





Research Priorities for Expansion of Opioid Use Disorder Treatment in the Community Pharmacy

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Abstract

In the last decade, the U.S. opioid overdose crisis has magnified, particularly since the introduction of synthetic opioids, including fentanyl. Despite the benefits of medications for opioid use disorder (MOUD), only about a fifth of people with opioid use disorder (OUD) in the U.S. receive MOUD. The ubiquity of pharmacists, along with their extensive education and training, represents great potential for expansion of MOUD services, particularly in community pharmacies. The National Institute on Drug Abuse's National Drug Abuse Treatment Clinical Trials Network (NIDA CTN) convened a working group to develop a research agenda to expand OUD treatment in the community pharmacy sector to support improved access to MOUD and patient outcomes. Identified settings for research include independent and chain pharmacies and co-located pharmacies within primary care settings. Specific topics for research included adaptation of pharmacy infrastructure for clinical service provision, strategies for interprofessional collaboration including health service models, drug policy and regulation, pharmacist education about OUD and OUD treatment, including didactic, experiential, and interprofessional curricula, and educational interventions to reduce stigma towards this patient population. Together, expanding these research areas can bring effective MOUD to where it is most needed.

Keywords

opioid use disorder, methadone, buprenorphine, addiction treatment, research priorities

Introduction

The Opioid Overdose Crisis

An estimated 5.6 million people in the United States (U.S.) over 12 years of age had opioid use disorder (OUD) in 2021.^{1,2} Over 109 000 drug overdose deaths occurred in the U.S. from September 2021 through August 2022, 75.6% of which involved opioids.³ The origins of the opioid overdose crisis began with morbidity and mortality related to prescription opioid analgesics and has since evolved into a public health crisis dominated by potent illicitly manufactured synthetic opioids such as fentanyl contributing to the majority of overdose

deaths, only complicated further by the rise in concomitant stimulant use.⁴ Some have described this shift as a predictable consequence of supply reduction strategies such as increased criminalization and policing of the street drug supply, decreased prescribing of opioid analgesics, and implementation of prescription drug monitoring programs.⁵ The worsening of the overdose crisis has occurred, at least in part, due to insufficient investment in effective risk mitigation approaches like pharmacotherapy utilization and naloxone distribution coupled with disinvestment in minoritized communities and rural populations.^{6,7}

Medications are an evidence-based and cost-effective strategy for treating OUD that is encouraged as first-line

treatment by professional societies like the American Society of Addiction Medicine (ASAM) and in clinical guidance from the Substance Abuse and Mental Health Services Administration (SAMHSA).^{6,8-12} Benefits of medications for OUD (MOUD) vary somewhat but include reduced opioid use, relief of withdrawal, reduced craving, retention in treatment, fewer overdoses and return to use, and lower mortality.¹³⁻²⁰ Societal benefits from MOUD use include cost reductions related to decreased criminal activity, decreased hepatitis C virus incidence, decreased transmission of HIV, and decreased emergency and inpatient health care utilization.^{16,21} However, only about 1 in 5 people with OUD in the U.S. receive MOUD, leading to serious public health consequences and increasing prevalence of preventable death.^{1,22-24} Herein, we consider the utilization of community pharmacy for OUD treatment, the research priorities needed to highlight implementation barriers and facilitators, and the potential impact of this novel approach.

Medications for Opioid Use Disorder

Three MOUD medications (methadone, buprenorphine, and naltrexone) are approved by the U.S. Food and Drug Administration.¹² Methadone, a full mu opioid receptor agonist, was approved to treat opioid dependence in 1972. It is listed as an essential medicine by the World Health Organization (WHO) and is consistently associated with reduced mortality and other beneficial outcomes in people with OUD.^{18-20,25-27} Despite its established efficacy, concerns about patient safety, misuse, and diversion have led to disproportionate limitations on methadone accessibility compared to other prescribed opioids, particularly in the U.S.²⁸ Patients with OUD must generally present to a federally-licensed opioid treatment program (OTP) to initially receive observed daily doses of methadone. Limited access

to take-home doses of methadone can be obtained after various adherence and clinical thresholds are met, though only at the discretion of the OTP and often subject to additional, onerous, and unnecessary state-level limitations.²⁹ Comparatively, Australia, Canada, and the United Kingdom allow prescribing of methadone outside of specialty treatment settings and allow for pharmacy dispensing.³⁰ The accessibility to methadone is further constrained by the limited prevalence of OTPs across the country and transportation barriers for daily in person dosing of methadone.^{31,32} In 2022, a bipartisan bill was introduced in Congress to allow certified addiction-treatment physicians to prescribe methadone and community pharmacies to dispense it to stable patients for the treatment of OUD. However, the Modernizing Opioid Treatment Access Act of 2022 did not pass, and an identical bill was re-introduced in 2023 in the House and the Senate.

Buprenorphine, a partial mu opioid receptor agonist, was originally approved with an indication for acute pain management. It was approved to treat opioid withdrawal and dependence in 2002.¹² It is available in both sublingual and long-acting injectable formulations. Some of the sublingual formulations are combined with naloxone, a mu opioid antagonist, to deter misuse, though evidence is lacking.³³ Prior to December 2022, select clinicians could only prescribe buprenorphine for OUD after obtaining a waiver from SAMHSA and accompanying license from the Drug Enforcement Administration (DEA).³⁴ These authorized prescribers faced a variety of additional hurdles and restrictions, including educational requirements, patient limits, and unannounced DEA audits but prescribers could provide buprenorphine in general medical settings rather than the highly regulated OTP space described above. The SAMHSA waiver and patient limits were removed with the passing of the Consolidated Appropriations Act of 2023, and buprenorphine for OUD can now be prescribed in a

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manner consistent with other schedule III controlled substances in most states.³⁵ Buprenorphine is relatively safe with minimal risk for acute overdose death, and surveys demonstrate that, as with methadone, even diverted buprenorphine is typically used for therapeutic purposes.³⁶⁻⁴¹ Both methadone and buprenorphine are similarly effective in treating OUD.^{19,20,26,27}

Naltrexone, a mu opioid receptor antagonist, is available in both oral and long-acting injectable formulations.¹² The oral formulation was approved for the blockade of the effects of exogenously administered opioids in 1984, but ASAM does not recommend oral naltrexone for treatment of OUD treatment given its limited efficacy due to non-adherence.¹¹ The long-acting injectable formulation was approved for treatment of OUD in 2010. Because it is not a controlled substance, a clinician does not need to be registered with the DEA to prescribe naltrexone for OUD. Initiating naltrexone can be challenging due to the necessity of being opioid-free at time of initiation. In 1 randomized trial comparing long-acting injectable naltrexone to sublingual buprenorphine, approximately 25% of those randomized to naltrexone did not receive an initial injection whereas only 6% randomized to buprenorphine did not receive an initial dose.⁴² In an intention-to-treat analysis, sublingual buprenorphine demonstrated superiority compared to long-acting injectable naltrexone for 24 week relapse rates due to the significant induction challenges of long-acting naltrexone. However, sublingual buprenorphine and long-acting injectable naltrexone were similar in reducing cravings and increasing days of opioid abstinence, if the patient was able to be successfully initiated on naltrexone. Furthermore, a post-hoc analysis identified significantly greater risk for overdose in the group treated with long-acting injectable naltrexone due to reduced opioid tolerance.^{42,43} While ASAM still identifies long-acting injectable naltrexone as an appropriate option for at least some patients with OUD,¹¹ buprenorphine and methadone comparatively are more consistently associated with reduced mortality and other beneficial outcomes. The National Academy of Medicine's recent report on MOUD reflects the lack of consensus surrounding the safety and efficacy of long-acting injectable naltrexone as overdose prevention.^{6,19,20,44}

Pharmacy Opportunities and Barriers

There are numerous barriers to accessing MOUD in the U.S. For methadone, a limited number of OTPs, which are typically located in metropolitan areas, leads to long travel times or waitlists for many patients.⁴⁵ For buprenorphine, limited regional availability of clinicians who are actively providing OUD treatment and accepting new patients has been a persistent challenge.⁴⁶ For long-acting injectable naltrexone, high cost, limited pharmacy access, and the

need to travel to a medical office for monthly administration represent significant barriers.

Several European countries achieve far greater MOUD utilization for people with OUD than the U.S. While France (89%), Germany (63%), and Scotland (51%) exceeded the WHO targeted metric of 40%, the U.S. achieves only 11% utilization of MOUD in patients with OUD.⁴⁷ A critical differentiator between the U.S. and these countries is their effective deployment of pharmacists as facilitators of MOUD access. Emulating their approach has enormous potential to impact patient outcomes given that 89% of Americans live within 5 miles of a pharmacy.⁴⁸ Beyond the pharmacy, there is a lack of addiction specialists and general health care services in the U.S. While there are over 330 million people in the U.S., there are fewer than 5 000 board-certified addiction physicians.⁴⁹ Prior to the removal of the X-waiver, studies revealed constrained access to a single waived provider in rural settings.^{50,51} Workforce shortages affect the ability of health care professionals to adequately address the diverse OUD and, more broadly, substance use disorder (SUD) needs of our country.^{49,52,53}

Despite the clear potential for pharmacists to enhance MOUD access in the U.S., there are many relevant barriers that must be addressed. Methadone for OUD cannot be dispensed by community pharmacies outside of investigational new drug trials.^{12,54} Many pharmacies do not consistently stock buprenorphine, and a variety of legal, financial, behavioral, and regulatory barriers to increased dispensing have been identified.⁵⁵⁻⁵⁸ For example, pharmacies in states that expanded Medicaid coverage following the Affordable Care Act, pharmacies in more urban areas, and chain pharmacies are more likely to stock buprenorphine.⁵⁵ In the limited number of states that authorize pharmacists to administer long-acting injectable naltrexone, there are a variety of logistical and financial considerations that have hampered implementation.⁵⁹ For example, coordination between health professionals, with thoughtful communication between providers and pharmacy staff is challenging to implement.⁵⁹ Stigma and knowledge deficits among some pharmacists, particularly related to OUD, also play a role in current access limitations.⁶⁰⁻⁶²

The extensive education and training of pharmacists in optimizing medication therapies and patient health represents an untapped opportunity to expand access to MOUD-related patient care services. Trained at the Doctor of Pharmacy (PharmD) level and licensed by state boards of pharmacy, pharmacists have expertise in the provision of medication management, disease state management, and prevention and wellness services. In 49 of 50 states and the District of Columbia, pharmacist scope of practice can be expanded through collaborative practice agreements (CPAs) with physicians to initiate, modify, and discontinue medications, and order and interpret laboratory tests, depending on state laws and regulations. Scope of practice

is also being expanded across the U.S. through statewide protocols that authorize pharmacists to prescribe medications to meet public health needs, such as the provision of naloxone for opioid overdose reversal.⁶³⁻⁶⁵

The role of pharmacists practicing in interprofessional settings such as hospitals and clinics in optimizing MOUD access and quality has been described in several pragmatic clinical studies and commentaries.⁶⁶⁻⁷³ However, relatively few studies in the U.S. have described MOUD service provision in the community pharmacy setting. A 2020 study in North Carolina demonstrated that methadone provision to patients at an independent pharmacy was safe and feasible for 16 patients over a three-month period.^{54,74} A pilot study conducted in 2015 in Maryland with 12 patients maintained on buprenorphine therapy showed the initial feasibility of a collaborative care model with a health department-based pharmacy.⁷³ A 2018 nonrandomized clinical trial extended this work and demonstrated the feasibility of a collaborative care model in which brief encounters with community pharmacists at 3 independent pharmacies replaced some prescriber encounters for patients with OUD who were stable on buprenorphine maintenance therapy.^{54,74} Patients, prescribers, and pharmacists all reported high levels of satisfaction with the model of community pharmacist-provided buprenorphine care, treatment retention (88.7%) and treatment adherence (95.3%).^{54,74} A 2021 to 2022 randomized trial in Rhode Island expanded on this finding by engaging community pharmacists in 6 chain behavioral health pharmacies to facilitate unobserved induction with buprenorphine in 100 patients and demonstrated superior retention at 1 month compared to usual care.⁷⁵ Community pharmacist administration of long-acting injectable naltrexone has also been described in pragmatic studies, and patient satisfaction with pharmacist administration of other long-acting injectable medications has been established.⁷⁶⁻⁷⁸ Two significant barriers to scalable enhanced pharmacist services for MOUD are the lack of consistent insurer payment for such services and the need for a standardized pharmacist scope of practice and collaborative practice agreements.⁷⁹⁻⁸¹ Scalable enhanced pharmacist services for MOUD necessitate payers to implement payment models for evidence-based evaluation and management services provided by pharmacists working as part of care teams. Community pharmacy operations and metrics would need significant reforms to support this level of service.

The goal of this paper is to describe critical research priorities for expansion of OUD treatment in the community pharmacy sector to support increased access and improved patient outcomes.

Methods

The National Institute on Drug Abuse's National Drug Abuse Treatment Clinical Trials Network (NIDA CTN) is

a cooperative agreement between NIDA, academic research nodes, and affiliated community partners to conduct rigorous multisite addiction treatment trials across a broad range of community-based settings. In December 2021, the NIDA's Center for the Clinical Trials Network (CCTN) set forth to explore the development of a roadmap that can lead to the expanded access to MOUD through community pharmacies. A CCTN Scientific Officer (UG) and CTN node principal investigator (GB) were tasked by the CCTN to form a committee to explore the following questions: 1) What are the practice models of a pharmacy-based MOUD facility?; 2) What does it take to scale-up such a model?; 3) Where are pharmacists who know how and are willing to do this?; and 4) Is there a right way to engage large pharmacy chain businesses? A CCTN Scientific Officer (UG) and a CTN node Principal Investigator (GB) were asked to chair a working group to explore these issues through the creation of a 1-day workshop meeting.

Through professional contacts, a list of experts working at the intersection of opioids, OUD, and pharmacy was generated. These individuals came from schools of pharmacy, professional pharmacy associations, and large chain pharmacies and were administrators, health services researchers, OUD treatment researchers, pharmacists, and pharmacy educators. The list was vetted by UG and GB based on an individual's prior work related to opioids, and invitations to join the working group were sent by GB. No representative from large chain pharmacies accepted the invitation but representatives from each of the other invited areas of pharmacy accepted.

The working group held four, 1-hour-long virtual planning meetings between February and May 2022. During these meetings, the goal of establishing a research roadmap for scaling up pharmacies for MOUD delivery was emphasized. The working group identified 4 main areas that could be addressed through a workshop:

1. Why pharmacies should provide access to and clinical services to treat OUD
2. Health services research related to pharmacy practice and OUD
3. Pharmacy collaborative care models
4. Pharmacy workforce training needs

The working group identified a lead for each of the 4 areas and tasked the lead to work collaboratively with working group members to identify 3 to 4 speakers for each subject area. While issues related to policy and financial structures pertaining to pharmacist scope of practice were raised as being essential to improving access to MOUD by leveraging pharmacists in community pharmacy settings, it was decided that these important issues lie outside of the scope of NIDA's research mission and, therefore, were not included in the workshop agenda. The

final workshop agenda and list of speakers are available (Appendix). This manuscript represents the proceedings and working group's summary of the 1-day workshop held on May 24, 2022. Data informing this report were derived from meeting minutes, correspondences between committee members, and workshop presentations. In addition, this manuscript outlines what the working group considers key next steps in advancing a research agenda that can inform policy and practice surrounding the utilization of community pharmacies in addressing OUD.

Rationale and Opportunity for Independent and Chain Community Pharmacies

Two practice locations are at the forefront of the priority settings for research within community pharmacy regarding OUD prevention, intervention, and treatment. The first is independent and chain community pharmacies. There are several important reasons why these settings offer promising opportunities for addressing OUD prevention and treatment. Independent and chain pharmacies are ubiquitous in the U.S., with most Americans living within close proximity,^{48,82} thus facilitating unparalleled access to pharmacists. Further, more than 40% of independent and chain pharmacies have private counseling rooms where sensitive issues, such as medication use or behavioral health, can be discretely and confidentially discussed.⁸³ Pharmacists employed in these locations likewise are experts in medication use, safety, and efficacy⁸⁴—which clearly supports their ability to interact with patients regarding medication use and benefit.

Independent and chain pharmacies currently have the capacity to host brief targeted interventions (≤ 15 minutes), like screening, brief intervention, and referral to treatment (SBIRT), provided to patients at the point of care—which could focus on prevention of misuse of controlled substances, initiation of MOUD, provision of naloxone, sterile syringes, and point of care testing equipment for illicit drugs, and/or referral to MOUD providers.^{85,86} If interventions or medication counseling services require greater time (> 15 minutes), these likely must be delivered out of workflow and may require appointments either in person or via telecommunication. In both cases, in the current practice environment, researchers will likely need to provide additional resources to offset loss of productivity caused by pulling pharmacists away from dispensation duties, additional pharmacists to perform research duties, or delegation of tasks to pharmacy technicians, depending on state scope of practice policies.

Community pharmacists can further expand access to OUD medications and services through telehealth. Some states authorize telepharmacy services that allow patients in rural areas to receive their medications via remote

dispensing sites that meet regulatory requirements.^{87,88} The COVID-19 pandemic accelerated telehealth service delivery in community pharmacies, as pharmacists performed assessments, triaged and referred patients, and provided patient education and medication management services using various technologies.⁸⁷ Leading up to the pandemic, reported telehealth services with a public health focus delivered in community pharmacies included medication adherence, hypertension management, tobacco cessation, patient education, and vaccination uptake services.⁸⁹ The DEA temporarily extended telehealth expansions from the public health emergency during the COVID-19 pandemic until November 2023; more permanent regulations are forthcoming. Broadened and clear telehealth regulations would support utility of community pharmacies for access of methadone.

In coming years, proactive engagement of pharmacists in opioid-related prevention, harm reduction, and intervention will be critical. Abatement injunctions resulting from civil litigation against large pharmacy chains and drug wholesalers have mandated extensive investment in controlled substance monitoring programs to prevent diversion.⁹⁰ Ensuring the same comprehensive approach is employed in community pharmacies will be essential to facilitating MOUD access and enhancing interprofessional collaboration between pharmacists and prescribers. Investment of funds from opioid litigation settlements to support implementation would support expansion of access to OUD treatment services and evaluation of best practices.

Rationale and Opportunity for Co-Located Pharmacy and Primary Care Settings

The second practice location for research related to the treatment of OUD are pharmacies integrated or co-located with primary care or behavioral health practices. Community and outpatient pharmacies with co-located primary care providers are advancing health care access and are important emerging community pharmacy models.⁹¹ The largest pharmacy chains have been investing heavily in this model for 2 decades, with companies such as CVS Caremark possessing 1,100 locations (plans to expand to 1,500 underway)⁹² and Walgreens with over 200 of these locations (with plans to expand to 500+ underway).⁹³ Integrated models have been common in the Veterans Affairs and Federally Qualified Health Centers settings, which similarly have pharmacy dispensing and health care services available. With the current number of locations, their continued expansion, and the rapidly scaling patient care services therein, co-located models of health care service delivery have the potential to drastically increase access to MOUD nationally. These settings

have prescribers, medications, and dispensing services all in one location, which allow both prescriber and pharmacist care with a higher degree of interprofessional collaboration and continuity of care. However, patients may utilize the pharmacy services that are co-located within their physician's clinic when it is convenient, such as when they see their physician, but also access pharmacy services from other retail locations due to proximity or hours of service. This fragmentation of care between pharmacies can lead to medication safety risks, including unrecognized drug-drug or drug-disease interactions. Strategies will be needed to either close this information gap or to motivate patients to more exclusively utilize co-located pharmacies. Nevertheless, this opportunity for expanded, co-located care will require training and mission focus for these organizations, in order to achieve their potential for scaled service delivery.⁹⁴

Currently, research in these settings must leverage interprofessional relationships. For the pharmacist to have expanded ability to engage in prescribing and patient care functions, organizations with co-located settings must agree to establish CPAs, where authorized, which operationalize health care practice relationships between pharmacists and prescribers to facilitate expanded and heightened pharmacist responsibilities. Further, stand-alone community pharmacies will need to leverage information technology services for sharing of information, particularly through an electronic health record, to support collaborations and services. These agreements often revolve around prescribers providing diagnoses and pharmacists providing comprehensive medication management.^{95,96} Under such CPAs, OUD diagnoses and treatment plans can be initiated by a physician or other prescriber, depending on the state, and the pharmacist can then implement, manage, and adjust the medication treatment plan and follow through with care of patients.

Future pharmacist practice involving prescribing and patient care outside of a CPA would require changes to state laws. Several states already permit pharmacists to prescribe medications including oral contraceptives, naloxone, allergy medications, and tobacco cessation products⁹⁷ and lead patient care including administering vaccines and ordering tests or laboratory work.⁹⁷ Nevertheless, pharmacists have large hurdles for these changes to take place more broadly given opposition from medical providers for autonomous practice⁹⁸ as well as individual state level legal and policy limitations related to CPAs that would need to be addressed in order to expand the role of pharmacists in MOUD service provision.

Utilization of research is critical to support evidence of initiation, growth, and sustainability of community pharmacies for MOUD access and clinical service. Research priorities for evaluating community pharmacy and service needs and capabilities are found in Table 1.

Educational Pathways and Areas for Research

To prepare community pharmacists and the pharmacy profession to be front-line providers of MOUD, more OUD education and training should be provided throughout the pharmacy curriculum and in professional development opportunities. A survey of U.S. pharmacy programs indicated that 94% of programs reported teaching SUD content in 2014 to 2015, with an average of 2.7 ± 1.5 hours of instruction.⁹⁹ Since SUD encompasses alcohol use disorder, OUD, and all other use disorders, this may indicate that OUD instruction, though occurring in the majority of U.S. pharmacy programs, is likely limited in depth and complexity. The American Association of Colleges of Pharmacy (AACCP) recently published recommendations for SUD core curricular content along with recommendations from the National Academy of Medicine and the Association for Multidisciplinary Education and Research in Substance use and Addiction (AMERSA), but it is unclear whether schools have adopted these frameworks or competencies and which methods may be best to meet these recommendations.¹⁰⁰⁻¹⁰²

Information obtained from the Opioid-Related Activities Database created by AACCP indicated that 65% of opioid-related activities reported by pharmacy schools in 2020 were related to education, with only 7% being experiential practice opportunities and 25% relating to research.¹⁰³ Experiential learning is a key component of achieving competency in a particular practice area, and this data may indicate the lack of available clinical learning or interest in OUD for pharmacy students. While 1 small pilot study demonstrated promising outcomes for pharmacy students participating in an advanced pharmacy practice experience in addiction medicine, further research and descriptions of other training models are needed.¹⁰⁴ Education surrounding SUD stigma, a critical barrier to optimal care for patients with OUD, is also not well characterized in pharmacy education. There have been variable published interventions for stigma towards mental health and SUD patients in pharmacy education, ranging from attendance at 12-step programs to learning directly from people with lived SUD experience.¹⁰⁵

There is also a lack of post-graduate and professional development training in OUD. The primary avenue for specialty training in SUD is through Post-Graduate Year (PGY)-2 specialty pharmacy residencies in Psychiatric Pharmacy and Pain Management and Palliative Care. However, the American Society of Health-System Pharmacists (ASHP) accreditation guidelines list SUD as optional or elective experiences for both Psychiatric and Pain and Palliative Care residencies.^{106,107} Continuing education is an additional pathway for pharmacist education, and opioid-related content has proliferated in recent years.^{56,108-110} These programs have shown promise for

Table 1. Research Priorities for Expansion of Opioid Use Disorder Treatment in the Community Pharmacy.

Timeline	Implementation	Workforce development
Short (1-3 years)	<ul style="list-style-type: none"> Assess current pharmacy infrastructure regarding its capacity for and willingness to address medication treatment for opioid use disorder (MOUD) care, including current policy and procedures Explore needs and opportunities to integrate comprehensive opioid use disorder (OUD) clinical services into community pharmacy infrastructure Identify strategies to develop collaborative relationships between community pharmacists and OUD treatment providers Assess current health service models for OUD treatment models, including collaborative practice agreements (CPAs) and different types of incentives for collaboration, including potential differences in implementation of MOUD service models for initiation and maintenance of MOUD Develop collaborative care practices to support interprofessional OUD treatment in the community setting Leverage opioid settlement funds to support implementation 	<ul style="list-style-type: none"> Conduct mixed-methods research to quantify and qualify the depth and breadth of OUD education and substance use disorder (SUD) stigma in pharmacy schools, including SBIRT for unhealthy drug use in adults and comprehensive medication management for OUD Conduct systematic reviews and mixed-methods research on educational interventions to reduce SUD stigma and improve OUD education in pharmacists and pharmacy students Evaluate strategies for and outcomes of implementing AACP recommendations for didactic OUD education in pharmacy schools Conduct research to characterize scope of post-graduate training opportunities in OUD Build the research workforce, support post-graduate training of pharmacists who have an interest in NIDA-related research on expansion of MOUD care management Evaluate expansion and sustainability for interprofessional education activities related to OUD
Medium (3-5 years)	<ul style="list-style-type: none"> Evaluate drug policy and regulation and their changes on access and efficacy of OUD clinical services in the community pharmacy setting, including urban, suburban, and rural settings Pilot unique OUD health service interventions based in the community pharmacy setting including induction and maintenance of each MOUD medications through CPAs across urban, suburban, and rural settings 	<ul style="list-style-type: none"> Conduct mixed-methods research to evaluate efficacy and impact of improved OUD education on pharmacy graduate competency in OUD, the treatment of OUD, and attitudes toward people living with OUD Conduct research to evaluate impact of increased training on pharmacist competency in OUD and its treatment, particularly for vulnerable populations such as rural settings Evaluate approaches for in-service training on OUD targeting already working community pharmacists
Long (>5 years)	<ul style="list-style-type: none"> Evaluate changes in pharmacy infrastructure on integration of OUD treatment services, including financial payment and accreditation from payers for services Evaluate the impact of OUD services in the community pharmacy setting on access and quality of care for patients with OUD across urban, suburban, and rural settings Evaluate comparative effectiveness of health service and collaborative practice models in the community setting on OUD treatment 	<ul style="list-style-type: none"> Evaluate impact of increased OUD education and training in pharmacy schools, post-graduate training, and professional development opportunities on access and quality of care for patients with OUD

increasing pharmacists' readiness to provide naloxone and overdose prevention counseling, but further research is needed to investigate their efficacy in conveying OUD treatment knowledge and attitudes, particularly in rural settings where post-graduate professional development may be limited.¹¹¹⁻¹¹³

To prepare pharmacists to offer OUD services, more research needs to be conducted to better characterize the state of OUD education and training in pharmacy schools, post-graduate training, interprofessional programs, and continuing education, and to identify effective interventions to

improve OUD education and training.^{114,115} Research priorities for pharmacy workforce development can be found in Table 1.

Future Directions

This paper provides an innovative roadmap of necessary research to support increased access of MOUD in a community pharmacy setting. The collaboration of experts within the field to collectively define these areas of interest is important. However, other voices will be needed through

this research to best highlight successful approaches to OUD care in alternative locations from opioid treatment programs. For example, while invited, no retail pharmacy stakeholders participated in this workshop. As they hold the largest market share of pharmacy services in the United States, their engagement will be important in refining and implementing this roadmap. While beyond the scope of this work, an additional key component of the collaboration with community pharmacy stakeholders will be building payment and billing models for financial incentive and sustainability of services over time.

With guidance from priorities identified in this roadmap, investigators are encouraged to engage in research to address key gaps in pharmacy patient flow, pharmacist training, and health services to inform how to effectively leverage community pharmacies in addressing opioid use disorder. Examples may include implementation of sustainable collaborative care models with qualified physicians to maximize expansion of evidence-based MOUD care management, addressing inequities in access to treatment. Funding agencies are encouraged to create funding opportunities to support expanding the role of community pharmacies in addressing opioid use disorder and substance use disorders in general. With this research evidence, pharmacy models can be expanded from pilot work to more sustainable, enduring practice.

Conclusion

Pharmacists are integral health professionals that stand to be useful providers within the continuum of OUD treatment, particularly in the community pharmacy arena, to increase access to services. More research is needed to best understand mechanisms for inclusion of services, payment and operational models, and professional education and development for evidence-based practice.

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Supplemental Material

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