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Substance Use Disorders (FG Moeller, Section Editor)

Integrating Evidence-Based Guidelines on Pain and Opioids into Medical School Education

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Abstract

Purpose of review Directed, quality educational content, integration, and experience are required to prepare new medical professionals to improve access to and deliver high quality treatment for individuals with opioid use disorders. The collaboration of medical schools, their deans, and faculties as well as the involvement of local, state, and federal partners yields some important observations for success to expedite curricular customization to ultimately improve the core competence of future providers.
Recent findings Much of the recent literature discusses what to teach medical students about substance use disorder, its identification, treatment, and prevention. The literature advocates the use of standardized patients and placement of the study within clinical rotations or a separate pain curriculum. These methods do not reduce the burden on a cramped curriculum or offer a forum for schools with similar challenges to share best practices.
Summary The paper describes an innovative partnership model that has led to the evolution of three cohorts for medical school collaboration in addiction education and identifies key concepts for adopting evidence-based, recovery-oriented substance use disorder (SUD) educational programs. Of key importance are leader champions, unique partnerships, a common goal to improve undergraduate medical education in SUD and addiction, and the development and longitudinal integration of core competencies. Findings are based on over 5 years of engagement with medical school deans by federal, state, and association leaders. Evidence supporting recommendations and models for leaders include that core competencies have been successfully adopted and that the

collaborations continue to thrive. Future research to measure leaders' continued engagement, medical students' integration of addiction and substance use disorder education, and resultant increased access to evidenced-based, recovery-centered SUD care is needed to inform and support the efficacy of the model.

Introduction

Overdose data indicates that there were over 70,000 deaths in this country in 2017 [1]. As the rate of opioid overdose deaths has increased and public health emergencies have been declared, federal, state, and local officials have formed task forces, convened stakeholders, passed legislation, issued prescriber guidelines, conducted research, and funded opioid use disorder-related programs [2–5, 6•]. Concurrently, medical schools have realized that new physician graduates must be able to diagnose and provide recovery-oriented care for individuals with substance use disorders.

A plethora of guidance documents and studies have provided medical schools with a vast array of considerations to navigate. Medical schools have been challenged to improve safe prescribing practices, improve curricula, and develop faculty [7, 8•, 9••]. In Rhode Island, the Department of Health and the medical schools mandated that graduating medical students will have completed the Waiver 2000 training requirements as part of their undergraduate medical education [10••]. The stage is set for academic, government, and association partners to innovate.

Faculties and deans of Virginia, Philadelphia, and other Pennsylvania medical schools were encouraged to entertain new partnerships to customize how their schools could better prepare their students to care for the number of individuals with a substance use disorder who need evidence-based treatment to achieve and sustain recovery. Critical success factors and recommendations common to models developed in the three cohorts may provide a roadmap for more generalized adoption.

In May 2016, the Region 3 Administrator from the Substance Abuse and Mental Health Services Administration (SAMHSA) and the Executive Vice-President of the Addiction Medicine Foundation (TAMF) invited medical school leaders and executive policymakers to an all-day addiction education summit. Region 3 includes DC and the states of PA, MD, DE, VA, and WV. The common goal of leaders who attended the May 2016 summit was to improve addiction education and ultimately to increase access to treatment for individuals with a substance use disorder. The summit provided a process to identify steps toward improving future physicians' competency in current and emerging evidence-based pain management and SUD. A facilitated discussion to identify capacity/strengths, barriers/weaknesses, needs, and opportunities was productive and provided the foundation for future progress.

A wide array of follow up activities to the May 2016 meeting identified common elements that may inform others pursuing addiction education program improvements. Three key parallel tracks of progress will be described, informed by what was learned as the result of the May 2016 summit and 23 subsequent convenings. Key success elements emerged from these activities which will be further delineated along the model development timeline of 39 months. Tables 1 and 2 summarize these activities, and Fig. 1 distills the timeline phases, success elements, and options for consideration into the innovative partnership model. This model provides practical examples for interprofessional academic addiction education and for leaders in need of practice ideas to customize integration of evidence-based guidelines.

Model timeline

Fourteen medical schools were represented by 18 deans and faculty members at the May 2016 Convening of Medical Schools in Region 3. The meeting was co-

Table 1. Medical school activity using innovative partnership convening model

a. Virginia Medical School 2016 Visits Summary Table	Number of Visitor Representatives			
	SCHOOL	SAMHSA	TAMF	STATE
6/28 UVA University of Virginia, Charlottesville	5	1	1	2
6/28 LUCOM Liberty University College of Osteopathic Medicine, Lynchburg	1	1		1
6/29 VCOM Edward Via College of Osteopathic Medicine, Blacksburg	7	1	1	2
6/29 VTC Virginia Tech Carilion School of Medicine, Roanoke	12	1	1	2
6/30 EVMS Eastern Virginia Medical School, Norfolk	12	1	3	1
7/1 VCU Virginia Commonwealth University, Richmond	3	1	1	2
b. Virginia Medical School 2018 Visits Summary Table	**Number of Representatives**			
	SCHOOL	SAMHSA	TAMF	STATE
10/23 UVA University of Virginia, Charlottesville	12	1		1
10/25 LUCOM Liberty University College of Osteopathic Medicine, Lynchburg	8	1		1
10/26 VCOM Edward Via College of Osteopathic Medicine, Blacksburg	6	1	1	1
10/26 VTC Virginia Tech Carilion School of Medicine, Roanoke	16	1	1	0
10/22 EVMS Eastern Virginia Medical School, Norfolk	16	1		1
10/24 VCU Virginia Commonwealth University, Richmond	14	1		1
c. VA Interprofessional Addiction Education Summits: 2017, 2018, 2019, 2020	**Number of Representatives**			
	SCHOOL	SAMHSA	TAMF	STATE
1/9/2017 @UVA: Medical School Leaders' Summit hosted by SAMHSA + VA DOH	23	2	1	4
3/29/2018 Charlottesville 1st Interprofessional Addiction Education Statewide Summit https://www.psva.org/wp-content/uploads/2018/02/Brochure-1st-annual-va-summit-addiction-education1.pdf	90 attendees Evaluations: 92% "learning needs met"			
3/29/2019 Richmond 2nd Interprofessional Addiction Education Summit https://www.evms.edu/media/evms_public/departments/cme/conference_documents/Brochure_VA_Interprofessional_Summit_for_Addiction_Education.pdf	121 attendees Evaluations: 94% "learning needs met"			
3/29/2020 Richmond 3rd Interprofessional Addiction Education Summit	Agenda per 2019 Summit Evaluations			

Table 2. Philadelphia medical school activity using innovative partnership convening model

Philadelphia Medical School Activity Using Innovative Partnership Convening Model											
Hosting Organization	**In-Person Convenings: Number and Dates**										
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
Drexel University College of Medicine	**7/7/16**						**1/22/19**				
Philadelphia College of Osteopathic Medicine		**10/2/17**						**4/30/19**			
Temple Lewis Katz School of Medicine			**1/8/18**						**7/30/19**		
Jefferson Disney Kimmel Medical College				**4/15/18**						**10/30/19**	
Univ. of Pennsylvania Perelman School of Medicine					**7/12/18**						**1/30/20**
Phila Dept Behavioral Health + Intellectual disAbility Services						**10/30/18**					

SAMHSA Region 3 facilitated convenings. The American College of Academic Addiction Medicine attended in-person 7/7/16, 10/2/17 and all others attended virtually.

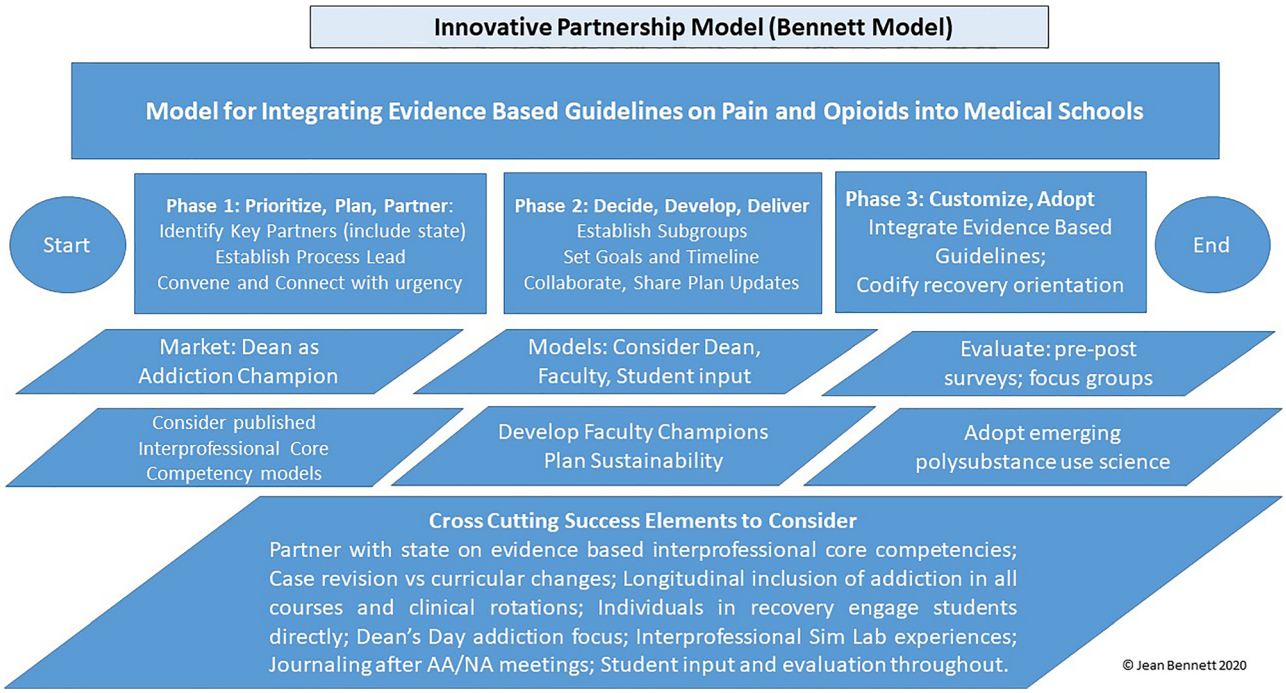

Figure 1. Innovative partnership model (Bennett model)

sponsored and co-facilitated by SAMHSA Region 3 and TAMF. Seven addiction experts attended as did behavioral health state government leaders from DE, MD, PA, and VA. Due to their addiction education portfolios, the White House Office of Drug Control Policy Senior Advisor and American Academy of Addiction Psychiatry Executive Director were included. The convening and resulting partnerships between and among attendees resulted in a number of follow-up initiatives and activities which still continue. The convening recognized each attendee with details about their position and their organizational support to addiction education. Critical to the success of the summit was the participation of the deans who in the Bennett model most often serve as the leader champions. Adoption of curricular changes are more likely with administrative support and participation by the medical school dean. The relevance of state leaders and why they matter was emphasized.

After presentations to highlight addiction medicine as a subspecialty and the "how to" success stories of launching an addiction medicine fellowship, two schools shared their successes in launching or revamping their addiction curriculum as a base for fellowship development. The examples shared and evolving models with innovative curricular elements were presented by medical school faculty, deans, and subject matter experts on addiction education. The presentations provided the foundation for subsequent breakout groups to capture priorities and plans focused ultimately on improving the quality of care provided by graduating medical students. Breakout groups were comprised of geographically based state, medical school, and subject matter experts. The breakout sessions nourished the new relationships and reinforced progress.

An analysis of the process followed at the May 2016 Summit provided the foundation for the innovative partnership (Bennett) model. The model phasis are 1) prioritize, plan and partner; 2) decide, develop and delever; and 3) customize and adopt deliverables for integration. The model has been followed to developed cohorts, that is, partnerships, in Virginia, Philadelphia, and Pennsylvania with the aim of improving SUD undergraduate medical education and subsequent access to recovery-centered care for patients with SUD. All three partnerships have contributed to the successful adoption and integration of evidence-based guidelines and/or related core competencies into the undergraduate medical education curriculum (Fig. 1).

Cohort 1: Virginia's six medical schools

As a result of the May 2016 convening, a senior policy advisor from Virginia extended an invitation to the SAMHSA and TAMF co-hosts to visit all six Virginia medical schools. This resulted in six 90-min meetings over 4 days during the last week of June 2016. Over 50 medical school faculty participated. Invitees varied with faculty composition, the degree to which addiction medicine faculty or content had been added, and goals of the school. Each school customized the agenda to address local needs. Three schools provided medical school tours and student engagement. The Virginia senior policy advisor organized the visits as outlined in Table 1 which indicates the state, medical school, TAMF, and SAMHSA representation for each meeting. Each Virginia medical school's meeting had three goals: First, to learn about the medical school and its undergraduate and graduate medical education (GME) programs in addiction/SUD and any progress or interest in addiction medicine fellowships; second, to share evidence-based resource information and offer future support related to substance use disorders, opioid misuse leading to overdose, existing medical school curricula addressing key topics, and GME training; and third, to gauge interest in and plan for future collaboration.

Every participant was encouraged to contribute updates and ideas, was sent follow up resources, and offered customized additional support. There was an energized culmination to each meeting as resources and contacts were shared, and ideas for future collaboration and invitees captured. Five programmatic themes emerged from the 2016 Virginia medical school visits:

- It is imperative to include addiction medicine topics in undergraduate medical education.
- The integrated curricula format used in undergraduate medical education makes the allocation of a specific number of training hours to a specific topic problematic.
- There is a risk that educators asked to include addiction/SUD materials in addition to other ever-increasing responsibilities may experience burnout.
- There is both a need for and value in a continuum of education and training in addiction medicine from medical school through residency which includes all addictions.
- An economic impact analysis of addiction to support curriculum change, treatment, and (for some schools) formation of addiction medicine residencies is required.

All of the six Virginia medical schools articulated their intent to expand their addiction medicine training and/or clinical opportunities for prevention, treatment, and recovery education for individuals with opioid use disorders. Four of the six medical schools were either considering or had taken steps to start an addiction medicine or addiction psychiatry fellowship, and the number of addiction fellowship has increased from one to three. A thematic concern to expanding addiction education reported by medical school leaders was the shortage of faculty with addiction medicine clinical expertise. Challenges to a fellowship being established were described as reticence by one or more key leaders, lack of the required faculty infrastructure, funding/sustainability, and/or recruitment challenges. Exploring solutions to overcome specific obstacles was an important practical result of the in-person meetings. Promised resources, models, and post-meeting actions were captured and provided continuity when statewide convenings by or for all schools were planned.

While the leader champions involved shared the passion for addressing addiction medicine goals, an overall strategy and infrastructure was needed to meet addiction education goals. The Secretary of the Department of Health (DOH) in Virginia was provided with a summary of highlights of the school visits. The Secretary of Health suggested an in-person convening of all the medical schools. The SAMHSA Regional Administrator worked with the schools and state to identify a deans' priority agenda and plan the convening. In January 2017, 6 months after the initial round of individual school visits, all of the medical schools, one oral surgery department chair at a dental school, the Secretary for Health, TAMF, SAMHSA Region 3, and the Director of the SAMHSA Office of the Chief Medical Officer (OCMO) participated in a day long *Addiction Medicine Partnership Summit for the Virginia Medical Schools*. The location, agenda, and invitees were selected by the deans and Virginia Senior Advisor-partner, and infrastructure for the convening was done by SAMHSA Region 3.

The January 2017 Summit included 23 attendees from the schools and Commonwealth of Virginia leaders from the Departments of Behavioral Health and Developmental Services and Health, SAMHSA, and TAMF as seen in Table 1. The theme of the presentations was addiction education priorities, progress, and vision for the future. The agenda included a kick-off and culminating interprofessional addiction education model presentation, an executive leadership panel, and a West Virginia medical schools' panel. The Core Competency Subgroup, comprised of one representative from each of the six Virginia medical schools, presented their progress on developing core competencies for the VA schools based on an analysis of core competencies published or under development in MA and PA [11, 12]. Recommendations identified by the attendees were captured and addiction education resources shared.

The January 2017 Virginia Summit enabled several milestones to be reached. It formalized the linkage between the VA and WV medical schools, VA medical schools and state leaders, and refreshed the sense of urgency established during the school visits. Results from the summit included the schools being offered the opportunity to develop an addiction education proposal idea for consideration by the VA Department of Health and Human Resources (DHHR) Secretary, and an invitation was

extended by the DHHR Secretary and members of the Core Competency Subgroup to become part of a more comprehensive work group with a more extensive partnership and more influence on addiction education Commonwealth-wide.

Virginia's then Governor Terry McAuliffe signed legislation directing the Secretary of Health and Human Resources to convene a work group made up of representatives from schools of medicine, pharmacy, dentistry, and nursing and physician assistant programs to develop standards and curricula for training healthcare providers in pain management, addiction, and the safe and appropriate prescribing of opioids. The Secretary convened a work group representing the range of opioid prescribers and dispensers in May 2017. They worked through the summer and early fall of 2017 to develop *Virginia Core Competencies in Addiction, Pain Management and Opioid Prescribing*. These competencies were subsequently adapted for use by schools that educate healthcare practitioners who do not prescribe or dispense but who interact with patients who suffer the disease of addiction or take prescription opioids for the treatment of pain, such as nurses, physical therapists, athletic trainers, and social workers.

The *Virginia Core Competencies in Addiction, Pain Management and Opioid Prescribing* outline the most important aspects of the opioid crisis, addiction, opioid use, and pain management which identified by the work group as critical knowledge for health professional students. Schools are free to tailor these competencies to meet the needs of their professions and national educational standards, accommodating their needs, resources, and schedules. Delivery of curricula may include in-person instruction, online instruction, case study discussion, simulated patient exercises, practicums, internships, and residencies.

Since open publication on the Internet, Virginia's core competencies for both prescribers and non-prescribers have been sent to the dean of every health professional school in the Commonwealth. [13, 14]. In addition, the Virginia Department of Health Professions partnered with Virginia Commonwealth University to produce four hours of medical education video presentations based on the competencies. The presentations cover the spectrum of the competencies and are delivered by faculty from several Virginia schools and the Commonwealth's Department of Medical Assistance Services. This continuing education credit, in the public domain, is available at no charge and is intended not only for practicing prescribers but for health professional school faculties to supplement lectures and other teaching modalities [15].

In 2018, a second round of in-person visits at each of the Virginia schools was completed. The 2018 convenings with each of the six medical schools were similarly organized with the deans and the Commonwealth handling the scheduling and meeting co-facilitation shared by the dean and SAMHSA Regional Administrator. In this second round, the American College of Academic Addiction Medicine (formerly TAMF, now ACAAM) participated virtually in two of the six visits to assist with fellowship inquiries. Attendee partners nearly doubled from the 2016 to the 2018 visits as shown in Table 1. The goal of the second round of visits was to focus more on the benefits and requirements for interprofessional addiction education, to provide a forum for the schools to eagerly share milestones regarding addiction education, and to identify

resources and solutions to gaps. During the course of the visits, which again occurred in 1 week, a compilation of twelve addiction education-related resources were concurrently disseminated to all 72 participants. Evidence-based information, population-specific publications, and existing models requested by schools were among the resources shared.

The Virginia medical schools have also collaborated in hosting interprofessional addiction education annual statewide summits in 2018 and 2019 which featured SAMHSA, Virginia DHHR and DBHDS speaking and facilitation roles. Table 1 provides a snapshot of attendees and success in meeting learners' needs and links to the conference agendas. Finally, the same key partners—medical schools, state reps, SAMHSA Region 3, and ACAAM—have quarterly calls which include the West Virginia schools and key leaders. There have been 10 quarterly follow-up calls with continuing participation by the schools, state, ACAAM, and SAMHSA and reciprocal invitations by WV to their annual addiction conference.

Cohort 2: Philadelphia's five medical schools

The dean and faculty champions for addiction education from the five Philadelphia medical schools also seized the momentum of the May 2016 Region 3 convening to partner regarding their shared goal of improving students' core competence to care for individuals with a substance use disorder. Since their first of ten in-person convenings in July 2016, goals to improve local care coordination by partnering with city officials represent a major difference from the other two state-based cohorts in the VA and PA models.

Philadelphia identified the addiction medicine fellowship opportunity presented by TAMF and considered how a collaboration between and among the five medical schools could more effectively address the parallel priorities of expanding and improving addiction education and streamlining access to treatment. Including the City of Philadelphia Department of Behavioral Health and Intellectual Disability Services (DBHIDS) Executive Director and Medical Director mirrored on a city level the Virginia process to include government state leaders. All involved were interested in an overarching recovery-oriented system of care as the framework for progress to inform key policy and timely funding discussions. The high level of interest and commitment from the schools and Philadelphia leaders was and continues to be evidenced by the in-person attendance by all schools, the city, ACAAM, and SAMHSA at the July 7, 2016, initial convening. There have been 10 subsequent quarterly meetings which will be described in more detail to illustrate their uniqueness and cohort model elements in common.

The physical location of the meetings rotates between Drexel, the Philadelphia College of Osteopathic Medicine (PCOM), Temple, Jefferson, Penn, PCOM, and DBHIDS. Virtual participation by ACAAM (formerly TAMF) has provided a consistent thread of updated information regarding addiction medicine fellowships, board certification, and fellowship directors' convenings. Ad hoc or permanent additional invitees have resulted from core participants' invitations to academic and clinical experts from the University of the Sciences College of Pharmacy, the Jefferson Center for Interprofessional Practice and Education experts, emergency departments, treatment providers, and

population health researchers. A medical student interested in addiction medicine recently accompanied a guest presenter and has become a permanent member of the partnership by providing vital and candid feedback. Table 2 illustrates the schedule and participation by key partners.

The Philadelphia Partnership has provided unique opportunities to address local coordination and addiction education clinical challenges. At the second convening on October 2017, an *ideas for implementation* exercise resulted in the identification of five projects and associated work groups including (1) streamlining access to treatment, (2) identifying the 30 best clinical placements for the 2000 medical students in Philadelphia, (3) developing a plan for interprofessional addiction education, (4) evaluating addiction education in Philadelphia medical schools, and (5) standardizing substance use disorder (SUD) core competencies across all schools. The local nature of the city partnership has fostered discussion of clinical challenge topics including *Barriers to Accessing Pharmacotherapy for OUD* and *Precipitated Withdrawal for Individuals with OUD Treated with Buprenorphine*. A sampling of models from hosting schools' champion expert presentations have included the following: (1) interprofessional addiction education collaborative practice model for linking to SUD curriculum, (2) a trauma-informed approach to the addiction crisis, (3) expanding suboxone access model via a family practice physician and emergency department toxicologist partnership, (4) substance abuse task force and research highlights, and (5) successful collaboration with pharmacy professionals to improve outcomes. The wide array of topics highlighted by attendees in the school round robin updates on addiction education, when combined with the subgroup and champion expert presentations, seems to explain participants' consistent attendance and continuing interest. Schools have had the opportunity through the Philadelphia Partnership to explore, craft, discuss, and begin to evaluate addiction education core competencies, guidelines, clinical models, and curricular options. A student focus group survey project is underway with all five schools participating.

Momentum and addiction education progress since 2016 of the Philadelphia schools continues to be demonstrated through all schools' participation in quarterly in-person meeting of the five medical schools in Philadelphia. The SAMHSA Regional Administrator, schools, and governmental entity share the quarterly agenda development, meeting facilitation, and follow-up on resources and progress on subgroup action items. ACAAM's virtual participation has been a consistent and essential partner. During the first year of quarterly in-person summits, goals in common were discussed as partnerships were strengthened. Benefits to the hosting organization include the chance to share innovative addiction education research projects and for their leaders to demonstrate their commitment to partnering on city-wide addiction education initiatives. Samplings of what schools have showcased are clinical successes that increase access to medication-assisted treatment, fellowship program establishment milestones, school task force infrastructure and projects, all students receiving naloxone on white coat day, and grant-related evidence-based milestones. Having the SAMHSA Regional Administrator as an entity outside of the medical schools to take responsibility for communications, calendaring and coordination as a core goal related to regional interprofessional addiction education initiative allows schools to focus on subgroup work, programmatic progress in addiction medicine, and preparing for quarterly meetings.

Cohort 3: Pennsylvania's ten medical schools

The medical schools in Pennsylvania began collaborating on a 2015 project to organize visits to all schools, similar to the aforementioned Virginia in-person meetings with the dean setting the agenda. The Pennsylvania work group, comprised of medical school representatives, SAMHSA, and PA, drafted a letter describing the proposal that each school would be visited by the Secretary of the PA Department of Drug and Alcohol Programs (DDAP) and SAMHSA Region 3 Administrator. The purpose of the visits was planned to provide a platform for innovative partnership development, identification of addiction education priorities for action, and development of the infrastructure to support expedited progress. Work group members are credited with this idea and pivotal to development of this plan.

The PA school visits did not come to fruition because the PA government leaders prioritized an initiative to involve all schools in the development of a PA core competency document and have it published. Prior related progress in PA in developing and approving guidance documents customized by profession with the input and participation of each profession had set a solid foundation for the core competency publication to be expeditiously developed and reviewed. The value of state government leadership as an innovative partner for medical schools is illustrated by the results achieved as a direct result of actions taken by the leadership in Pennsylvania collaborating with the medical schools. The process of PA state leadership organizing recurring convenings with the schools, mostly virtual, resulted in a publication of the Pennsylvania core competencies [12]. The PA core competencies have elements in common with Massachusetts and Virginia [11, 13, 14, 16]. Additional initiatives and future publications are underway in Pennsylvania due to these fruitful partnerships. Key elements in common from the PA partnership are also represented in the model for integrating evidence-based guidelines on pain and opioids into medical schools (Fig. 1).

Another related significant example of effectiveness of schools partnering with government policymakers-leaders is the development of and availability of the *PA-Source for Understanding Pain, Prescribing Opioids, and Recovery Treatment (SUPPORT)* [17]. PA SUPPORT is an educational curriculum associated with PA Act 126 of 2016 requiring the licensing boards for dentistry, medicine, nursing, optometry, osteopathic medicine, and podiatry to use this curriculum emphasizing safe prescribing of controlled substances. Additional notable projects undertaken by the PA-led medical school partnership have resulted in the proactive consideration and adoption by each medical school a customized waiver 2000 training program for all students prior to graduation.

Quarterly calls have continued with the nine medical schools in Virginia and West Virginia, state government leaders, and ad hoc participation by ACAAM and hosted by SAMHSA. Quarterly in-person convenings of the Philadelphia medical schools concurrently continued at the request of the school's addiction medicine champions. The progress and preferences of the aforementioned Philadelphia schools inform and confirm key patterns of progress observed in the six Virginia medical

schools and Virginia-West Virginia quarterly call partners. Similarities and differences in obstacles encountered by schools and in preferences by schools in adopting evidence-based guidelines will be noted.

Conclusions

Based on over 5 years of convenings with medical schools and, in particular, three cohorts of six, five, and 10 medical schools in Virginia, Philadelphia, and Pennsylvania, respectively, an innovative partnership model has been developed, discussed, and depicted. The model's elements are common to these cohorts and seem to be associated with the expedited development of core competencies and related progress in addiction education. The three phases of the model, as illustrated in Fig. 1, are to (1) prioritize, plan, and partner with the dean as the champion and consider published interprofessional core competencies; (2) decide, develop, and deliver a local method for faculty development and sustaining curricular currency; and (3) customize and adopt evidence-based guidelines with the codification of a recovery orientation for treatment of individuals with an opioid use disorder or substance use disorder and establishment of a protocol for adopting emerging polysubstance use science. Across these phases, critical elements of the model and, as was demonstrated by the medical school cohorts described above, the medical schools' key partnerships include state policymakers and funders, federal programmatic leaders with convening infrastructure and knowledge of resources and models to share, and professional association leaders whose expertise in addiction education curricular innovation or special populations can bolster progress and address barriers encountered by medical school leaders with competing demands.

The cohorts have demonstrated, and the literature supports, active learning, such as engaging with individuals in recovery-, simulation-, and case-based interactive learning and engaging students in program content and delivery longitudinally [18••]. Contributing success elements of the model include a sense of urgency, openness to innovative partnerships, and the commitment to follow through by all partners collaborating to ultimately improve outcomes for individuals with a substance use disorder who need providers equipped to understand evidence-based treatment and long-term recovery.

Model elements in common include the following: Having the state and schools collaborate regionally followed by convenings of VA and Philadelphia medical schools at dean-hosted meetings created leader champions of a higher order. Leadership seemed spurred to action to save lives by improving the future workforce's competence to help individuals achieve sustained recovery from addiction. The medical school-centric progress demonstrated in Virginia, Philadelphia, and Pennsylvania is contributing to the realization of how to develop more SUD treatment capacity and recovery competent new physicians. The cross-cutting theme is that medical school leaders will eagerly participate in the development and incorporation of evidence-based addiction education program changes with champion collaborators.

The innovative partnership model includes key elements that lead to the success of any meeting. The right stakeholders must be at the table; in this case it includes deans and faculty leaders as well as addiction subject matter experts. The agenda and the goals for the gathering must be clear, the convener organized, and follow-up planned. Shared stories of success and experiential learning contribute to the success of the convening.

Phase 2 of the model entails that the cohort decides, develops, and delivers. Virginia had two subgroups working on the development of core competencies. One was comprised of a representative of each of Virginia's six medical schools. The other was a more comprehensive, interprofessional group led by the director of a state agency and commissioned by the Secretary of Health and Human Resources. The former was incorporated into the latter, and the competencies were developed, written, approved, disseminated expeditiously, and made available online. The broad partnerships were invaluable. Similarly, the medical schools in the Commonwealth of Pennsylvania chose to partner with their state leaders and to focus on producing and publishing their competencies as a priority. The innovative partnerships foster the use of resources both human and in print. The Academy of Academic Addiction Medicine (then TAMF) provided their entire curricular and core competency notebook during the 2016 visits. Both Virginia and Pennsylvania set a priority (decided), developed competencies, and delivered the published core competency product to their stakeholders.

In Phase 3, the work product is customized and adopted. There are critical factors that contribute to success in integrating evidence-based guidelines on pain and opioids into medical education programs. Specifically, the leader champion is key and is often the medical school dean. It is critical that the dean retain some control over an already burdened curriculum. Core competencies, which can be integrated longitudinally over basic science classes, case studies, and clinical rotations, are more easily integrated (or adopted) than another required unit of study. Giving faculty the flexibility to integrate evidence based guidelines through the customization of clinical cases is an important strategy. The students benefit from this integration and customization because the cases more accurately reflect the real-world patients that students encounter. Adoption of charges according to a timeline and trajectory that fits with the schools' prior progress, faculty readiness, and competing priorities is key.

As medical schools and other academic institutions prepare future health professionals to be well-rounded practitioners able to assess and care for individuals who may have a substance use disorder or co-occurring substance use and mental health disorder, it is important to consider and adopt emerging science and models to expedite progress. A systematic approach, such as in the innovative partnership model that evolved as a result of the cohorts described, may be helpful to consider related to faculty development, curricular innovation, and unique partnerships.

Compliance with ethical standards

Conflict of interest
Jean M. Bennett declares that she has no conflict of interest. Barbara Allison-Bryan declares that she has no conflict of interest.

Human and animal rights and informed consent
This article does not contain any studies with human or animal subjects performed by any of the authors.

Disclaimer
The article content contained herein was developed by the authors and is not to be construed as reflecting the views of the Substance Abuse and Mental Health Services Administration or the Virginia Department of Health Professions.

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Papers of particular interest, published recently, have been highlighted as:
- • Of importance
- •• Of major importance

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Opioid curricular elements with key areas of content for undergraduate medical education.

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