Consensus-Driven Priorities for Firearm Injury Education Among Medical Professionals

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Abstract

Purpose

Firearm injury is a leading cause of morbidity and mortality in the United States. However, many medical professionals currently receive minimal or no education on firearm injury or its prevention. The authors sought to convene a diverse group of national experts in firearm injury epidemiology, injury prevention, and medical education to develop consensus on priorities to inform the creation of learning objectives and curricula for firearm injury education for medical professionals.

Method

In 2019, the authors convened an advisory group that was geographically, demographically, and professionally diverse, composed of 33 clinicians, researchers, and educators from across the United States. They used the nominal group technique to achieve consensus on priorities for health professions education on firearm injury. The process involved an initial idea-generating phase, followed by a round-robin sharing of ideas and further idea generation, facilitated discussion and clarification, and the ranking of ideas to generate a prioritized list.

Results

This report provides the first national consensus guidelines on firearm injury education for medical professionals. These priorities include a set of crosscutting, basic, and advanced learning objectives applicable to all contexts of firearm injury and all medical disciplines, specialties, and levels of training. They focus on 7 contextual categories that had previously been identified in the literature: 1 category of general priorities applicable to all contexts and 6 categories of specific contexts, including intimate partner violence, mass violence, officer-involved shootings, peer (nonpartner) violence, suicide, and unintentional injury.

Conclusions

Robust, data- and consensus-driven priorities for health professions education on firearm injury create a pathway to clinician competence and self-efficacy. With an improved foundation for curriculum development and educational program-building, clinicians will be better informed to engage in a host of firearm injury prevention initiatives both at the bedside and in their communities.

In 2018, there were nearly 40,000 firearm deaths in the United States.[1] Firearm injuries are among the 5 leading causes of death in the United States among individuals aged 1 to 64 years.[1] In addition to firearm deaths, which are predominantly suicides, firearm injuries cause significant morbidity; most nonfatal firearm injuries are related to assault and are concentrated in urban settings.[1] The initial hospital costs following firearm injury have been estimated at over $700 million annually,[2] with nearly another $100 million related to readmissions within 6 months.[3]

Leading medical professional societies have identified firearm injury and death as a public health threat, and multiple systematic reviews have outlined the current state of the evidence supporting clinician involvement in firearm injury prevention.[4–6] When they engage in firearm safety counseling, clinicians are effective in improving families' safe storage behaviors.[7–11] Nonetheless, few clinicians have received education on the basics of firearm injury epidemiology, risk factors, or preventive interventions. Medical students, residents, and practicing physicians report low rates of knowledge, self-efficacy, and evidence-based practice related to firearm injury prevention. For example, in a 2016 survey of pediatric residents, only 22% reported having received didactic education on firearm injury prevention and, despite 96% saying they had a responsibility to counsel patients on the risks posed by firearms, only 37% ever provided firearm-related counseling.[12] Similarly, a minority of emergency medicine providers report having received training on firearm safety or counseling.[13,14] According to a 2014 survey of members of the American College of Physicians, 58% said they "never" ask about the presence of firearms in the home.[15]

Although qualitative research shows that patients are open to discussing

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The authors have informed the journal that they agree that both Katherine Hoops and Jahan Fahimi completed the intellectual and other work typical of the first author.

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firearm safety with their clinicians,[16,17] fewer than 20% of U.S. firearm owners rated physicians as effective messengers about safe storage practices, such as the application of an external locking device when a locked box or safe is unavailable or unacceptable; this is consistent with prior research suggesting that physicians do not have an understanding of firearm safety or culture.[18,19] These findings highlight the need for training in firearm safety and injury prevention to improve clinicians' self-efficacy and competence in firearm counseling and thereby increase the provision of firearm counseling.

Integrating firearm injury and violence prevention into health professions education is crucial to ensure that current and future clinicians have the tools and skills to address this issue at the bedside as with any other threat that causes morbidity or death.[20] As yet, this critical need is unmet among undergraduate, graduate, and continuing medical education programs.[21–23] The curricula of health professions schools are designed to train students to meet the health care needs and priorities of the local communities within which they reside and for whom they serve. Although major changes are less frequent, all accredited medical and nursing schools make small changes, or quality improvements, to their curricular structure and content on a regular basis. The Association of American Medical Colleges tracks these changes on an annual basis; from 2015 to 2020, the percentage of schools that included firearm-related content increased from 18% to 27%.[24]

Consensus methodologies have been used for curriculum development in nearly every medical specialty and all levels of training throughout undergraduate and graduate medical education.[25–27] The aim of this investigation was to convene a diverse group of national experts in firearm injury epidemiology, injury prevention, and medical education to develop consensus on priorities to inform the creation of learning objectives and curricula for firearm injury education for medical professionals using the well-validated nominal group technique.

Method

Study design

We convened an advisory group of content experts on firearm injury epidemiology and medical education and used the nominal group technique to achieve consensus on priorities for health professions education on firearm injury. This work was deemed exempt by the University of California, San Francisco Institutional Review Board.

Advisory group members

We recruited a cohort of experts for our advisory group in April 2019, using a purposive snowball sampling methodology.[28] Prospective members were identified according to a survey of previously published firearm injury research, affiliation with professional societies or organizations with experience in education in firearm injury (including the American Foundation for Firearm Injury Reduction in Medicine and the Association of American Medical Colleges), and recommendations from experts in the field.

We sought a wide breadth of expertise with respect to geography, medical specialty and profession, level of training, and practice setting. We recruited firearm owners, firearm trainers, and veterans. We also purposefully included nonclinical researchers and medical educators with expertise in curriculum development.

Consensus methods

We used the nominal group technique[29,30] to develop specific and comprehensive consensus-based priorities across various contexts of firearm injury, educational domains, and concept types.[31] This technique allowed for data collection and consensus development through the engagement of a group of experts.[32,33] The process involved an initial idea-generating phase, followed by a round-robin sharing of ideas and further idea generation, facilitated discussion and clarification, and the ranking of ideas to generate a prioritized list. Nominal group technique allows for the generation of a large list of prioritized ideas and reduces biases from excessive influence by individual perspectives.[29,30] Because our goal was to develop a compendium of educational priorities, the nominal group technique was deemed to be superior to the Delphi technique, which attempts to converge on a final opinion.[29,30]

We chose to focus our work on 7 contextual categories relevant to firearm injury that have previously been identified in the literature: 1 category of general, crosscutting priorities applicable to all contexts and 6 categories of specific contexts of firearm injury, including intimate partner violence, mass violence, officer-involved shootings, peer (nonpartner) violence, suicide, and unintentional injury.[32,33] For consistency with an injury prevention framework, we note that the specific contexts of injury may be interchangeable with the "intent" of injury. Firearms are the mechanism of injury for all contexts.

Given the wide geographic distribution of the advisory group, we convened entirely via teleconferences and online surveys to maximize participation by all members. After an initial 1-hour introductory meeting in July 2019, we held two 4-hour meetings in September and October 2019. After each meeting facilitated by the advisory group chairs (K.H., J.F.), we deployed an online survey. We collected advisory group member participation data for each step of the process. In addition to recording the meetings, 2 study investigators (L.K. and C.S.) captured detailed meeting minutes. During the meetings, we allowed for time so that all ideas and perspectives could be voiced, and members had the option to message the group via the chat function rather than speak (or message the advisory group chairs privately). The advisory group chairs made note of the less vocal members of the group and contacted those individuals personally to solicit feedback and ideas. All teleconferences were held via Zoom (Zoom Video Communications, San Jose, California), and online surveys were created and distributed using Qualtrics (Qualtrics, Provo, Utah).

Process

Phase 1: Silent idea generation phase: Literature review and the identification of initial priorities. Our initial idea-generating survey asked each advisory group member to contribute 2 to 10 educational priorities for the general and context-specific categories based on their individual knowledge and review of the firearm injury literature. Members with expertise in a specific context of firearm injury contributed at least 5 priorities related to that context. The advisory group chairs organized the submissions into educational domains (epidemiology, screening and counseling, cultural humility, medical management, interprofessional education, health systems improvement, health policy,

ethics, and firearm basics), which were guided by the content of the submissions.

Phase 2: Round-robin phase: Presentation of priorities and continued idea generation. For each of the 7 categories (1 general and 6 context-specific) of firearm injury, suggestions for educational priorities organized into the 9 educational domains above were sent by email to the advisory group members for review before an initial round-robin meeting. The term "round-robin" is used to describe the circulation or discussion of an idea within a group for the purpose of sharing comments and other ideas. During this meeting, moderated by the advisory group chairs, the priorities and domains were modified, consolidated, and recategorized through group discussion.

Phase 3: Clarification phase: Iterative refinement of priorities. Advisory group members divided into context-specific subgroups according to self-identified areas of expertise to further refine and clarify the priorities and ensure completeness. This work was completed via email over 2 weeks. The advisory group chairs were included in all communications, but revisions were led by members of the subgroups.

Phase 4: Ranking and voting phase: Ranking survey and consensus generation. When the subgroup revisions were complete, a ranking survey was disseminated to the full advisory group. Members assigned a rank order to the priorities within each educational domain. The results were sorted and shared in advance of a consensus-generating meeting. We relied on group discussion during this meeting to determine the priorities of least importance to exclude from our list.

Based on group discussion in the consensus-generating meeting, the potential educational domains were narrowed to epidemiology and social context; patient-centered care; and ethical, legal, and policy implications. Within the general section, we included firearm anatomy and physiology and health systems improvement.

Phase 5: Finalizing educational priorities phase: Final survey and external expert review. To determine consensus, the advisory group members voted to include or exclude each of the remaining priorities on the final list. Consensus was defined as approval by ≥ 75% of members to include a priority. The priorities for the officer-involved shooting context of firearm injury did not undergo further refinement as none of the priorities reached the threshold for consensus.

Advisory group members were provided space to offer additional feedback, such as grouping similar priorities sharing a common topic or theme, and the advisory group chairs considered this feedback for further editing of the priorities. Standardized language using Bloom's taxonomy was used to create action-oriented statements commonly used in curriculum development.[34] At this point, it was decided that the health systems improvement priorities, while important, should be considered separately for the purposes of curriculum development given their greater relevance to organizations and health care systems than to clinical educators.

Per advisory group feedback, in addition to organizing the priorities according to contextual and educational categories, we also assigned concept types: "basic" concepts that form a foundation for firearm injury education important to all learners, "complex" concepts that represent higher level or more nuanced priorities in firearm policy or outcomes, and "threshold" concepts that potentially could lead to a qualitatively different view of the subject matter or learning experience.[31] Concept types are not ordinal; specifically, a threshold concept is not, by definition, more complicated or difficult to master than basic or complex concepts.

At this stage, 3 external experts (2 in firearm injury and 1 in medical education) who were not part of the advisory group reviewed the list of priorities and provided feedback. The advisory group chairs made revisions based on this feedback and sent the revised list to the advisory group members for final review, which did not result in any further revisions. The list of priorities was considered finalized at this point.

Results

Our advisory group was geographically, demographically, and professionally diverse, with 33 members from across the United States. Geographically, 12 (36%) members were from the West, 9 (27%) from the South, 7 (21%) from the Northeast, and 5 (15%) from the Midwest. Practicing physicians accounted for 23 (70%) members, many of whom had dual roles in research, public health, or education. Ten (43%) of the 23 physician members were from emergency medicine, with the remainder distributed among family medicine, internal medicine, pediatrics, psychiatry, and surgery. Four (12%) members were medical students, 3 (9%) were from nursing, 2 (6%) were primarily in public health, and 1 (3%) was primarily a medical educator. Eight (24%) members were firearm owners, and 7 (21%) had military affiliations. Additionally, 8 (24%) members identified as persons of color.

Each meeting had more than two-thirds participation, and each survey had more than 87% participation. Twenty-nine members responded to the initial idea-generating survey, resulting in 613 overlapping priorities, which represented 111 unique themes. After review at the first consensus-generating session, 141 unique priorities remained, which were then ranked by the advisory group. After reviewing the rankings and consolidating the themes during the second consensus-generating session, 89 priorities remained. A total of 58 educational priorities were approved by 75% or more of the advisory group. Based on additional feedback from the advisory group and external reviewers, as well as further editing and consolidation by the advisory group chairs, a total of 51 final priorities were included in the consensus recommendations. Figure 1 diagrams the consensus-generating process and outcomes. The distribution of the final priorities across the contexts of injury and educational domains is summarized in Chart 1.

The final list of priorities for health professions education on firearm injury, grouped by contextual categories and educational domains, can be found in Appendix 1. Concept types (basic, complex, and threshold) are also shown for each priority. For example, all learners receiving basic education on unintentional firearm injury prevention should be able to "describe measures to reduce unintentional injury risk in the home including but not limited to firearm removal, safe storage, safe handling, safety training, education at the point of

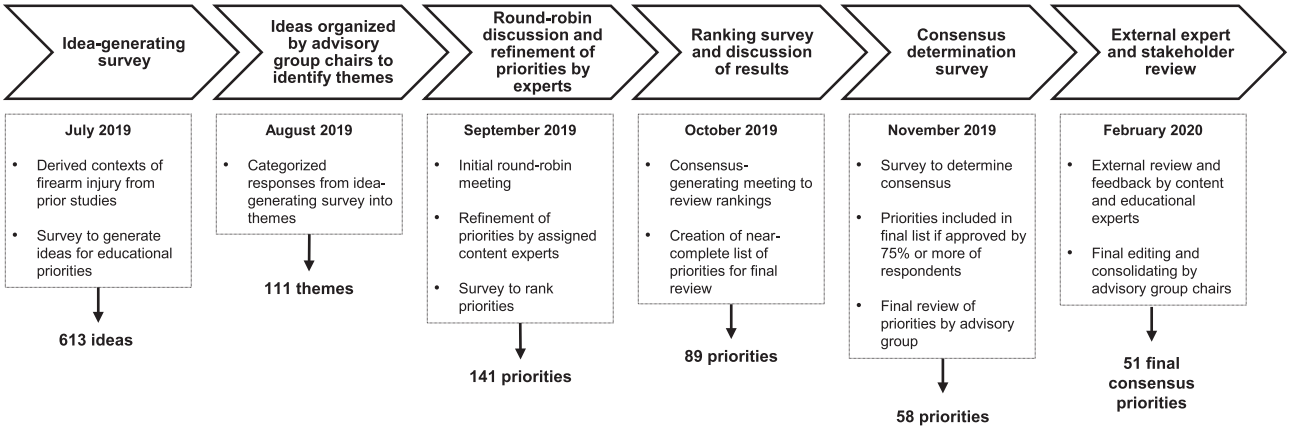

Figure 1 Consensus-generating process using the nominal group technique to develop priorities for health professions education on firearm injury.

firearms sale, shooting sports education, and injury prevention education in schools." Priorities relating to health systems improvement are shown in List 1.

Discussion

To our knowledge, this report describes the first national consensus guidelines on firearm injury education for medical professionals. These guidelines provide a set of educational priorities that are applicable to all contexts of firearm injury and all medical disciplines and levels of training. The guidelines highlight areas in which there is evidence for the efficacy of various policies or practices (e.g., licensing or counseling on safe storage), which we highlight below. They cover material that should be understood by clinicians in all disciplines and specialties.

Each set of priorities within a contextual category lays out educational content that is focused on that context of firearm injury with particular attention to epidemiology, risk factors and risk assessment, and prevention strategies at the population level and in the hospital setting. Below, we briefly summarize our priorities for each firearm injury context with references to the literature that informed the development of the corresponding guidelines. In some instances, we provide recommendations for implementation.

Medical professionals should understand the relationship between firearm access and risk of homicide in intimate partner violence, including how this effect may be modified by a multitude of cofactors, such as gender identity, race, and substance use.[35,36] Violence toward an intimate partner may also extend to others, including children or oneself.[37,38] Our priorities focus on screening, including targeted screening in high-risk situations, followed by coaching and counseling to mitigate injury and risk as there is tremendous nuance in mitigation strategies specific to individual circumstances.[39,40] Clinicians must be prepared to navigate a variety of challenges when patients are at high risk of attack from their partners (e.g., safety planning, controlling firearm access, potential for escalation, need for social resources).[41,42] These scenarios may be further complicated by mandatory reporting and by laws governing firearm safekeeping and removal.[43]

While mass shootings garner (and to an extent may be motivated by) a disproportionate share of media and policymaker attention, they represent an extremely small fraction of firearm injuries.[44,45] These events, while rare, have overlapping risk factors and phenomenology with other contexts of firearm violence, especially suicide

Chart 1

Distribution of Final Priorities for Health Professions Education on Firearm Injury Across Contexts of Firearm Injury and Educational Domains

		Educational domains					
		Epidemiology and social context	Patient-centered care	Ethical, legal, and policy implications	Firearm anatomy and physiology	Health systems improvement	Total
Contexts of injury	General	3	6	3	1		13
	Intimate partner violence	1	6	2			9
	Mass violence	5	4	1			10
	Peer violence	3	3	0			6
	Suicide	2	3	0			5
	Unintentional injury	2	2	0			4
Health systems improvement						4	4
Total		16	24	6	1	4	51

List 1
Health Systems Improvement Priorities for Health Professions Education on Firearm Injury

1. Develop screening for firearm suicide, unintentional injury, and homicide risk in patient visits, and incorporate appropriate interventions, resources, and counseling when a patient is identified as being at increased risk for firearm injury.
2. Develop and implement appropriate documentation of firearm injury risk and of counseling provided in clinical encounters as well as clinically appropriate after-visit summary information.
3. Devise institutional policies governing safe handling and storage of a firearm if brought by a patient or visitor to a health care setting.
4. Provide training for active shooter scenarios specific to the health care setting, with attention to duty to care.

and intimate partner violence.[46,47] Tools to prevent targeted and mass violence, such as extreme risk protection orders and threat assessment, are important for clinicians to understand and use to prevent future attacks, especially because the psychological impacts of mass shootings are profound and lasting for survivors and medical professionals alike.[48–50]

Peer (nonpartner) violence is an important contributor to firearm-related morbidity and mortality; indeed, it is the leading cause of death among non-Hispanic, Black American males aged 15 to 34 years.[51,52] Our advisory group prioritized understanding the epidemiology of these injuries[53]; the role of the social determinants of health[54]; and evidence-based policies,[55–57] programs,[58] and strategies[59] that can reduce peer violence. Our advisory group had consensus that medical professionals should be trained in best practices for screening and counseling victims of peer violence[60] and understand the role and effectiveness of hospital- and community-based violence prevention programs.[61,62] We recommend that these priorities be incorporated into core course requirements including, for example, simulated patient encounters using a trauma-informed approach and continuing education on community-based violence intervention programs. With appropriate training, medical professionals have a unique opportunity to apply evidence-based strategies and interrupt the cycle of peer violence.

For firearm suicide prevention, our advisory group prioritized educating clinicians about the risk factors for suicide and understanding how short-term spikes in suicidal intent[63–65] and access to a highly lethal,[66,67] fast, and nonreversible suicide method increase the risk of a fatal outcome.[68–71] When a patient is at risk for suicide, clinicians should be comfortable counseling on the reduction of access to lethal means with patients and families as part of a suicide safety plan[72] or general safety discussion.[73–76] In our consensus guidelines, a motivational interviewing approach is described that respects patients' decisional autonomy (in the absence of acute risk requiring emergency intervention) and is aimed at solutions, such as storing firearms away from the home or locking firearms and having a friend hold the key until the patient recovers. Clinicians should be familiar with institutional and state-specific policies regarding safe storage,[77,78] temporary transfers,[79] and emergency firearm access restriction.[80,81] Firearm access should be recognized as an important element of suicide risk and firearm owners as critical partners in prevention.

Regarding education about the prevention of unintentional firearm injuries and deaths, our advisory group prioritized the identification of high-risk behaviors for unintentional injury and understanding the mechanisms by which these risks might be mitigated, including safe storage and safety training. For example, when providing routine age-based anticipatory guidance, clinicians should be aware of state child access prevention laws, be comfortable counseling on safe storage methods (including options for when a firearm is owned for personal protection), and know that a majority of firearm owners support safe storage and that physicians can be effective at motivating families to adopt safe storage behaviors.[7,82] These priorities should be integrated into education on relevant state and local policies or through hands-on training to improve physicians' self-efficacy in counseling on the application of safety devices.

Our consensus guidelines are reflective of the current state of research and should be considered a living document that will need to be adapted to incorporate new study findings as the evidence base continues to grow. Much of this material is best presented (and to a degree already being presented) interwoven throughout existing curricula. The intent of this phase of our research was not to develop a complete curriculum nor a series of educational modules. These priorities will need to be interpreted and applied to each program and school according to their unique educational needs. Challenges and barriers to implementation will need to be considered by educators (e.g., alignment with existing curricula, tensions related to constraints in available curricular time, faculty development).

Furthermore, some types of firearm injury and death disproportionately affect racial, ethnic, sexual, and gender minorities.[83,84] These priorities must also be interpreted and applied to broader educational efforts addressing equity and structural racism. It is important to recognize that each school and program exists within a larger health system. The health systems improvement priorities in List 1 are reflective of institutional-level requirements that are critical for creating a clinical learning environment that facilitates learners' ability to apply lessons learned in the classroom to hands-on patient care.

Officer-involved shootings, while not well characterized, have resulted in about 1,000 deaths each year for the last 6 years.[85,86] They are an important cause of death and injury in the United States and are critical topics on which medical professionals must be well informed, especially with respect to discussions of how structural violence and racism impact health and well-being. Furthermore, officer-involved shootings have direct effects on patients and communities as well as on health care systems and society. The failure of any priority in this context of firearm injury to reach the 75% threshold for consensus for inclusion is indicative of the need for further research to inform the development of robust, comprehensive educational priorities. It is also indicative of the lack of perceived clinician efficacy

in addressing this societal problem. As universities and hospitals increasingly recognize their roles in dismantling structural racism, addressing officer-involved shootings will become an important component of health professions education. We have chosen to include these priorities in Supplemental Digital Appendix 1 at http://links.lww.com/ACADMED/B141 to serve as a foundation for future work.

Future research should examine the implementation and validation of these objectives, specifically studying their use in educational program development (e.g., measures of implementation efficacy, continuous quality improvement, learner evaluations) and the downstream effects of improved clinician education on firearm injury. Downstream effects could be assessed using outcome measures such as the frequency of counseling, rate of patient uptake of safe storage behaviors, and patients' perceptions of clinicians as effective messengers about firearm safety.

These findings must be considered in the context of some limitations. First, educational topics or areas not included in this analysis may reflect lack of consensus knowledge or standards; these guidelines will therefore be subject to revision as knowledge changes. We also did not attempt to prioritize certain topics for clinicians practicing in different settings (e.g., rural versus urban), further emphasizing the need for tailoring this curriculum to the needs of a given program or practice. While our advisory group members were carefully selected to be highly inclusive, with respect to national demographic data, our cohort underrepresents the South and minority groups relative to the population, with about 25% of our group comprising individuals who identified as people of color.[87] We also overrepresented emergency medicine clinicians, with nearly a third of our group consisting of emergency physicians and nurses. While we intentionally included firearm experts, we did not attempt to include representatives from community organizations.

In addition, not all members were able to participate in each meeting, and it cannot be known how full involvement might have altered the final language of the priorities. We were unable to convene every expert in the field of firearm injury and some influential clinician–researchers were not included in our advisory group. Although bias is possible in any consensus technique, the nominal group technique is specifically designed and implemented in such a way that minimizes undue influence by any individual or group by allowing for both open and anonymous feedback in multiple formats.

In conclusion, physicians consistently indicate that they feel a responsibility to counsel patients and families on firearms and injury risk.[12,88] Yet, when only about 20% of physicians have received education on any aspect of firearm injury, it is not surprising that many do not feel well equipped to provide this counseling and that patients do not find physicians to be credible messengers about firearms.[12,13,18] Robust, data- and consensus-driven priorities for health professions education on firearm injury create a pathway to clinician competence and self-efficacy. With an improved foundation for curriculum development and educational program-building, clinicians will be better informed and poised to engage in a host of firearm injury prevention initiatives both at the bedside and in their communities.

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Appendix 1

Priorities for Health Professions Education on Firearm Injury, Developed by Consensus by an Expert Advisory Group, 2019

Context of firearm injury and educational domains	Educational priorities	Concept type
General, crosscutting priorities		
Epidemiology and social context	1) Describe fatal and nonfatal firearm injury epidemiology	Basic
	a) Describe the burden of death and injury due to firearm suicide, peer violence, mass violence, unintentional injury, IPV, and officer-involved shootings	Basic
	b) Distinguish among demographic groups (race, age, gender, urbanicity)	Basic
	c) Describe long-term psychosocial and physical effects, community impact, and mortality data	Basic
	d) Recognize the limitations of the available sources of data on firearm epidemiology, particularly regarding firearm threats and injury	Complex
	e) Summarize the basic economic effects of firearm injury and death, including quality and disability-adjusted life years	Complex
	2) Understand patterns of firearm access, possession, ownership, transfer, and use	Basic
	a) Recognize patients' and family members' reasons for firearm access	Basic
	b) Examine population-based factors such as gender, race/ethnicity, geography, urbanicity, and culture	Basic
	3) Explain risk and protective factors related to firearm threats, injury, and death	Basic
	a) Identify overlap in risk factors between victims and perpetrators	Basic
	b) Explain models of risk and protection (e.g., social-ecological or biopsychosocial models) that encompass numerous factors, including but not limited to demographics, firearm use and storage behaviors, socioeconomic factors, cultural factors, psychological and behavioral factors, mental health, and adverse childhood experiences	Complex
Patient-centered care	4) Provide counseling about firearm injury prevention to patients deemed to be at high risk based on epidemiologic data and/or clinical judgment by:	Basic
	a) facilitating patient-centered dialogue about firearm ownership, access, storage, or exposure while responding to patients' experiences/perspectives and recognizing personal biases	Basic
	b) using motivational interviewing techniques to encourage safer behavior	Basic
	c) using a trauma-informed care model	Threshold
	5) Describe interprofessional and educational resources for patients experiencing or at risk of firearm injury and the process by which to refer patients to these programs or materials, including but not limited to:	Complex
	a) social workers and mental health professionals	Complex
	b) suicide prevention programs	Complex
	c) community- or hospital-based violence intervention programs	Complex
	d) survivor support groups	Complex
	e) IPV prevention programs	Complex
	f) educational materials from organizations or professional societies	Complex
	6) Describe the identification, prevention, and treatment of posttraumatic stress disorder in individuals at risk for violence or with a history of exposure to violence, especially suicide, peer violence, or military experience while:	Complex
	a) including support and counseling for family members	Complex
	b) using a trauma-informed care model	Threshold
	7) Describe evidence-based counseling of patients on safe storage and removal in higher and lower risk situations, including but not limited to in-home storage, offsite storage, permanent disposal, and extreme risk protection orders	Basic
	a) Explain best practices for safe gun storage (e.g., storing unloaded firearms separate from ammunition in a locked box or safe or application of an external locking device when a locked box or safe is unavailable)	Basic
	b) Describe community resources for safe offsite storage or disposal (e.g., gun retailers, clubs, ranges; Veterans Affairs programs or facilities; law enforcement buy-back or surrender programs)	Complex
	8) Provide anticipatory guidance and follow-up for patients and families with access to firearms in specific at-risk situations, including but not limited to:	Basic
	a) substance use disorders	Basic
	b) depression or suicidal ideation	Basic
	c) history of assault or IPV	Basic
	d) children or adolescents living in or visiting the home	Basic
	e) aging, cognitive impairment (including traumatic brain injury), and dementia	Basic
	9) Develop insight into one's personal views and biases around firearms and the potential implications for communication with patients	Threshold

(*Appendix continues*)

Appendix 1
(Continued)

Context of firearm injury and educational domains	Educational priorities	Concept type
Ethical, legal, and policy implications	10) Describe federal and state laws regarding aspects of firearm ownership and access that may impact patients, specifically:	Basic
	a) background checks and licensing	Basic
	b) restraining orders and extreme risk protection orders	Basic
	c) history of involuntary psychiatric commitments	Basic
	d) firearm transfers and purchase	Basic
	e) child access and safe storage	Basic
	f) firearm training and certification	Basic
	11) Describe mandated reporting, duty to warn, forensic, and law enforcement requirements while respecting patient autonomy and privacy	Complex
	12) Summarize the impact of selected policies on incidence of firearm injury, recognizing the need for more research and evidence, including but not limited to:	Basic
	a) universal background checks	Basic
	b) permit to purchase and licensing processes	Basic
	c) extreme risk protection orders	Basic
	d) storage practices and training	Basic
	e) gun-free zones	Basic
	f) laws limiting magazine capacities and access to semiautomatic military-style weapons	Basic
Firearm anatomy and physiology	13) Be familiar with basic types of firearms and ammunition, firearms storage techniques, and safety devices/locks	Basic
Intimate partner violence priorities		
Epidemiology and social context	1) Understand the influence of IPV risk factors and IPV-related firearm threats, injury, and death	Basic
	a) Describe basic demographic information (e.g., gender identity, race/ethnicity, age); pregnancy status; history of prior IPV; and substance use as it relates to risk of IPV	Basic
	b) Explain the connection between IPV and mass shootings, homicides-suicides, and violence against children	Complex
Patient-centered care	2) Screen patients for firearms in the setting of IPV	Basic
	a) Identify high-risk features in a patient encounter that prompt targeted, clinician-initiated screening for IPV and firearm access	Basic
	b) Recognize limitations of and barriers to screening and counseling modalities	Basic
	3) Discuss the impact of firearm access on the risk of injury and death in patients who screen positive for firearms in the setting of IPV while avoiding stigmatization	Complex
	a) Discuss safety planning, exit planning, and means of reducing firearm access when firearm presence complicates IPV	Complex
	4) Recognize the importance of a nuanced approach to discussing interventions with victims of IPV where a firearm is present	Complex
	a) Appraise potential risks and benefits of removing the firearm or leaving the relationship	Complex
	b) Assess individual differences in readiness for change and the potential for associated risks	Complex
	5) Analyze current data on the risks, benefits, and misperceptions of concealed carry and firearm ownership as self-protection among victims of IPV	Threshold
	6) Evaluate approaches to high-risk cases of IPV	Complex
	a) Describe situations in which violence may escalate (e.g., threats with a firearm or increasing coercive behavior)	Complex
	b) Use special consideration in situations in which the partner is present at the visit	Complex
	7) Analyze gaps in clinical and social resources (e.g., availability of emergency family shelters, family counseling) and how they impact the risk of violence to patients and families and influence decision making	Threshold
Ethical, legal, and policy implications	8) Understand the implications of reporting high-risk IPV as it relates to firearm injury and death	Complex
	a) Examine risks such as violent behavior escalation and benefits such as removal of firearms	Complex
	b) Evaluate the strengths and limitations of federal, state, and local (if preemption laws do not exist) laws relating to firearms and IPV	Threshold
	9) Summarize mandatory reporting of IPV, including reporting to authorities, pressing charges, and potential implications for firearms in the home	Complex

(*Appendix continues*)

Appendix 1
(Continued)

Context of firearm injury and educational domains	Educational priorities	Concept type
Mass violence priorities		
Epidemiology and social context	1) Recognize that the frequency of events and deaths due to mass violence is low relative to overall firearm deaths and that acts of mass violence receive a disproportionate amount of media attention relative to overall firearm deaths	Basic
	2) Describe the current data on common weapons and tactics used to perpetrate acts of mass violence, common triggers or motivators for committing acts of mass violence, and other characteristics of perpetrators	Complex
	3) Recognize the challenges in identifying risk factors for perpetration of mass shootings	Basic
	a) Recognize the relative role of mental health as a potential risk factor but a poor predictor, given that the vast majority of people with mental illness are not violent and relatively few homicides are committed by people with mental illness	Basic
	b) Explain the potential effects of social media, media reporting, and other variables as contributing factors	Complex
	4) Explain the relationships between mass violence and other forms of violence (e.g., IPV and suicide)	Complex
	5) Describe the potential harms and benefits of preparing for mass shootings including:	Threshold
	a) active shooter drills in schools and other environments	Threshold
	b) selected individual and organizational defenses, including active shooter training	Threshold
Patient-centered care	6) Recognize access to firearms as a risk factor for perpetration of mass violence and provide appropriate counseling to patients and families to reduce firearm access by unauthorized or prohibited users	Basic
	7) Identify factors that indicate a patient may be at risk of perpetrating mass violence, while recognizing limitations and barriers to screening and counseling modalities	Basic
	8) Describe best practices for invoking involuntary psychiatric holds and extreme risk protection orders for patients at imminent risk of perpetrating mass violence, including but not limited to:	Complex
	a) recognizing and reporting threats of violence	Complex
	b) understanding threat management resources within the health care setting	Complex
	9) Recognize the importance of providing comprehensive psychosocial support for survivors of mass violence	Complex
Ethical, legal, and policy implications	10) Describe methods to limit firearm access to individuals at risk of perpetrating mass violence considering the role of background checks and licensing strategies, extreme risk protection orders, and availability/access to firearms	Basic
Peer violence priorities		
Epidemiology and social context	1) Understand the impact of the social determinants of health on firearms injury and death	Basic
	a) Explain the risk of firearm injury and violence as affected by many social determinants of health, including but not limited to social support and social networks (including social media), racism, concentrated poverty, access to educational and economic opportunities, and adverse childhood experiences	Basic
	b) Recognize the relationships between firearm violence and other forms of violence (e.g., bullying, cyberbullying, assault, IPV)	Complex
	c) Evaluate the overlap in risk factors between victims and perpetrators	Threshold
	2) Describe the epidemiology of intentional nonfatal firearm injuries and firearm homicides	Basic
	a) Recognize patterns in the type of firearm used, specifically that handguns are used in an overwhelming majority of homicides in which the gun type is known	Basic
	b) Describe how crime guns may be obtained (e.g., legal purchase, straw purchase, theft, loan) and how they are often stored or carried	Complex
	3) Summarize strategies (and supporting evidence) to reduce peer or community violence-related firearm injury, including but not limited to hospital- and community-based interventions, policing strategies, and licensing strategies	Threshold

(*Appendix continues*)

Appendix 1
(Continued)

Context of firearm injury and educational domains	Educational priorities	Concept type
Patient-centered care	4) Describe best practices for screening and counseling of patients at high risk for victimization and perpetration of peer or community violence	Basic
	a) Recognize initial injury as an opportunity to link patients and families to prevention resources	Basic
	b) Use approaches such as screening, brief intervention, and referral to treatment; harm reduction; and institutional and community-based referrals	Complex
	c) Recognize the limitations of and barriers to screening and counseling modalities	Complex
	5) Understand the use of hospital-based and community-based violence intervention and conflict mediation programs	Basic
	a) Identify supporting evidence for the utility of these programs in reducing peer and community violence	Basic
	b) Understand their relationships to the social determinants of health	Basic
	c) Recognize the range of program methods (e.g., counseling and peer mentorship)	Basic
	d) Describe local resources and referral processes	Complex
	6) Employ evidence-based bedside interventions to reduce risk of firearm violence and retaliation	Complex
	a) Describe basic de-escalation techniques	Complex
	b) Examine clinicians' roles in referral to or support of interprofessional or community-based programs	Complex
Suicide priorities		
Epidemiology and social context	1) Describe the epidemiology of suicide and suicide attempts as they relate to firearm injury and death	Basic
	a) Describe risk factors for self-harm, including special at-risk populations (e.g., veterans, older adults, patients with alcohol use disorder, health care workers, LGBTQ+ individuals, adolescents)	Basic
	b) Explain the differences in methods used in suicides and suicide attempts	Basic
	2) Based on conceptual frameworks for suicide, explain the effects of impulsivity, acute stress, and comparative lethality of various means used to attempt suicide as they relate to the need to reduce access to firearms in at-risk individuals	Complex
Patient-centered care	3) Describe principles for suicide risk assessment and communication about suicide	Basic
	a) Recognize the limitations of screening for suicidal ideation	Basic
	b) Explain lethal means restriction to patients, parents, caregivers, family members of aging patients, and other support members	Complex
	4) Describe "safety planning" and how lethal means screening and restriction relate to it	Complex
	5) Discuss institutional and state-specific policies for escalation of concerns about firearm access and suicide risk, including options for clinicians, patients (i.e., self-reporting), and family members	Complex
Unintentional injury priorities		
Epidemiology and social context	1) Identify mechanisms of unintentional firearm injury and associated risks or protective factors, especially:	Basic
	a) special considerations in pediatric, adolescent, and young adult populations	Basic
	b) safe storage methods	Basic
	c) firearm education and training among youth in the home	Basic
	d) substance use and violence in the home	Basic
	e) firearms training programs and shooting sports	Basic
	2) Describe measures to reduce unintentional injury risk in the home, including but not limited to firearm removal, safe storage, safe handling, safety training, education at the point of firearms sale, shooting sports education, and injury prevention education in schools	Basic
Patient-centered care	3) Apply universal screening and personalized counseling on firearm safety during routine age-based anticipatory guidance and under special circumstances, including but not limited to substance use disorder and traumatic injury by any mechanism	Complex
	4) Identify tools that can help families inquire about the accessibility of firearms in homes where their children live and visit	Complex

Abbreviations: IPV, intimate partner violence; LGBTQ+, lesbian, gay, bisexual, transgender, and queer.