


# The Role of the Pharmacist in Combating the Opioid Crisis: An Update

Lucas Kosobuski<sup>1</sup>, Carolyn O'Donnell<sup>1</sup>, Cynthia P Koh-Knox Sharp<sup>2</sup>, Nathaniel Chen<sup>1</sup>,  
Laura Palombi<sup>1</sup> 

<sup>1</sup>Pharmacy Practice and Pharmaceutical Sciences, University of Minnesota - College of Pharmacy, Duluth, MN, USA; <sup>2</sup>Purdue University College of Pharmacy, West Lafayette, IN, USA

Correspondence: Laura Palombi, Pharmacy Practice and Pharmaceutical Sciences, University of Minnesota – College of Pharmacy, 1110 Kirby Drive, 232 Life Science, Duluth, MN, 55812, USA, Tel +1 218-726-6000, Fax +1 218-726-6500, Email lpalombi@d.umn.edu

**Introduction:** The opioid overdose crisis has claimed hundreds of thousands of lives in the United States in the last decade, with overdose numbers continuing to climb. At the same time, the role of the pharmacist in combating the opioid crisis continues to evolve.

**Methods:** A literature search was conducted in Ovid MEDLINE that incorporated both MeSH terms and keywords to describe two concepts: the opioid epidemic and pharmacists/pharmacies. The search was limited to articles published after 2010 through the end of 2021 and returned 196 articles that were analyzed thematically.

**Results:** Thematic analysis revealed the following themes: prevention, interventions, public health role of the pharmacist, pharmacists in multiple roles, barriers, pharmacist and healthcare provider attitudes, educational initiatives for pharmacists and student pharmacists, and future research.

**Discussion:** While a great deal of progress has been made in the role of the pharmacist in supporting individuals with opioid use disorder (OUD) in the last two decades, pharmacists must seek to invest time and resources into practices with a strong evidence base to better mitigate the growing, devastating impact of the opioid crisis. Pharmacists must be willing to embrace new and non-traditional roles in patient care, service and research, and seek to advance evidence-based knowledge and practice.

**Conclusion:** Pharmacy practice has expanded greatly in the past decade with pharmacists taking on new and creative approaches to addressing the opioid crisis. Collaborative and interdisciplinary approaches to addressing the root causes of opioid misuse and opioid overdose are still desperately needed. These include attention to the critical roles of social determinants of health, stigma elimination, legislative advocacy for patients with OUD, and focused education for providers, pharmacists, and the community. Recognition and support of the value of collaboration to both improve public health and individual patient care, continued investments in pharmacy practice advancement in OUD treatment and harm reduction, and the creation of workflows and prescribing algorithms to assist in dosing medications to prevent withdrawal symptoms and achieve improved pain control are desperately needed.

**Keywords:** pharmacist, pharmacy, opioid, overdose, pharmacy practice

## Introduction

The opioid crisis began as early as 1990, with opioid overdoses due to prescription medications increasing due to the “fifth vital sign” pain, being treated.<sup>1,2</sup> The crisis continued to increase in 2010 as more deaths occurred due to heroin use. In 2013, manufactured fentanyl began to lead to a significant number of overdose deaths.<sup>3</sup> A goal of the National Institute of Health and United States Department of Health and Human Services is to increase access to recovery and treatment resources, but access to treatment still continues to be a barrier for many patients receiving care.<sup>4</sup>

Currently, there are over three million people in the United States with opioid use disorder (OUD) and as many as 16 million individuals throughout the world.<sup>2,5</sup> In 2019 alone, there were 10.1 million people who misused opioids.<sup>3</sup> The 2020 National Survey on Drug Use and Health reported that 2.7 million people aged 12 years or older had an opioid use disorder in 2019.<sup>5</sup> As many as 8–12% of patients will develop an opioid use disorder once started on opioid therapy.<sup>6</sup> Since 1999, there have been 760,000 deaths due to opioid use disorder and that number is still growing despite effective

treatments for OUD and improved awareness.<sup>3,7</sup> The consequences of the opioid epidemic costs the United States \$56 billion dollars each year.<sup>8</sup>

Access to medication for opioid use disorder (MOUD) is still a major barrier to care, and more providers treating substance use disorder are needed to combat the opioid epidemic.<sup>9,10</sup> Of the patients who are able to receive treatment for opioid use disorder, 40–60% may relapse and access to continuing care is crucial to prevent hospitalizations and further complications.<sup>11,12</sup>

Patients have options of MOUD - also known as medication-assisted treatment (MAT)- for treating opioid use disorder including methadone, buprenorphine, and naltrexone. Nonpharmacological therapies, such as counseling, and naloxone can be used to prevent or reverse opioid overdose.<sup>13</sup> Methadone and buprenorphine can reduce deaths from opioid overdoses by 50%.<sup>10,14,15</sup> MOUD is essential to decreasing the risk of relapse and improving survival, but access is a large barrier to care.<sup>13,16,17</sup> Methadone can only be given at an opioid treatment program (OTP) for patients with an opioid use disorder.<sup>16</sup> Although buprenorphine does not require patients to be enrolled in an OTP, prescribers do need to be registered with the DEA and need a Drug Addiction Treatment Act 2000 waiver to prescribe the medication. This waiver requires healthcare providers to limit the number of patients to treat, and patients may not have access to these providers.<sup>9,18</sup> There are currently a limited number of providers who prescribe buprenorphine and of the healthcare professionals trained in prescribing buprenorphine, only 28–35% prescribe the medication for their patients.<sup>6</sup>

Pharmacists have many opportunities to mitigate OUD given their accessibility. One study found that up to 90% of Americans live within two miles of a community pharmacy, which allows them to provide care to a broader population.<sup>19</sup> Pharmacists are also able to develop a rapport with patients to whom they regularly dispense prescriptions, which may help provide care to patients who feel stigmatized or have not yet sought care for their OUD. Pharmacists can provide services including substance use disorder screening, appropriate referrals, monitoring prescribed medications, and following-up with patients.<sup>20,21</sup> However, in order for pharmacists to provide OUD services, pharmacists need to be included in the interprofessional team, have a larger scope of practice, and have reimbursement and funding for their services.<sup>9</sup>

With a goal of identifying important roles that pharmacists can play in the opioid crisis and what direction pharmacy practice is headed in addressing growing concerns with opioid overdose, a literature search and review were conducted on the role of the pharmacist in addressing the opioid crisis.

## Methods

A literature search was conducted by a reference librarian in Ovid MEDLINE that incorporated both MeSH terms and keywords to describe two concepts: the opioid epidemic and pharmacists/pharmacies. The search was limited to articles published in English after 2010 through the end of 2021 and returned 196 articles. MeSH terms included “Opioid Epidemic, Pharmacists and Pharmacies” and keywords included “opioid epidemic, opioid crisis, pharmacists, pharmacies, and pharmacy.” Article abstracts were screened for relevance by the authors to determine if they met inclusion criteria of being focused on pharmacy and pharmacist practice to address the opioid crisis. Articles were excluded from review if there was restricted access to full articles or the pharmacist’s role was not directly addressed. Five additional articles were excluded due to a focus on non-opioid medications, establishment of a pain clinic practice, patient experience in drug utilization, a call to action, and a continuing medical education article. Thematic analysis of collected articles was conducted by two authors using a modified consensual qualitative research approach and cross-checked by a third author.<sup>22</sup>

## Results

Analysis resulted in the following major themes focused on the role of the pharmacist in combating the opioid crisis: prevention, interventions, public health role of the pharmacist, pharmacists in multiple roles, barriers, pharmacist and healthcare provider (HCP) attitudes, educational initiatives for pharmacists and student pharmacists, and future research. Articles were separated by themes prior to review. Some papers identified in this study appeared to overlap within several themes; when this was the case, the article was placed with the theme that the authors determined most closely aligned.

## Prevention

While prescription of opioids has fallen in US private and public healthcare sectors, pharmacists must remain vigilant as they play a pivotal role in preventing opioid overdoses being responsible for controlling opioid distribution to patients.<sup>23</sup> This results in great responsibility as pharmacists must assess if opioid therapy is suitable for their patients; not properly doing so can carry dire consequences. Pharmacists must openly communicate with patients and other patient care team members in managing patient pain to avoid undue outcomes and unnecessary opioid prescription while fulfilling patient needs.<sup>24</sup> Recent advances have been made to emphasize safely prescribing opioids and, as of 2017, restrictions on initial opioid prescriptions have been implemented in 23 states.<sup>25</sup> Experimental tools guiding opioid practice have been developed such as standard opioid prescription schedules, formal prescription guidelines, and registries documenting opioid treatment therapy and outcomes.<sup>26–29</sup> Further guidelines have been suggested by the American Society of Interventional Pain Physicians (ASIPP) and the United States Centers for Disease Control and Prevention (CDC) to limit opioid misuse by standardizing care and reducing provider variability.<sup>25,30,31</sup> Studies have shown that these guidelines can play a role in reducing opioid prescriptions and impact prescribing patterns.<sup>25,26,30</sup>

Tools such as prescription drug monitoring programs (PDMPs) can aid in assessment.<sup>25</sup> PDMPs are databases that track controlled substance prescriptions usually within a state. Healthcare providers can view the prescription patterns and identify opioid misuse risk factors including prescriptions from multiple providers, filling opioid prescriptions early, and filling at many different pharmacies.<sup>32</sup> Unusual patterns can be identified and then acted upon to prevent opioid misuse. Studies show that states mandating PDMPs have less prescription opioid poisonings.<sup>25</sup> One study investigating the PDMP in Ohio identified a reduction in opioid prescriptions and doctor shopping after the PDMP was implemented.<sup>32</sup> Tools such as the Opioid Risk Tool (ORT) and the Current Opioid Misuse Measure (COMM)<sup>TM</sup> screen for opioid misuse in patients. While these tools have been validated with other healthcare prescribers, one pilot study demonstrated the efficacy of these tools with practicing pharmacists.<sup>25,33</sup>

Pharmacists can educate patients about safe opioid practices to prevent misuse. Patients should be briefed about the risks of opioids as well as their usage and storage. Literature concerning pharmacist-patient counseling is scant, but a study by Thakur and Chewning found that a relatively low proportion of Wisconsin pharmacists discussed opioid risks and considerations with patients.<sup>34</sup> Pharmacists could expand their counseling practices to include this vital information. Finally, education to patients can include harm reduction resources such as naloxone and fentanyl test strips. These resources are instrumental in preventing overdoses, and some pharmacy chains have expanded naloxone distribution and trained pharmacists allowing them authorization to dispense naloxone.<sup>35</sup> Pharmacies can work to bolster on-site overdose protocols, as preliminary evidence suggests that many pharmacists are unaware of them.<sup>36</sup> Pharmacists play versatile roles in prevention – with harm reduction being one of these critical roles - to avert possible overdoses.

## Interventions by Pharmacists

Pharmacists across settings can play important roles in referral to resources, treatment services, and harm reduction, including clinical management of medications for OUD, dispensing MOUD, education, and referral to resources and treatment. They can also provide access to and education about naloxone, sterile equipment, and fentanyl test strips. Pharmacists' roles in public health have become particularly evident during the coronavirus disease 2019 (COVID-19) pandemic, given the accessibility individuals have to community pharmacists across a broad geography.

Pharmacists can be leveraged to maintain and extend buprenorphine access across care settings. Peckham et al described key strategies for optimizing access to buprenorphine during the COVID-19 pandemic that could also extend beyond COVID-19.<sup>21</sup> In a hospital setting, pharmacists can help initiate buprenorphine therapy prior to discharge and provide a bedside delivery of medication or coordinate the prescription with a local pharmacy. Other opportunities in opioid use disorder include advocating to remove quantity limitations for buprenorphine so patients have better access with an appropriate supply, developing relationships with community resources including criminal justice centers and clinics to assist patients in having access to buprenorphine, supplying clean syringes, and prescribing naloxone. If the Drug Addiction Treatment Act of 2000 waiver was removed, it would also provide an opportunity for pharmacists to prescribe buprenorphine in states where pharmacists can register with the Drug Enforcement Agency (DEA), and this would dramatically increase access to care.<sup>21</sup>

Cochran et al called on advancing community pharmacy-based MOUD to lead clinical management of OUD and dispense treatment medications to provide individuals with needed care.<sup>19</sup> Work in Australia, Canada, and the United Kingdom was cited, whereby licensed pharmacists can fill and dispense methadone prescriptions for individuals with OUD. This is particularly important for individuals in rural areas, who otherwise may have limited access to MOUD.<sup>19</sup> Their work echoed the call by Calcaterra et al for collaboration, whereby the primary care provider would prescribe methadone and monitoring could be accomplished collaboratively by a nurse and a pharmacist.<sup>17</sup>

Long-acting buprenorphine injectables (Sublocade<sup>®</sup>/Brixadi<sup>™</sup>) may present another opportunity to improve opioid use disorder treatment through community pharmacies among rural populations, given their potential decreased risks of nonadherence, diversion, and misuse.<sup>10</sup> Provision of naltrexone in community pharmacies could allow pharmacists to partner in care of individuals with OUD. While this would increase access to treatment, barriers associated with transportation, service infrastructure, reimbursement, awareness and acceptance by practitioners still exist.<sup>9</sup>

Cochran and Winhusen completed a study (CTN-0093), Validation of a community pharmacy-based prescription drug monitoring program risk screening tool (PHARMSCREEN) (NIH HEAL Initiative).<sup>37</sup> The focus was on validating a national PDMP-based metric to enable community pharmacists to identify care needs and triage individuals with prescription opioid-related risk including OUD. At the time of this review, the study has been completed and not yet published. Another NIH HEAL initiative, Integrating pharmacy-based prevention and treatment of opioid and other substance use disorders: A survey of pharmacists and stakeholders (CTN-0105), is underway to study US pharmacists' knowledge, attitudes, and provision of screening and treatment services for substance use disorder (SUD) and MOUD.<sup>38</sup>

Through the Consolidation Framework for Implementation Research, Kenney et al documented a stepwise trajectory for creating a program of clinical research in community pharmacy. The authors developed the Brief Intervention Medication Therapy Management (BIMTM) model, through which pharmacists play a key role in reducing medication misuse among their patients in the community.<sup>39</sup>

Education of pharmacists, collaborative practice agreements, and sustainable payment models would facilitate successful long-term practice integration.<sup>19</sup> Callister et al evaluated interprofessional clinician experiences with an inpatient addiction consultation service in a Colorado hospital using focused groups and interviews.<sup>12</sup> Pharmacists identified practice variations when physicians dosed buprenorphine for acute pain in patients with OUD. There were concerns about inadequate analgesia as well as return to opioid use after discharge given the lack of dosing standards.<sup>12</sup>

Insurance coverage is vital for individuals to access medications for opioid use disorder. Reif et al evaluated commercial health plan coverage of methadone and buprenorphine for OUD following implementation of federal parity law and the Affordable Care Act (ACA). Surveys in benefit years 2003, 2010, and 2014 found that medication treatments for OUD were covered by nearly all health plans, but the types and patterns of coverage varied by year. Nearly 100% of plans covered OTPs by 2014, and prior authorization requirements for OTPs and buprenorphine have decreased over time.<sup>40</sup>

Ferries et al conducted a retrospective, cross-sectional study evaluating the impact of removal of prior authorization for MOUD (buprenorphine, buprenorphine-naloxone, and naltrexone) in a Medicare Advantage population.<sup>6</sup> Following removal of the prior authorization, there was a decrease in opioid utilization, an increase in MOUD initiation, and a 4% reduction in return to prescribed opioid use (relapse) rates. Members initiating MOUD after removal of the prior authorization and those with an OUD diagnosis had a 19% decrease in return to prescribed opioid use and 47% decrease in the likelihood of relapse, respectively.<sup>6</sup>

Tennessee passed legislation in 2017 to establish nonresidential treatment guidelines for the use of buprenorphine to establish an "adequate care" standard.<sup>13</sup> An interprofessional group in Tennessee developed nonresidential buprenorphine treatment guidelines, which are updated annually. While the guidelines were grounded in evidence from Substance Abuse and Mental Health Services Administration (SAMHSA), American Society of Addiction Medicine (ASAM), and American Board of Preventive Medicine (ABPM), they include non-evidence-based practices such as women of child-bearing age must submit to a serum or observed pregnancy test monthly to receive buprenorphine treatment.<sup>13</sup> At the time of implementation, the authors developed the guidelines to meet a legislative requirement. The main outcome was to determine feasibility to collect data. Unfortunately, a major issue in collecting buprenorphine data is reliance on PDMP

data, which is mainly prescription data.<sup>13</sup> They are working to determine metrics needed to assess and how to effectively and efficiently collect data. (EB Schlesinger, email communication, March 6, 2022)

Li et al discussed the misuse and diversion of buprenorphine, its impact, and strategies for its reduction, including changes in policy, prescription and pharmacy monitoring, and continuing education for guiding and improving clinical practice.<sup>18</sup> The authors posed the question of how to expand buprenorphine prescribing safely and effectively. There was a lack of or poor compliance with SAMHSA guidelines for buprenorphine prescribing. Efforts to reduce misuse and diversion should include limiting 30-day prescriptions to compliant patients, prescribing the lowest effective dose, and requiring regular urine or drug screens, pill counts, use of state-level PMPs, and medication. Additional measures could include financial incentives for prescribers and pharmacists.<sup>18</sup>

## Public Health Role of the Pharmacist

Pharmacists occupy a unique space in the healthcare system as one of the most accessible healthcare professions to the public. Pharmacists link patients to other services within healthcare and provide technical expertise. These multifaceted capabilities allow pharmacists to have a pivotal impact in public health, and the opioid crisis is no exception. Besides directly controlling the distribution of opioids to patients, pharmacists can engage in community and prescriber education to promote the safe distribution and usage of opioids. This is important given the continuation of the opioid crisis and evidence of geographical and racial disparities in opioid deaths and prescriptions.<sup>41,42</sup>

Laws and policies enacted throughout the opioid crisis have altered how pharmacists dispense opioids. Many patients are now required to show identification picking up prescriptions and providers are mandated to report to prescription drug monitoring databases in many states.<sup>40,43</sup> The 2016 CDC-published guidelines promoting safer opioid prescribing practices have been associated with reductions in high-risk first-time opioid prescriptions.<sup>24</sup>

Community and hospital pharmacies have implemented opioid stewardship measures such as the promotion of abuse deterrent opioids such as buprenorphine with naltrexone and establishing their own guidelines for safe opioid prescription.<sup>40,44</sup> Pharmacists are taking steps to prevent potentially inappropriate prescriptions, and this can have major implications in reducing overdoses.

Pharmacists have opportunities to educate patients, communities, and fellow healthcare professionals. Academic detailing, where prescribers receive noncommercial education from other healthcare professionals (such as pharmacists), can help prescribers stay up-to-date on best opioid prescribing recommendations as supported by current scientific evidence.<sup>44,45</sup> Pharmacists can counsel patients on various facets regarding opioid use or misuse. Whether it be MOUD therapy for opioid misuse or opioid therapy for pain, pharmacists can provide biochemical and pharmacological expertise to enable safe usage of opioids. Pharmacists can play a pivotal role in promoting harm reduction policies. Some states have allowed pharmacies to dispense naloxone; naloxone training can reduce the stigma associated with its use and increase awareness of ultimately life-saving capabilities amongst communities.<sup>43,46</sup> Overall, pharmacists play an important role in public health regarding the opioid crisis. Opportunities to expand their role exist, as pharmacists can take leadership roles in lobbying for governmental policies regarding safer opioid prescription practices, guidelines for counseling patients, and education initiatives.

## Pharmacists in Multiple Roles

Pharmacists play multiple roles in combating the opioid crisis from stewardship of opioids, exploring existing and new treatment options, and promoting safe opioid practices amongst communities. There are opportunities to expand the scope of pharmacy practice. Guidelines can be developed for opioid storage and distribution to avoid excessive prescribing. Screening a patient's risk of misusing opioids whether it be diversion or overuse can be performed by a pharmacist. Private consultation with patients and various screening methods such as the opioid response questionnaire or motivational interviewing can be performed by pharmacists.<sup>47</sup> Checking PDMPs may identify data of multiple prescribers and dispensing pharmacies that suggest misuse.<sup>48</sup> Pharmacists can continue to promote harm reduction practices such as naloxone and sterile syringe provision to prevent community overdoses in general.<sup>48</sup> Additional structured training, resources, and organizational support would increase confidence level and provision of pharmacy services.<sup>49</sup> Pharmaceutical interventions for opioid use disorder such as buprenorphine and methadone should be further

explored. Pharmacists can educate other prescribers and healthcare professionals about the benefits of MOUD while working together to create guidelines for safe and effective prescribing.

Pharmacists provide a crucial service to the field of healthcare. Their roles as medication experts on interprofessional healthcare teams continue to expand and become more integrated as pharmacists are the most accessible and final HCP a patient visits before beginning a prescribed medication.<sup>50</sup> As many as 90% of Americans are currently living within five miles of a pharmacy.<sup>51</sup> With this growing role on interprofessional healthcare teams, pharmacists are positioned to be a vital provider with regard to combating opioid overdose. It is important to be aware of the attitudes and perspectives that pharmacists and other HCPs hold with regard to opioids, OUD, OUD treatment, harm reduction and related services.

## Barriers in Pharmacy Practice

In Minnesota, there are many legislative initiatives set by the Board of Pharmacy, Department of Health, University of Minnesota College of Pharmacy, and the Minnesota Pharmacists Association that allow pharmacists to use the Opiate Antagonist Protocol, Minnesota Syringe Access Initiative, and act as an Authorized Collector of unwanted pharmaceuticals. Palombi et al found that barriers to participation in these programs include pharmacists' confidence level, lack of individual autonomy, corporate policies, perceived program costs of implementation, lack of space, and liability concerns.<sup>52</sup> Pharmacists in the study also reported lack of understanding the Authorized Collector process and personal discomfort in dispensing syringes for non-insulin use.<sup>52</sup> One study concluded that bordering states need to collaborate on regulations to prevent delays in patient care and decrease patient frustrations with Rhode Island's Department of Health Pain Management Regulations, which require co-prescription of naloxone with opioids to patients with high overdose risk.<sup>53</sup>

Prescription drug monitoring programs (PDMPs) have been implemented by all US states and the District of Columbia. Thornton et al reported barriers to utilization of these are inconsistent use, internet access, and pharmacists' desire for training and assistance. While the PDMP might identify a concern when filling prescriptions, pharmacists expressed discomfort or lack of confidence with the need for patient or prescriber interventions.<sup>54</sup>

Pharmacists identified lack of education specific to pain treatment guidelines, structured interviewing communication with patients, and comprehensive interventions with prescribers as barriers to implementing pain and opioid management. Actual patient and provider relationships are often hindered when pharmacists are seen as overstepping their perceived professional responsibilities.<sup>55</sup> Vadieli et al reported many pharmacist-perceived barriers, including lack of team collaboration between health professionals and patients, hostile interactions with prescribers (due to mistrust in medical expertise or lack of understanding the role of pharmacists), low services reimbursement, lack of corporate support and time, and lack of clarity of the pharmacist's role in the opioid epidemic.<sup>56</sup> More structured education and training of pharmacy services, corporate and organizational support, and resources would increase pharmacists' ability and confidence to participate in combating the opioid crisis.<sup>57</sup>

In a qualitative survey conducted by Rao et al, pharmacists had reservations or negative views towards tools that may prove effective in combating the opioid crisis.<sup>58</sup> Subdomains identified were attitude toward naloxone, negative [professional] perspectives of MOUD, and stigma towards patients. Some attitudes were that pharmacies are "targeted as a safer place to overdose" since naloxone was readily available. Naloxone and needle exchange programs promoted substance use due to its ability to reverse an opioid overdose. Previous negative experiences with patients resulted in discomfort in dispensing opioid prescriptions. The authors concluded that these attitudes were barriers to effective interventions and harm reduction.<sup>58</sup>

Naloxone training has been implemented in many Doctor of Pharmacy curricula, and many states have legislation for pharmacists to dispense naloxone without a prescription or with a standing order from the state's Department of Health.<sup>59</sup> In 2019, only nineteen states required naloxone education before pharmacists engaged in dispensing or prescribing activities. Standardized naloxone education is necessary if the pharmacy profession intends to prevent opioid overdose events in the US.<sup>60</sup> Barriers to naloxone distribution included time constraints for patient education, stigma associated with addiction, patient perception that naloxone was indicated only for patients who use opioids incorrectly, and concerns that patients would be offended if offered naloxone.<sup>61</sup>

Thornton et al surveyed community pharmacists in West Virginia and identified that even after receiving training, only 20% were comfortable selling naloxone over the counter and 25% felt adequately trained in its use. Pharmacists also reported that opioids were more regularly stocked than buprenorphine with or without naloxone.<sup>62</sup>

## Pharmacist Behaviors and Attitudes

In a case study exploring buprenorphine dispensing practices in twelve rural Appalachian Kentucky counties, 80% of pharmacies limited buprenorphine dispensing by refusing new patients, limiting dispensing to known patients/prescribers, or refusing to dispense buprenorphine due lack of trust in buprenorphine and prescribers.<sup>63</sup> The authors offered four pathways to support buprenorphine dispensing to meet patients' needs in this rural area: 1) buprenorphine and other MOUDs should be excluded from DEA and wholesaler monitoring protocols designed to reduce diversion of opioid analgesics (OAs); 2) relevant professional organizations could convene local meetings of prescribing physicians and pharmacists to restore trust and build shared non-stigmatizing MOUD norms; 3) advocacy efforts to end the war on drugs could be expanded to rural areas; and 4) local government and non-government organizations could implement multilevel interventions to reduce stigma toward people who use drugs and buprenorphine.<sup>63</sup>

A survey of Utah pharmacists investigated the pharmacists' perceptions towards topics such as opioids, pain management, and naloxone.<sup>64</sup> Pharmacists held positive attitudes toward dispensing naloxone to patients at high risk for opioid overdose or a third party of those at high risk for opioid abuse. Pharmacists should educate and counsel patients on the risk of addiction with regard to use or extended duration of opioids, and the signs and symptoms of an opioid overdose. Pharmacists felt that they should have an active role in the reduction of opioid addiction by collaborating with and recommending medication changes to physicians. Several areas where pharmacists had less agreement included counseling patients at first dispensing of prescriptions and refilled opioid medications, implementing the use of an opioid misuse risk identification tool, checking PDMP prior to dispensing an opioid, and having the authority to change an opioid with a non-opioid analgesic without physician consultation. Only half of the respondents felt that pharmacists should educate physicians about opioid pharmacotherapy or establishing a collaborative practice agreement.<sup>64</sup>

A qualitative survey of Ohio, Pennsylvania and West Virginia pharmacists explored perspectives with regard to prescription opioid misuse.<sup>58</sup> Multiple domains identified included overprescribing opioids, policy and practice recommendations, prescriber pharmacist relationship, negative attitudes of pharmacists, unintended consequences, and personal experience. Pharmacists identified problems with overprescribing opioids due to inappropriate prescriptions and lack of prescriber accountability, issues with policy and practice recommendations, and poor relationship between prescriber and pharmacist. Respondents had negative attitudes toward buprenorphine and naloxone, and they noted unintended consequences from opioid access and lack of monitoring by prescribers. Pharmacists' attitudes are likely due to a lack of education with regard to harm reduction methods and treatments such as MOUD.<sup>58</sup>

Peckham et al surveyed healthcare professionals about opioid overdose education and naloxone distribution amid COVID-19 pandemic.<sup>21</sup> Seventeen percent of respondents identified as pharmacists. The majority of respondents held positive attitudes towards opioid education, prevention, and harm reduction. They were largely not concerned about naloxone causing increased opioid use, offending patients by offering overdose prevention education, and the side effects of naloxone. Most respondents felt comfortable with naloxone training to patients and discussing overdose prevention, but many were either uncomfortable or provided a neutral response to these topics. Roughly half of the respondents agreed with statements regarding having time to provide naloxone education, starting conversations with regard to opioid prevention, and familiarity with naloxone administration/overdose prevention strategies.<sup>21</sup>

Patients engage with pharmacy technicians and student pharmacists at the community pharmacy counter, often before a pharmacist is beckoned. Negative stigma has been reported from technician interactions with patients with OUD. Proper resources and education/training for technicians may alleviate work-related stress for managing pharmacists of technicians while maintaining nonjudgmental service to patients.<sup>65</sup> Comfort levels of student pharmacists, who interact with patients with OUD should be addressed. Increased knowledge of community resources and professional training in counseling or discussing treatment options with patients can reduce barriers for the overall pharmacy staff.<sup>66</sup>

## Educational Initiatives for Student Pharmacists and Pharmacists

Pharmacy students at the University of Pittsburgh, North Dakota State University, and Merced University have piloted curricular modules on opioid use, guidelines, and safety.<sup>67–70</sup> Students have reported these modules as being valuable and improving their confidence in dealing with situations regarding opioids in the future.<sup>67,70</sup> North Dakota State University also mandates that students complete a naloxone training session while embedding opioid-related education and hands-on activities in the general curriculum.<sup>67</sup> Thomas et al developed an interprofessional activity to educate pharmacy, nursing, counseling, physical therapy, and occupational therapy students. Authentic patient cases were used to impact the socialization and learning of 490 students. Students reported a greater understanding of patients with OUD and the importance of healthcare professionals in teamwork.<sup>71</sup>

As the opioid crisis continues to evolve, pharmacists need to stay current with changing regulations. Renfro et al found that 75% of college of pharmacy continuing education (CE) providers delivered 1237 opioid and/or pain management-related activities in 2015 through 2018.<sup>72</sup> Activities included live and home study, knowledge-based, and application-based programs. The authors concluded while college of pharmacy CE departments are developing opioid-related programming, future research might examine the impact of such activities on public health outcomes.<sup>72</sup>

Faculty can benefit from a greater focus on opioid programming as there are more opportunities to connect with community partners in fighting the opioid crisis.<sup>73</sup> Initiatives such as community forums and grants-steps can induce changes in policy regionally and beyond. Further discussion needs to be held on how to shape curriculums and continuing education to improve and standardize opioid care. More emphasis needs to be placed on opioid education for future and current pharmacists.<sup>73</sup>

## Future Research

A study conducted by Delcher et al looked at cases and trends of doctor and pharmacy shopping and examined how these can signal potential opioid misuse.<sup>74</sup> Data of patients with prescriptions for controlled substances from 2010 to 2017 were analyzed for cases that would fit the definition of doctor/pharmacy shopping. During the research period, multiple provider encounters declined by 73%. Additionally, of those identified as having multiple provider encounters, 13.9–21.2% of those patients were diagnosed with cancer. This population is comprised of patients who may need high doses of opioids or other controlled medications to manage pain and side effects of their treatment and/or diagnosis. This study provided evidence that multiple provider encounters are currently declining and that doctor shopping may not be a strong indicator of SUD.<sup>74</sup>

Dodson et al conducted a study using spatial modeling to monitor opioid overdoses with an aim to better public health surveillance.<sup>75</sup> This study was conducted in Pittsburgh, PA, from April 2013 to Dec. 2016 and involved 3182 cases of non-fatal opioid overdoses where naloxone was given. Spatial modeling visualized where the greatest number of cases was occurring in Pittsburgh, PA, locations of naloxone dispensing pharmacies, and optimal naloxone dispensing areas. A method was developed for optimizing naloxone dispensing that may aid in reducing the number of non-fatal and fatal opioid overdoses. Further research using this method is needed to determine if optimized naloxone dispensing has a significant impact on opioid overdoses.<sup>75</sup>

Zhao et al conducted a novel study to address illicit online pharmacies.<sup>76</sup> A list of legitimate and illicit online pharmacies was obtained from the National Association Board of Pharmacies and used in the study. The authors found that the majority (over 95%) of business with illicit online pharmacies was from direct typing in the website URL, using search engines to find the site, or referral from another website linked to the pharmacy. Two models, reference rating prediction method (RRPM) and the reference-based K-nearest neighbor (RKNN), were developed to identify and predict online pharmacy status, and both had an accuracy of 95% or better. While this study provided steps to address illicit online pharmacies, further studies are needed to implement these models to determine effectiveness of reduced traffic to illicit online pharmacies.<sup>76</sup>

## Discussion

A great deal of progress has been made in the role of the pharmacist in supporting individuals with OUD in the last two decades, and new pharmacy practice roles have developed out of opportunities to better serve patients with SUD/OUD.



At the same time, an investment in practices without evidence, such as limiting or cutting off opioid access to individuals with OUD, may worsen the opioid crisis and cost lives. While some of the initiatives described in this review have shown utility in reducing the impact of the opioid crisis, opioid overdose continues to claim more lives every year. The addition of synthetic opioids, including fentanyl, to the drug supply – including stimulants such as methamphetamine and cocaine – in the United States has led to unexpected overdoses in individuals who did not even realize they were taking an opioid.

Interestingly, published articles focused on the role of pharmacy or pharmacists in supporting patients in their recovery from a substance use disorder were not identified in this search, despite the quickly growing recovery movement in the United States. It is likely that pharmacists and pharmacies engaged in recovery efforts are not reflected in published literature. This is another opportunity for pharmacy to develop practices and services with the community.

Creative and collaborative approaches to addressing the root causes of opioid misuse and opioid overdose are desperately needed, including:

1. Attention to how social determinants of health impact opioid use and overdose
  - As members of the interdisciplinary care team, pharmacists must be trained in how to recognize the ways that social determinants of health impact patients with SUD/OUD and to adapt the care they provide to address social determinants of health.
2. Education on the neurochemistry of substance use disorder for community members and healthcare professionals to eliminate the belief that substance use disorder is a moral failure
  - Pharmacists can provide essential education to healthcare providers and community members on the ways that SUD/OUD impacts brain chemistry, which is critical in providing stigma-free patient and community care and eliminating discrimination.
3. Focused stigma elimination efforts in pharmacist education (curricula and continuing education) to decrease barriers for individuals with SUD/OUD seeking and obtaining treatment for SUD/OUD
  - Considerable stigma towards individuals with SUD/OUD still exists within the profession of pharmacy, which prohibits the profession from fulfilling their public health role in prevention, treatment, recovery, and harm reduction.
4. Pharmacists advocating for legislative priorities that value SUD/OUD prevention, intervention, recovery and harm reduction
  - Attention must be focused on removing legislative barriers that prevent pharmacists from engaging in harm reduction (eg, Selling new syringes, dispensing naloxone) and removing other barriers to SUD/OUD care (eg, the DEA registration requirement for prescribers to prescribe buprenorphine).
5. Continued investments in pharmacy practice advancement in SUD/OUD treatment and harm reduction
  - Considerable potential exists in expanding pharmacy practice to allow pharmacists to take on greater roles in SUD/OUD treatment (eg, MOUD prescribing and support) and harm reduction (eg, roles on harm reduction care teams, innovative harm reduction practices).
6. Recognition of the value of collaboration, partnerships, multi-disciplinary teams, and multi-pronged approaches to SUD/OUD
  - Pharmacists continue to take on more unrecognized but innovative and collaborative population health roles to benefit patients with SUD/OUD.
7. Investment of pharmacists' time and practice in supporting recovery from SUD/OUD
  - Currently, a gap in the literature exists as it pertains to the pharmacists role in supporting and engaging with the recovery community and patients in recovery from SUD/OUD.
8. Creation of workflows and prescribing algorithms to assist in dosing medications to prevent withdrawal symptoms and achieve improved pain control
  - As more patients access MOUD, pharmacy practice must be prepared to take on greater roles in transitioning patients from active use to recovery in a safe and comfortable manner.

While these recommendations are by no means exhaustive, they serve as a starting point for future practice developments to benefit individual patients and population health.

## Conclusion

While the continued devastating impact of the opioid crisis is both grim and unsettling, the profession of pharmacy is well poised to have a positive impact on reducing opioid-related harm on both individual and population levels. This will require innovative thinking, an eagerness to collaborate with community and public health partners, a willingness to honestly evaluate and acknowledge past shortcomings and failed efforts, and an investment in both human and fiscal resources. This life-saving commitment is necessary for the good of the patient, the community, and the profession.

## Acknowledgments

The authors would like to acknowledge Sarah Jane Brown, MSc, Pharmacy and Medical School, UMN Duluth Campus Librarian and Keri Hager, PharmD, BCACP, Associate Professor & Associate Dean for Clinical Affairs, UMN Duluth for their assistance in this project.

## Disclosure

The authors report no conflicts of interest in this work.

## References

- Centers for Disease Control and Prevention. Understanding the epidemic. Available from: <https://www.cdc.gov/drugoverdose/epidemic>. Accessed May 17, 2022.
- Azadfar M, Huecker MR, Leaming JM. Opioid addiction. In: *StatPearls [Internet]*. Treasure Island (FL): StatPearls Publishing; 2022. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK448203/>. Accessed December 20, 2022.
- United States Department of Health and Human Services. Opioid crisis statistics. Available from: <https://www.hhs.gov/opioids/about-The-epidemic/opioid-crisis-statistics/>. Accessed June 14, 2022.
- National Institutes of Health. National Institute on Drug Abuse. Opioid overdose crisis. Available from: <https://nida.nih.gov/research-topics/opioids/opioid-overdose-crisis>. Accessed May 17, 2022.
- Substance Abuse and Mental Health Services Administration. Key substance use and mental health indicators in the United States: results from the 2020 National Survey on Drug Use and Health. Available from: <https://www.samhsa.gov/data/report/2020-nsduh-annual-national-report>. Accessed June 15, 2022.
- Ferries E, Racsa P, Bizzell B, Rhodes C, Suehs B. Removal of prior authorization for medication-assisted treatment: impact on opioid use and policy implications in a Medicare Advantage population. *J Manag Care Spec Pharm*. 2021;27(5):596–606. doi:10.18553/jmcp.2021.27.5.596
- Centers for Disease Control and Prevention. Drug overdose deaths in the US top 100,000 annually. Opioid overdose crisis. Available from: [https://www.cdc.gov/nchs/pressroom/nchs\\_press\\_releases/2021/20211117.htm](https://www.cdc.gov/nchs/pressroom/nchs_press_releases/2021/20211117.htm). Accessed May 17, 2022.
- Brooklyn JR, Sigmon SC. Vermont hub-and-spoke model of care for opioid use disorder: development, implementation, and impact. *J Addict Med*. 2017;11(4):286–292. doi:10.1097/ADM.0000000000000310
- Ford JH, Gilson A, Mott DA. Systematic analysis of the service process and the legislative and regulatory environment for a pharmacist-provided naltrexone injection service in Wisconsin. *Pharmacy*. 2019;7(2):59. doi:10.3390/pharmacy7020059
- Lofwall MR, Fanucchi LC. Long-acting buprenorphine injectables: opportunity to improve opioid use disorder treatment among rural populations. *Prev Med*. 2021;152(Pt 2):106756. doi:10.1016/j.ypmed.2021.106756
- Wartenweiler V, Chung G, Stewart A, Wenthur C. Pharmacy stakeholder reports on ethical and logistical considerations in anti-opioid vaccine development. *BMC Med Ethics*. 2021;22(1):30. doi:10.1186/s12910-021-00599-2
- Callister C, Lockhart S, Holtrop JS, Hoover K, Calcaterra SL. Experiences with an addiction consultation service on care provided to hospitalized patients with opioid use disorder: a qualitative study of hospitalists, nurses, pharmacists, and social workers. *Subst Abus*. 2022;43(1):615–622. doi:10.1080/08897077.2021.1975873
- Schlesinger EB, Germinn W, Hohmeier KC, Burley HL. Development and implementation of Tennessee nonresidential buprenorphine treatment guidelines. *Innov Pharm*. 2018;9(3):1–4. doi:10.24926/iip.v9i3.1317
- Slavova S, Rock P, Bush HM, Quesinberry D, Walsh SL. Signal of increased opioid overdose during COVID-19 from emergency medical services data. *Drug Alcohol Depend*. 2020;214:108176. doi:10.1016/j.drugalcdep.2020.108176
- Ochalek TA, Cumpston KL, Wills BK, Gal TS, Moeller FG. Nonfatal opioid overdoses at an urban emergency department during the COVID-19 pandemic. *JAMA*. 2020;324(16):1673–1674. doi:10.1001/jama.2020.17477
- Substance Abuse and Mental Health Services Administration. Medication-assisted treatment (MAT). Available from: <https://www.samhsa.gov/medication-assisted-treatment>. Accessed May 17, 2022.
- Calcaterra SL, Bach P, Chad A, et al. Methadone matters: what the United States can learn from the global effort to treat opioid addiction. *J Gen Int Med*. 2019;34(6):1039–1042. doi:10.1007/s11606-018-4801-3
- Li X, Shorter D, Kosten T. Buprenorphine prescribing: to expand or not to expand. *J Psychiatr Pract*. 2016;22(3):183–192. doi:10.1097/PRA.0000000000000154

19. Cochran G, Bruneau J, Cox N, Gordon AJ. Medication treatment for opioid use disorder and community pharmacy: expanding care during a national epidemic and global pandemic. *Subst Abuse*. 2020;41(3):269–274. doi:10.1080/08897077.2020.1787300
20. Acquisto NM, Coralic Z. In the midst of an opioid epidemic: pharmacists on the frontline of substance use disorder treatment. *Am J Health Syst Pharm*. 2021;78(4):277–278. doi:10.1093/ajhp/zxaa410
21. Peckham AM, Ball J, Colvard MD, et al. Leveraging pharmacists to maintain and extend buprenorphine supply for opioid use disorder amid COVID-19 pandemic. *Am J Health Syst Pharm*. 2021;78(7):613–618. doi:10.1093/ajhp/zxab003
22. Hill CE, Knox S, Thompson BJ, et al. Consensual qualitative research: an update. *J Couns Psychol*. 2005;52(2):196–205. doi:10.1037/0022-0167.52.2.196
23. Goldman AH, Johnson DD, Griffis CE, Land V, Balazs GC. Opioid prescribing in the U.S. Military Health System, 2014 to 2018: fewer prescriptions, fewer pills, and shorter treatment duration. *Pain*. 2022;163(1):e87–e93. doi:10.1097/j.pain.0000000000002313
24. Bryan K, Menighan TE. What does good pharmacist-physician pain management collaboration look like? *AMA J Ethics*. 2020;22(1):E675–E680. doi:10.1001/amajethics.2020.675
25. Gregory T. The role of pharmacists in safe opioid dispensing. *J Pharm Pract*. 2020;33(6):856–862. doi:10.1177/0897190019852803
26. Gessner GH, Jung J, Cook HE, et al. Implementation of postoperative standard opioid prescribing schedules reduces opioid prescriptions without change in patient-reported pain outcomes. *Urology*. 2021;148:126–133. doi:10.1016/j.urology.2020.11.009
27. Langley PC. Meeting physician compliance recommendations in the management of opioids in chronic pain: the chronic pain management registry (CPMR). *Innov Pharm*. 2019;10(1):13. doi:10.24926/iip.v10i1.1629
28. Lovecchio F, Premkumar A, Stepan JG, Albert TJ. Fighting back: institutional strategies to combat the opioid epidemic: a systematic review. *HSS J*. 2019;15(1):66–71. doi:10.1007/s11420-018-09662-y
29. Vascimini A, Duane K, Curtis S. System intervention in community pharmacy setting: leading to better patient care through reducing harm associated with coprescribing benzodiazepines and opioids. *J Opioid Manag*. 2021;17(6):445–453. doi:10.5055/jom.2021.0679
30. Elhage SA, Thielen ON, Huber AT, et al. Preoperative patient opioid education, standardization of prescriptions, and their impact on overall patient satisfaction. *Surgery*. 2021;169(3):655–659. doi:10.1016/j.surg.2020.09.013
31. Togun AT, Karaca-Mandic P, Wurtz R, et al. Association of 3 CDC opioid prescription guidelines for chronic pain and 2 payer pharmacy coverage changes on opioid initiation practices. *J Manag Care Spec Pharm*. 2021;27(10):1352–1364. doi:10.18553/jmcp.2021.27.10.1352
32. Penn J, MacKinnon NJ, Boone JM, et al. Strategies and policies to address the opioid epidemic: a case study of Ohio. *J Am Pharm Assoc*. 2017;57(2S):S148–S153. doi:10.1016/j.japh.2017.01.001
33. Strand MA, Eukel H, Burck S. Moving opioid misuse prevention upstream: a pilot study of community pharmacists screening for opioid misuse risk. *Res Soc Admin Pharm*. 2019;15(8):1032–1036. doi:10.1016/j.sapharm.2018.07.011
34. Thakur T, Chewning B. Pharmacists opioid risk and safety counseling practices: a latent class analysis approach. *Res Soc Admin Pharm*. 2022;18(6):3013–3018. doi:10.1016/j.sapharm.2021.07.023
35. Shafer E, Bergeron N, Smith-Ray R, et al. A nationwide pharmacy chain responds to the opioid epidemic. *J Am Pharm Assoc*. 2003;57(2S):S123–S129. doi:10.1016/j.japh.2016.12.075
36. Green TC, Soipe A, Baloy B, et al. Pharmacy on-site overdose protocols and prevention of overdose. *Subst Abuse*. 2022;43(1):64–68. doi:10.1080/08897077.2020.1736236
37. Cochran G, Winhusen JT. Validation of a community pharmacy-based prescription drug monitoring program risk screening tool (PHARMSCREEN) (NIH HEAL Initiative)|National Institute on Drug Abuse (NIDA). Available from: <https://nida.nih.gov/organization/cctn/ctn/research-studies/validation-community-pharmacy-based-prescription-drug-monitoring-program-risk-screening-tool>. Accessed June 6, 2022.
38. Wu LT. Integrating pharmacy-based prevention and treatment of opioid and other substance use disorders: a survey of pharmacists and stakeholders (CTN-0105) (NIH HEAL Initiative). Available from: <https://nida.nih.gov/about-nida/organization/cctn/ctn/research-studies/integrating-pharmacy-based-prevention-treatment-opioid-other-substance-use-disorders-survey>. Accessed June 6, 2022.
39. Kenney A, Cox N, Bryan MA, Cochran G. Brief intervention medication therapy management: establishment of an opioid misuse intervention model delivered in a community pharmacy. *Am J Health-Syst Pharm*. 2021;78:310–319. doi:10.1093/ajhp/zxaa389
40. Reif S, Creedon TB, Horgan CM, et al. Commercial health plan coverage of selected treatments for opioid use disorders from 2003–2014. *J Psychoactive Drugs*. 2017;49(2):102–110. doi:10.1080/02791072.2017.1300360
41. Griffith KN, Feyman Y, Auty SG, Crable EL, Levengood TW. Implications of county-level variation in US opioid distribution. *Drug Alcohol Depend*. 2021;219:108501. doi:10.1016/j.drugalcdep.2020.108501
42. Schieber LZ, Guy GP, Seth P, Young R. Trends and patterns of geographic variation in opioid prescribing practices by State, United States, 2006–2017. *JAMA Netw Open*. 2019;2(3):e190665. doi:10.1001/jamanetworkopen.2019.0665
43. Gadd S, Cox N, Samuelson J, Kenney A, Turner K, Cochran G. Abuse-deterrent Opioid formulations and the opioid crisis: a pharmacist's perspective. [Review]. *Ther Drug Monit*. 2021;43(1):35–41. doi:10.1097/FTD.0000000000000844
44. Wickramatilake S, Zur J, Mulvaney-Day N, Klimo MC, Selmi E, Harwood H. How states are tackling the opioid crisis. *Public Health Rep*. 2017;132(2):171–179. doi:10.1177/0033354916688206
45. Al-Samawy S, Varughese N, Vaillancourt R, Wang XYW, Penm J. A global survey on opioid stewardship practices in hospitals: a cross-sectional pilot study. *Pharmacy*. 2021;9(3):122. doi:10.3390/pharmacy9030122
46. Price ET. Demonstrated value in the public health arena: pharmacist roles in addressing the current opioid crisis. *J Am Pharm Assoc*. 2017;57(5):566–567. doi:10.1016/j.japh.2017.08.005
47. Xu J, Murkerjee S. State laws that authorize pharmacists to prescribe naloxone are associated with increased naloxone dispensing in retail pharmacies. *Drug Alcohol Depend*. 2021;227:109012. doi:10.1016/j.drugalcdep.2021.109012
48. Cochran G, Field C, Karp J, et al. A community pharmacy intervention for opioid medication misuse: a pilot randomized clinical trial. *J Am Pharm Assoc*. 2018;58(4):395–403. doi:10.1016/j.japh.2018.03.005
49. Bach P, Hartung D. Leveraging the role of community pharmacists in the prevention, surveillance, and treatment of opioid use disorders. *Addict Sci Clin Pract*. 2019;14(1):30. doi:10.1186/s13722-019-0158-0
50. Manolakis PG, Skelton JB. Pharmacists' contributions to primary care in the United States collaborating to address unmet patient care needs: the emerging role for pharmacists to address the shortage of primary care providers. *Am J Pharm Educ*. 2010;74(10):S7. doi:10.5688/aj7410s7
51. Kelling SE. Exploring accessibility of community pharmacy services. *Innov Pharm*. 2015;6(3). doi:10.24926/iip.v6i3.392

52. Palombi L, Hawthorne AN, Lunos S, Melgaard K, Dahly A, Blue H. Community pharmacist utilization of legislation that allows impact on the opioid crisis in the state of Minnesota: a mixed-methods approach. *J Pharm Pract.* 2020;33(6):799–808. doi:10.1177/0897190019841747
53. Rogala BG, Jarvais A, Ng T, Bratberg J. Prescriber and pharmacist understanding of revised Rhode Island pain management regulations. *J Oncol Pharm Pract.* 2021;27(3):601–608. doi:10.1177/1078155220929057
54. Thornton JD, Anyanwu P, Tata V, Al Rawwad T. Differences between pharmacists' perception of counseling and practice in the era of prescription drug misuse. *Pharm Pract.* 2020;18(1):1682. doi:10.18549/PharmPract.2020.1.1682
55. Samaha NT, Vanier MC, David PM. Pharmaceutical practices before and throughout the opioid crisis: a scoping review. *J Am Pharm Assoc.* 2020;60:e375ee387. doi:10.1016/j.japh.2020.03.026
56. Vadieli N, Eldridge LA, Meyerson BE, Agle J. "The gatekeepers in prevention": community pharmacist perceptions of their role in the opioid epidemic. *Subst Abuse.* 2021;43(1):319–327. doi:10.1080/08897077.2021.1941516
57. Thakur T, Frey M, Chewning B. Pharmacist services in the opioid crisis: current practices and scope in the United States. *Pharmacy.* 2019;7:60. doi:10.3390/pharmacy7020060
58. Rao D, Gianetti V, Kamal KM, Covvey JR, Tomko JR. Pharmacist views regarding the prescription opioid epidemic. *Subst Use Misuse.* 2021;56(14):2096–2105. doi:10.1080/10826084.2021.1968434
59. Centers for Disease Control and Prevention. Vital Signs. Life-saving naloxone from pharmacies. Available from: <https://www.cdc.gov/vitalsigns/naloxone>. Accessed May 31, 2022.
60. Roberts AW, Carpenter DM, Smith A, Look KA. Reviewing state-mandated training requirements for naloxone-dispensing pharmacists. *Res Social Adm Pharm.* 2019;15(2):222–225. doi:10.1016/j.sapharm.2018.04.002
61. McQuillan A. Clinical pharmacist involvement in expanding naloxone distribution in a veteran population. *Am J Health-Syst Pharm.* 2022;79:472–476. doi:10.1093/ajhp/zxab424
62. Thornton JD, Lyvers E, Scott VG, Dwibedi N. Pharmacists' readiness to provide naloxone in community pharmacies in West Virginia. *J Am Pharm Assoc.* 2017;57(2Suppl):S12–S18.e4. doi:10.1016/j.japh.2016.12.070
63. Cooper HL, Cloud DH, Freeman PR, et al. Buprenorphine dispensing in an epicenter of the US opioid epidemic: a case study of the rural risk environment in Appalachian Kentucky. *Int J Drug Policy.* 2020;85:102701. doi:10.1016/j.drugpo.2020.102701
64. Balough MM, Nwankpa S, Unni EJ. Readiness of pharmacists based in Utah about pain management and opioid dispensing. *Pharmacy.* 2019;7(1):11. doi:10.3390/pharmacy7010011
65. Cernasev A, Deselle S, Hohmeier KC, et al. Pharmacy technicians, stigma, and compassion fatigue: front-line perspectives of pharmacy and the US opioid epidemic. *Int J Environ Res Public Health.* 2021;18(12):6231. doi:10.3390/ijerph18126231
66. Hall EA, Cernasev A, Nasritdinova U, et al. Stigma of opioid use disorder and its indirect effects on student pharmacists' perceptions and attitudes. *Pharmacy.* 2020;8(3):144. doi:10.3390/pharmacy8030144
67. Werremeyer A, Skoy E, Marvanova M, et al. A PharmD program curricular approach to addressing the opioid crisis. *Curr Pharm Teach Learn.* 2019;11(6):592–602. doi:10.1016/j.cptl.2019.02.026
68. Skoy E, Eukel H, Frenzel J, Werremeyer A. Preparing student pharmacists to identify opioid misuse, prevent overdose and prescribe naloxone. *Curr Pharm Teach Learn.* 2019;11(5):522–527. doi:10.1016/j.cptl.2019.02.013
69. Pruskowski J, Childers J, Moore PA, et al. Managing acute pain and opioid risks following wisdom teeth extraction: an illustrative case. *Med Ed PORTAL.* 2019;15:10855. doi:10.15766/mep\_2374-8265.10855
70. Murnane KS, Augustine JM, Quesnel M, Marshall L, Strom JG. A classroom activity to increase student pharmacists confidence in dealing with the opioid epidemic. *Am J Pharm Educ.* 2019;83(9):7199. doi:10.5688/ajpe7199
71. Thomas S, Holm S, Feltman C, Rich AJ, Brooks MJ. Promoting interprofessional student outcomes through the narrative of an opioid use disorder survivor. *Physiother Theory Pract.* 2021;1–11. doi:10.1080/09593985.2021.1934919
72. Renfro ML, Moczygemba LR, Baumgartner J, Baumgart G, Hill LG. Opioid-related education provided by continuing education divisions at US pharmacy schools. *Am J Pharm Educ.* 2020;84(10):ajpe8001. doi:10.5688/ajpe8001
73. Palombi LC, LaRue A, Fierke KK. Facilitating community partnerships to reduce opioid overdose: an engaged department initiative. *Res Social Adm Pharm.* 2019;15(12):1406–1414. doi:10.1016/j.sapharm.2018.07.002
74. Delcher C, Harris DR, Park C, Strickler GK, Talbert J, Freeman PR. Doctor and pharmacy shopping: a fading signal for prescription opioid use monitoring? *Drug Alcohol Depend.* 2021;221:108618. doi:10.1016/j.drugalcdep.2021.108618
75. Dodson ZM, Enki Yoo E-H, Martin-Gill C, Roth R. Spatial methods to enhance public health surveillance and resource deployment in the opioid epidemic. *Am J Public Health.* 2018;108(9):1191–1196. doi:10.1016/j.drugalcdep.2021.108618
76. Zhao H, Muthupaandi S, Kumara S. Managing illicit online pharmacies: web analytics and predictive models study. *J Med Internet Res.* 2020;22(8):e17239. doi:10.2196/17239

## Substance Abuse and Rehabilitation

Dovepress

### Publish your work in this journal

Substance Abuse and Rehabilitation is an international, peer-reviewed, open access journal publishing original research, case reports, editorials, reviews and commentaries on all areas of addiction and substance abuse and options for treatment and rehabilitation. The manuscript management system is completely online and includes a very quick and fair peer-review system. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <http://www.dovepress.com/substance-abuse-and-rehabilitation-journal>