet weekly. In the 2020-2021 academic year, 152 students and 19 AMEs participated in the doctoring course and served as the intervention group for our educational activity. The TIPPE curriculum was woven throughout this yearlong course, with one doctoring session at the start of both the fall and spring semesters devoted specifically to this subject. No prerequisite knowledge was needed.

The doctoring small-group session devoted to TIPPE in the fall semester utilized a flipped classroom model. Students and AMEs reviewed the following prior to class: the TIPPE introductory video (Appendix A) describing the purpose of the curriculum, the TIC overview from the first author’s previous MedEdPORTAL publication,\textsuperscript{26} the TIPPE course policy (Appendix B) offering
The survey had been completed, students and AMEs discussed the session, AMEs met with students in small groups and asked them questions related to the TIPPE curriculum. Immediately following the session, AMEs emphasized TIPPE principles and incorporated strategies from Table 1: Curricular Strategies for TIPPE Aligned With the Substance Abuse and Mental Health Services Administration’s Six Core Principles of TIC.

### Table 1: Curricular Strategies for TIPPE Aligned With the Substance Abuse and Mental Health Services Administration’s Six Core Principles of TIC

| TIC Principle | Strategy |
|---------------|----------|
| 1. Safety     | Train students and faculty on trauma-informed approaches to enhance physical and psychological safety in patient and peer PE. Invest in hiring standardized patients as surrogate patients whenever possible, particularly for sensitive areas (e.g., chest, abdomen). Provide adequate space or curtain dividers to enhance privacy during PPE. Remind students to utilize a trauma-informed approach to PPE before practice sessions. Confirm peer partner consent verbally before each PPE practice session. Approach students who opt out of PPE nonjudgmentally. Handle discussions about PPE sensitively and confidentially. |
| 2. Trustworthiness and transparency | Highlight potential issues that may arise before, during, or after PPE and offer a clear course of action. Distribute and review a PPE participation information sheet (Appendix C) prior to the date of the first PPE session. Clarify how students can raise concerns about PPE anonymously. Include PPE guidelines in the written course policy. |
| 3. Peer support | Reinforce and promote student physical and mental health resources, both at the medical school and in the community. Build upon existing opportunities within PPE for peer-to-peer learning and connection. Invite student volunteers to expand integration of TIC content throughout the curriculum and contribute to a trauma-informed educational experience, in the form of a task force or work group. |
| 4. Collaboration and mutuality | Consider a written informed-consent process for PPE. Consider the benefits of an opt-in rather than opt-out policy for PPE; students who elect not to play the role of surrogate patient need not offer an explanation. Make alternative experiential learning methods widely known and accessible. |
| 5. Empowerment, voice, and choice | Empower students as teachers by encouraging surrogate patients to provide feedback to peer examiners. Include verbal and written standardized patient feedback in PE practice and OSCEs. Solicit student feedback about PPE regularly, including concerns and suggestions for improvement. |
| 6. Cultural, historical, and gender issues | Include formal training about implicit bias and promote discussions about cultural sensitivity, diversity, and equity. Do not use PPE in any examination of the breasts, inguinal, genital, or rectal areas. Provide private, gender-specific, and gender-neutral changing areas. |

**Abbreviations:** PE, physical examination; PPE, peer physical examination; TIC, trauma-informed care; TIPPE, trauma-informed peer physical examination.

The first author presented a 60-minute TIPPE faculty development session (Appendix E) for AMEs addressing trauma-informed physical examination and TIPPE. This session was nearly identical to Appendix A of the first author’s previous MedEdPORTAL publication, though it included new content related to the TIPPE curriculum. Immediately following the session, AMEs met with students in small groups and asked them to complete the TIPPE precurricular survey (Appendix F). Once the survey had been completed, students and AMEs discussed the prework resources and PPE case examples included in the TIPPE fall faculty guide (Appendix D).

Each subsequent doctoring session that included PPE practice incorporated strategies from the Table. For example, students could select their PPE partner prior to practice sessions, and practice rooms were arranged with dividers to support student privacy. The doctoring course director provided advance reminders via email that serving as a surrogate patient was voluntary and that students who wished to opt out should inform their AME faculty member. AMEs emphasized TIPPE principles during each practice session, drawing suggested phrasing and maneuvers from the TIPPE tips for examination by organ system (Appendix G). Student feedback was routinely encouraged, and scheduled office hours provided space for private debriefing. We
also invited interested students to form a Student TIC Task Force. This group met monthly with the first author to promote student-led, integrated TIC curricula within the institution. Standardized patients were not utilized due to institutional funding barriers.

We ensured that an incident reporting system was available to address any concerns related to PPE, including student distress, inappropriate behavior, breach of student confidentiality, or the finding of a clinical abnormality requiring action. At our institution, course directors advised students and AMEs to use the Appropriate Treatment in Medicine online portal, a local program for documenting and responding to medical student mistreatment. In addition, the doctoring course director and AMEs encouraged students to access existing mental health services and engage in self-care to facilitate well-being and address mistreatment. In addition, the doctoring course director and AMEs encouraged students to access existing mental health services and engage in self-care to facilitate well-being and address health needs, whether related to PPE or otherwise.

The doctoring session that was devoted to TIPPE in the spring semester included a large-group didactic session and small-group discussions. The first author led a 60-minute, PowerPoint TIC presentation for all first-year students from the first author’s group discussions. The doctoring session that was devoted to TIPPE in the spring semester included a large-group didactic session and small-group discussions. The first author led a 60-minute, PowerPoint TIC presentation for all first-year students from the first author’s previous MedEdPORTAL publication, specifically noting that the content was relevant for examinations of both patients and peers. Students and AMEs met for a small-group discussion that promoted reflection on students’ experiences with TIPPE in doctoring and with trauma-informed physical examination in their clinical preceptorship. AMEs facilitated this session using the cases and questions included in the TIPPE spring faculty guide (Appendix H).

To evaluate the relevance and efficacy of our TIPPE curriculum, we administered the first-year TIPPE precurricular survey (Appendix F) at the start of the fall semester and the first-year TIPPE postcurricular survey (Appendix I) at the end of the spring semester, using Qualtrics Core XM software. One hundred fifty-six second-year students who did not participate in the curriculum received the TIPPE control survey (Appendix J) at the start of the fall semester. These surveys assessed students’ history of a mental health condition or traumatic experience, as well as feelings of safety, trust, and choice with PPE, on 5-point Likert scales. Additionally, we utilized our institution’s in-house midterm and final TIPPE course evaluations (Appendix K) on eValue to assess the perceived efficacy of the curriculum on a 5-point Likert scale (from strongly disagree to strongly agree) and solicit recommendations for improvement using open-ended responses, the latter of which were coded thematically using an inductive approach. Finally, the initial Student TIC Task Force meetings served as semistructured focus groups, providing student insight regarding the TIPPE curriculum and the doctoring educational experience. The investigators reviewed task force meeting notes and summarized key findings.

Results

A total of 152 first-year medical students participated in the TIPPE curriculum, 42 of whom completed the TIPPE precurricular survey (response rate: 27%). Of the students completing the survey, 33% endorsed experiencing a past traumatic event, 29% reported having been diagnosed with a mental health condition, and 12% noted a belief that they might have an undiagnosed mental health condition. While the majority of students did not express concern about their future participation in PPE, 21% reported concern for their safety, 29% reported concern about trusting their peers to be respectful, and 24% reported concern that they would have no choice when participating in PPE. Importantly, some students reported slight (10%) or moderate concern (2%) that PPE could trigger recall of a prior traumatic experience.

Some students endorsed the idea that potential interventions would allay some of their concerns regarding PPE, such as the opportunity to keep clothing on (50%), pick their peer examiner (48%), opt out of examination of certain body parts (43%), use a screen (41%) or a private room (21%) for privacy, be supervised by a same-gender chaperone (17%), or be provided with an alternative learning strategy (17%). A minority of students (26%) denied any anticipatory concerns with PPE.

Forty-two first-year students completed the TIPPE postcurricular survey (response rate: 27%). Respondents were not necessarily the same students who had completed the precurricular survey, and pre- and postcurricular data were not paired. Additionally, 47 second-year students not exposed to the TIPPE curriculum the year prior completed the TIPPE control survey (response rate: 30%). Participation in the TIPPE curriculum led to significantly greater familiarity with TIC. The percentage of first-year students who reported at least moderate familiarity with TIC rose significantly by 31% (p = .004) after engaging with the curriculum. Similarly, the percentage of first-year students reporting at least moderate familiarity with TIC was 22% greater than in the second-year control group (p = .03).

Importantly, two student respondents (5%) in the first-year TIPPE group and three student respondents (6%) in the second-year control group reported that participation in PPE triggered recall of a prior traumatic experience. Of the first-year students enrolled in the TIPPE curriculum, 83% reported a somewhat or very positive experience examining peers, and 79% reported a somewhat or very positive experience being examined by peers. There was no significant difference in the overall median rating of the PPE
experience between the first-year intervention group and the second-year control group for both examining peers ($p = .79$) and being examined by peers ($p = .33$). Students in the TIPPE curriculum endorsed high levels of feeling somewhat or very safe during PPE (91% when examining, 86% when being examined), trusting peers to be respectful during PPE to a moderate or great degree (98% when examining, 95% when being examined), and having a moderate or great degree of choice during PPE (60% when examining, 62% when being examined). No significant difference was detected between group medians for the metrics of safety, trust, or choice when comparing the intervention group to the control group.

In the midterm doctoring course evaluation, 89% of students reported that the first author’s lecture was effective at helping them learn a trauma-informed approach to physical examination. Over half of the open-ended responses (59%) included expressions of the importance of TIC, with numerous requests for expanded TIC training in the doctoring curriculum. One student appealed, “[We] need early and integrated trauma-informed approaches to physical exams.” Many respondents (24%) expressed a desire for more hands-on, practical application of TIC concepts.

In the final doctoring course evaluation, multiple respondents (13%) advocated for an opt-in policy for PPE, noting students’ hesitancy to opt out due to fear of judgment. One student explained,

> Having it opt out makes it so that your peer’s learning experience hinges on you letting them examine you. Opting in makes it so that people feel comfortable saying “no, I do not want my school peers observing my exposed body” without having to say that.

Similarly, students in the Student TIC Task Force voiced concerns that opting out had not been normalized and that they were not made sufficiently aware of what individual PPE sessions would entail or of potential alternatives. They expressed strong support for a written informed-consent process, which had not been implemented, to help rectify the weaknesses they identified with the current policy. Collectively, these students favored the inclusion of additional resources in the curriculum, including time for supervised TIPPE practice and demonstrations of trauma-informed encounters with a standardized patient.

**Discussion**

To address the potential for PPE to cause student distress, we designed a novel PPE curriculum aligned with TIC principles. First and foremost, our investigation demonstrated that first-year medical students at our institution strongly desired a PPE curriculum that was trauma-informed. While this preference may have reflected students’ preexisting awareness of TIC and involvement in a larger social movement, our results also demonstrated the significant trauma burden carried by medical students, many of whom could have had comorbid mental health conditions. More than one-third of student respondents in both the first-year intervention and second-year control groups reported a prior traumatic experience.

Most strikingly, our surveys revealed that students in both groups experienced flashbacks to a prior traumatic event specifically due to participation in PPE. This was a serious harm. As our intervention was unable to demonstrate a reduction in the number of students experiencing retraumatization through PPE, we recommend that medical schools consider greater inclusion of standardized patients to mitigate the potential for students to reexperience trauma in the process of learning. A trauma-informed approach to clinical skills training can promote a culture of safety for students’ future patients, their colleagues, and themselves.

Student familiarity with TIC principles rose significantly as a result of our intervention, and the majority of students reported their experience with the TIPPE curriculum to be positive. However, student perceptions of overall experience, safety, trust, and choice did not significantly change from the prior year. We believe the main limitation to our findings was timing; our curriculum was implemented and evaluated amidst new and major adaptations to learning during the COVID-19 pandemic. On our surveys and evaluations, students offered feedback unrelated to the curriculum but rather confirming general dissatisfaction with remote physical examination learning. Additionally, though all students engaged in the required curriculum, fewer than expected completed the nonrequired survey assessments, which were delivered via email and coupled with an institutional review board–mandated passage describing their optional nature and research purpose. This low response rate may have negatively impacted our ability to detect a meaningful difference in outcome. A third limitation of our project was the inability to accurately pair pre- and postintervention survey responses, despite the inclusion of identifiers that would pair responses and ensure anonymity. Finally, survey responses may have been influenced by response bias, in which students with a more profoundly positive or negative experience with PPE, as well as students with a greater personal interest in TIC, may have been more likely to participate in our surveys. Though second-year students not
exposed to the TIPPE program were included to provide a control
group representative of the preexisting PPE curriculum, reflecting
upon experiences from the year prior may have introduced recall
bias.

In future iterations of this curriculum, our institution will explore
student suggestions for improving the PPE experience, including
an informed-consent form, an opt-in rather than opt-out policy,
and more clearly advertised educational alternatives. A formal
informed-consent process was not utilized in this pilot curriculum
due to time constraints and institutional focus on COVID
protocols. However, we believe it to be an important aspect
of a TIPPE curriculum. Informed consent for PPE has been
recommended by experts as a tool to promote student comfort
and as a model for patient encounters.3,4,12 We note here that
consent is an iterative process that goes beyond signing a
form and that it should be reaffirmed verbally throughout PPE
practice. A number of learning strategies, such as anatomical
teaching models, near-peer or faculty volunteers, and video
demonstrations, can be explored to complement or replace
PPE. Close collaboration with medical school leadership may be
necessary to acquire funding for standardized patients. Additional
future directions include identification of targets for inclusion
of trauma-informed skills practice beyond the preclinical years
and evaluation of the impact of TIC education on student-patient
interactions.

Because the majority of medical schools rely on PPE as a core
component of clinical skills education, we hope that these
materials and reflections assist other institutions in developing
their own TIPPE curricula. We believe that trauma-informed
practices should be a standard feature in health professions
education, from physical therapy to nursing. We envision a
future in which students of all disciplines learn trauma-informed
practices in environments built upon individual choice and mutual
respect. Amidst growing recognition that TIC should be employed
as a universal model of care delivery, we aim to ensure that this
standard is not only taught, but also extended, to our learners.

Appendices
A. TIPPE Introductory Video.mp4
B. TIPPE Course Policy.docx
C. TIPPE Participant Information Sheet.docx
D. TIPPE Fall Faculty Guide.docx
E. TIPPE Faculty Development.pptx
F. TIPPE Precurricular Survey.docx
G. TIPPE Tips for Examination by Organ System.docx
H. TIPPE Spring Faculty Guide.docx
I. TIPPE Postcurricular Survey.docx
J. TIPPE Control Survey.docx
K. TIPPE Course Evaluations.docx

All appendices are peer reviewed as integral parts of the Original
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