



Program development and implementation outcomes of a statewide addiction consultation service: Maryland Addiction Consultation Service (MACS)

Sarah Sweeney , Kelly Coble , Elizabeth Connors , Kathleen Rebbert-Franklin , Christopher Welsh & Eric Weintraub

To cite this article: Sarah Sweeney , Kelly Coble , Elizabeth Connors , Kathleen Rebbert-Franklin , Christopher Welsh & Eric Weintraub (2020): Program development and implementation outcomes of a statewide addiction consultation service: Maryland Addiction Consultation Service (MACS), Substance Abuse, DOI: [10.1080/08897077.2020.1803179](https://doi.org/10.1080/08897077.2020.1803179)

To link to this article: <https://doi.org/10.1080/08897077.2020.1803179>



Published online: 19 Aug 2020.



Submit your article to this journal [↗](#)



View related articles [↗](#)



View Crossmark data [↗](#)

Program development and implementation outcomes of a statewide addiction consultation service: Maryland Addiction Consultation Service (MACS)

Sarah Sweeney, MSW, MPH^a, Kelly Coble, LCSW-C^a, Elizabeth Connors, PhD^b, Kathleen Rebbert-Franklin, LCSW-C^c, Christopher Welsh, MD^a, and Eric Weintraub, MD^a

^aDepartment of Psychiatry, School of Medicine, University of Maryland, Baltimore, Maryland, USA; ^bDepartment of Psychiatry, Yale School of Medicine, New Haven, CT, USA; ^cBehavioral Health Administration, Maryland Department of Health, Catonsville, Maryland, USA

ABSTRACT

Background: As the opioid epidemic continues, there is a mounting sense of urgency to improve access to high-quality early identification and treatment services. However, the need is outpacing capacity in many states and effective solutions to support primary care and specialty prescribers to identify and treat more patients with opioid use disorders are still emerging. This paper describes one state's approach to increase access to medication for opioid use disorders (MOUD) through development and implementation of a statewide addiction consultation service: Maryland Addiction Consultation Service (MACS). **Methods:** Program components include a warmline, outreach and training, and resource and referral linkages for prescribers based on related consultation service models and documented barriers to prescribing MOUDs. **Results:** Initial implementation outcomes indicate service components are being adopted as intended and by the target audience; many prescribers who engaged with the service have their buprenorphine waiver (44%) but do not have any additional formal addiction training (57%). Also, statewide penetration is promising with prescriber engagement in 100% of counties, however only 33% of counties in engaged in all four types of MACS services. Most calls (61%) originated from urban counties. **Conclusions:** The MACS program increases access to specialty addiction medicine consultation and training through use of technology. MACS can serve as a model for other states looking to bridge the gap in access to addiction treatment.

KEYWORDS

Opioid use disorder; buprenorphine; medication-based treatment; medication for opioid use disorders; access to addiction treatment

Introduction

The United States is in the midst of an opioid epidemic that is now a public health emergency.¹ Opioid-related overdose deaths increased from 8,048 in 1999 to 47,600 in 2018, an almost six-fold increase.^{2,3} In 2017, Maryland had the 7th highest death rate from drug overdoses among all states in the U.S.² Maryland, like much of the rest of the country, had seen a significant increase in fatal overdoses involving heroin (up more than 500% from 238 deaths in 2010 to 1,212 in 2016) and deaths related to illicitly-manufactured fentanyl and its analogues such as carfentanyl (up more than 4,300% from 26 deaths in 2011 to 1,119 in 2016).^{3,4} Despite numerous initiatives at the state and county level, fatalities continued to increase.⁴⁻⁶

Medications for opioid use disorders (MOUD) such as methadone and buprenorphine have consistently been shown to be more effective than counseling alone in decreasing opioid use, increasing retention in substance use treatment, and decreasing the risk of overdose and death.^{1,7-9} However, it is estimated that less than 35% of the more than 2 million individuals with Opioid Use Disorders (OUD) in the United States receive this life-saving

treatment.⁹⁻¹¹ Stigma as well as racial, economic, and geographical disparities limit access to care.¹²⁻¹⁴ Additionally, prescribers underutilize MOUDs or prescribe inadequate doses and/or durations.¹² Increasing access to quality addiction treatment is critical to addressing the opioid epidemic.^{9,15}

While some MOUDs require treatment within a specialized setting, the Drug Addiction Treatment Act of 2000 (DATA 2000) allows buprenorphine to be prescribed by physicians to treat OUD in office-based settings after they obtain a waiver from the Substance Abuse and Mental Health Services Administration (SAMHSA) and a special identification number from the Drug Enforcement Administration (DEA). Prescribers are initially waived to treat a maximum of 30 patients during their first year, after which they may apply to expand their patient capacity up to 100 patients, and in 2016 this was expanded to allow qualified physicians to treat up to 275 patients.¹⁶ The Comprehensive Addiction and Recovery Act (CARA) of 2016 and the Substance Use-Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities (SUPPORT) Act of 2018 extended this prescribing authority to nurse practitioners, physician assistants,

Table 1. MACS Components Addressing Barriers to Prescribing Buprenorphine.

Barriers to prescribing buprenorphine:	MACS components			
	Warmline consultation	Outreach	Training	Resources and referrals
Limited training, education and skills	✓		✓	✓
Lack of institutional support	✓	✓	✓	✓
Insufficient behavioral health treatment referral options	✓	✓		✓
Burdensome regulatory procedures	✓	✓	✓	✓
Prescriber stigma toward patients with OUD	✓	✓	✓	✓

clinical nurse specialists, certified nurse midwives, and certified registered nurse anesthetists with the goal of increasing access to MOUDs, particularly in underserved areas.¹⁷ However, providers report a lack of training as well as systematic barriers preventing them from providing MOUDs.^{18–20} Less than a quarter of residency programs provide 12 or more hours of training in addiction medicine, and even fewer programs promote obtaining a waiver.²¹ Nationally, only 6% of providers have received their waiver.²² As a result, many US counties lack a single waived prescriber and many waived prescribers are treating very few patients or none at all.^{20,23}

This is certainly reflective of the landscape in Maryland. As of 2019, eight (33%) Maryland counties had five or fewer waived prescribers according to the SAMHSA buprenorphine practitioner locator list. Also, despite consistent coverage of buprenorphine by Maryland Medical Assistance since its release in 2003 and Maryland's Medicaid expansion in 2014, a relatively small number of Maryland residents with OUD were being prescribed buprenorphine.²⁴ According to Medicaid claims data in 2015, only 1,118 Marylanders were receiving buprenorphine from an opioid treatment program, comparatively there were 1,089 fatal opioid overdoses in Maryland that year, suggesting substantial unmet need for treatment.²⁵ In 2016, the Maryland Department of Health utilized state Prescription Drug Monitoring Program (PDMP) and DEA data to determine the number of physicians prescribing buprenorphine within the state and the number of prescriptions that each provider had written. It was estimated that only 4.5% of Maryland physicians with a DEA number had a waiver and that, of these, 38% had never written a prescription for buprenorphine.

In response the Maryland Addiction Consultation Service (MACS) was developed and launched by the University of Maryland, School of Medicine, Department of Psychiatry, in collaboration with the Maryland Department of Health, Behavioral Health Administration. The MACS model was based on successful Child Psychiatry Access Programs (CPAP) for behavioral health/primary care integration and tailored specifically to address provider-reported barriers to prescribing buprenorphine.²⁶ A recent national evaluation of CPAPs found that CPAPs had significantly increased access to pediatric mental health care services.²⁷ Many other programs have demonstrated success in addressing the lack of specialty providers with a telephone consultation program, and there is a growing interest in applying this model to addiction medicine. Several other states (e.g., Arkansas, California, Massachusetts, Michigan, and Wisconsin) have recently launched similar addiction telephone consultation programs with support of their state health departments or

federal grant agencies.^{15,28–40} The only published account of a longstanding addiction medicine consultation program that we could locate is in Australia.⁴¹

The goal of this paper is to describe MACS components and initial implementation outcomes to inform efforts in other states to increase access to MOUDs in the context of a provider shortage and/or under-prescribing of buprenorphine among the current provider community. Recent studies on prescriber barriers highlight the need for provider training and education in addiction medicine and the need for access to addiction specialist mentors.^{42,43} While federal laws are expanding prescriber capacity, additional supports are needed to support those newly eligible to not only utilize their waiver but provide high quality care to a deeply stigmatized patient population.²²

Methods

MACS was established in 2017 to build capacity among primary care providers and specialty prescribers (hereafter, prescribers) to address the opioid epidemic and support the statewide goal to expand access to buprenorphine to treat OUD. In 2018, MACS expanded its scope to include all Substance Use Disorders (SUD) and chronic pain management. MACS provides prescribers with real-time consultation opportunities from addiction and pain management specialists as well as additional supports through training, education, and resource identification for their patients.

MACS model design

The MACS model was designed to address the various barriers to delivering MOUDs (see Table 1). For example, one barrier is that prescribers report limited **specialty training, education and skills** related to managing OUD and prescribing opioids for pain, which is consistent with findings about the need for additional behavioral health training among primary care providers if they are to identify, refer, and treat patients with behavioral health needs.^{19,38,44–46} Warmline consultation to individual prescribers is designed to increase knowledge and skills necessary to treat patients, as well as provide a means to request trainings and resources.

Also, physicians not prescribing buprenorphine have been found to be more likely to cite a lack of **institutional support** among their peer practitioners, mentors or more senior practitioners, and/or practice workflows to accommodate and facilitate their use of buprenorphine with patients.^{18,19} The warmline can provide consultation for

prescribers who might not have access to consultation within their practice, and outreach, training and practice resources are often tailored to issues of practice-level supports for prescribers serving patients with OUDs.

Insufficient **behavioral health treatment referral options**, particularly psychiatric services, are a consistent barrier and reality in many locales that plagues primary care providers and other community-based prescribers when treating patients who would benefit from additional psychosocial supports.^{47,48} Warmline consultations and referral supports provide individualized suggestions for the type of services to refer to, as well as up to date information on appropriate local resources for referral.

Numerous **regulatory procedures** related to the waiver process, such as record-keeping requirements for managing patients receiving buprenorphine also add burden to prescribers utilizing buprenorphine in their practice.⁴⁹ Similarly, because treatment of SUDs is often “carved out” out from the primary medical insurance, prior authorization and billing issues may be cumbersome for a primary care provider and dissuade them from providing buprenorphine treatment.^{42,43} All MACS components are designed to support prescribers in their process to navigate these regulations and alleviate some of the burden related to tracking and complying with the numerous administrative details. Something as simple as not knowing how to get the waiver keeps prescribers from prescribing.⁵⁰

Finally, **prescriber stigma toward patients with SUDs** has been well-documented in the research literature as recently as 2019 and is likely even underreported.^{12,42,49} MACS seeks to support all prescribers in their ability to have strengths-based perceptions of their patients and to build hope for the recovery of patients with SUDs both through individual warmline consultations and practice-based activities such as outreach, training and resources.

Description of MACS components

Warmline consultation

MACS consultation calls are answered and triaged by a Behavioral Health Consultant (BHC) who is a Masters-level, licensed social worker. The BHC assists with referrals, answers general behavioral health questions and triages clinical questions to the MACS Physician Consultants who are board certified in addiction medicine or addiction psychiatry. Our team of physician consultants includes those with specializations in Family Medicine ($N=1$), Internal Medicine/Primary Care ($N=2$), Psychiatry ($N=2$), and Anesthesia/Pain ($N=1$) with an average of 19 years specializing in addiction treatment. Calls are returned within one business day at a time that is convenient to the caller. If the patient about whom the prescriber calls is still in the office, an attempt is made for the physician consultant to return the call immediately to help increase the usefulness of the consultation. Patient demographics and pertinent medical history are gathered, but no patient identifying information are collected. Services are provided free of charge and regardless of patient’s insurance status or the prescriber’s

practice setting. Following the consultation, a call summary and any tools, resources or referrals are sent to the prescriber for their reference within 24 h. Consultation calls are answered Monday through Friday from 9:00am until 5:00pm.

Outreach

The MACS team engages in statewide outreach efforts as well as a targeted regional outreach strategy. Outreach and dissemination efforts for MACS includes presentations at local, regional, and national conferences, practice visits, exhibit tables, targeted phone, email, mail and social media. Individualized follow-up is made after each engagement with MACS. Additionally, MACS works collaboratively with local health departments, the PDMP, and other community stakeholders across the state to increase awareness of MACS as well as coordinate educational opportunities.

Training

Training is available to prescribers related to SUDs, MOUDs, and chronic pain management. Training content is tailored to the needs of individual practices. Trainings include online webinars, grand rounds, in-office “lunch and learns,” and continuing medical education (CME) events, including waiver qualifying trainings. They may be delivered as a one-time event or a series of events on an ongoing basis.

Resource and referrals

Prescribers can call MACS to request individualized resources and referrals for a specific patient with whom they are working. The BHC uses an updated referral and resource database to provide real-time information to prescribers about the availability and appropriateness of behavioral health, SUDs, and pain management services in their community.

Additionally, MACS maintains a Resource Catalogue to support all MACS components. Resource topics range from educational resources to templates that can be used in prescriber practice sites to archived webinars on various addiction related topics. Prescribers can call to request assistance with a particular screening tool or for informational material on a particular topic. Additionally, during consultation calls MACS consultants may recommend the use of a specific resource(s). These resources are included in summaries sent to prescribers following consultation calls. Currently, resources are available on the MACS website: www.marylandMACS.org

Implementation outcome evaluation

The MACS evaluation team tracks prescribers’ engagement in the various components of MACS to understand the adoption and penetration of MACS components. This project was reviewed by the University of Maryland, Baltimore Institutional Review Board and determined Not Human Subject Research. Data gathered between October 16, 2017,

Table 2. MACS Penetration by Encounter Type.

Encounter type	Statewide MACS prescribers	Statewide penetration <i>N</i> = 24 counties	Rural MACS prescribers	Rural penetration <i>N</i> = 18 counties	Urban MACS prescribers	Urban penetration <i>N</i> = 6 counties
Sign up	396	23 (96%)	120 (30%)	17 (94%)	276 (70%)	6 (100%)
Practice outreach visit	135	20 (83%)	95 (70%)	16 (89%)	40 (30%)	4 (67%)
Warmline Consultation	118	16 (67%)	34 (29%)	10 (55%)	84 (71%)	6 (100%)
Training/Education	250	11 (46%)	56 (22%)	5 (28%)	194 (78%)	6 (100%)

and April 30, 2019 were entered in REDCap (Research Electronic Data Capture), which is a secure, HIPAA-compliant, online data management application. Adoption is defined as the intention or initial decision to use any MACS component (also referred to as “uptake”) and penetration is defined as the reach of MACS components in all counties across the state.³⁹ Individual prescribers’ adoption is tracked based on their encounters with MACS using the Sign Up Form, Consultation Form, and the Outreach Form. The Sign Up Form is distributed to waived and waiver-eligible prescribers across the state via mailings, in-person practice visits, outreach events and local buprenorphine waiver trainings. Prescribers who complete the Sign-Up Form indicate their credentials, specialty, practice type, waiver status, patient case load, addiction training as well as their location and contact information to be added to the MACS communication listservs. The Consultation Form is used during every Warmline Consultation to track consultation question(s), de-identified case details, substances discussed, and recommendations and resources provided. The Outreach Form tracks prescriber attendance at all outreach and training events. These forms were developed based on comprehensive review of forms used in other CPAPs and revised using an iterative process within the MACS development team (which includes state behavioral health administrators, CPAP development experts, evaluators, and clinical providers including addictions psychiatrists, a clinical psychologist, and two social workers). Penetration is measured by aggregating the number of MACS encounters by county (i.e., the number of counties with at least one encounter type divided by the total number of counties in the state).

Results

Adoption

A total of 396 prescribers signed up with MACS over the 18-month pilot period. These early adopters included medical doctors (MD/DO, *N* = 183, 46%), nurse practitioners (NP, *N* = 145, 37%) and physician assistants, (PA, *N* = 47, 12%). Twenty-one (5%) of enrolled prescribers were missing credentials. Prescribers primarily specialize in Family Medicine (*N* = 133, 34%) or Internal Medicine (*N* = 72, 18%). Most often prescribers were located in a solo or private practice setting (*N* = 146, 37%). Prescribers were evenly split between those waived to prescribe buprenorphine (*N* = 173, 44%) and those not yet waived (*N* = 174, 44%), with 12% (*N* = 49) missing this data point. Of those waived, nearly half (*N* = 83, 48%) have a 30-patient limit, indicating they likely obtained their waiver within the last year or do not prescribe near capacity. Based on self-reported

caseloads of all waived prescribers, more than half (*N* = 89, 51%) either failed to report a caseload (*N* = 48, 28%) or reported treating zero patients with buprenorphine (*N* = 41, 24%). Lastly, more than half of waived prescribers (*N* = 97, 56%) have never received any specific addiction medicine training outside of the eight-hour buprenorphine waiver training course.

Among prescribers signed up with MACS, 30% (*N* = 118) called the warmline, resulting in 208 calls. Prescribers calling the warmline were usually physicians (*N* = 52, 44%) or NPs (*N* = 43, 38%), with their waiver (*N* = 66, 56%). Few PAs (*N* = 9, 8%) called the warmline. Additionally, a small number of non-prescribers (*N* = 6, 5%) called the warmline as well as three patients. The majority (*N* = 84, 71%) of these callers practiced in urban counties. Nearly a third (*N* = 34, 29%) of callers utilized the warmline repeatedly. Most consultations were triaged to a MACS Physician Consultant (*N* = 129, 62%) and most questions were clinical (i.e., case-specific or pertaining to clinical practice, *N* = 119, 57%). Of these clinical questions 44% (*N* = 52) concerned the initiation and/or maintenance of buprenorphine, however an unexpected number of calls were coded as “other” (*N* = 47, 39%). These “other” calls related to issues surrounding starting a new office-based prescribing practice and protocols.

Also, among prescribers signed up with MACS, 63% (*N* = 250) attended a training event held by MACS. Most of attendees were physicians (*N* = 123, 49%) or NPs (*N* = 84, 34%), with relatively fewer training encounters attended by PAs (*N* = 39, 16%). Individual attendance records are not always obtainable at all training events, but it is estimated that over 2,000 prescribers and stakeholders attended the 63 training events conducted by MACS Physician Consultants. Attendance numbers were missing from 22 (35%) events, however of the events where attendance was collected (*N* = 57) a range of 1 to 390 prescribers were in attendance (Mean = 37). These events included CMEs, in-office trainings, waiver-qualifying trainings, webinars and plenary presentations. Evaluations collected (*N* = 171) from training participants found that 87% felt the content was clinically relevant to their practice, 90% learned at least one practical skill for the clinical care of their patients, and 88% learned a great deal as a result of the training.

Additionally, MACS staff provide in-person outreach through presentations on MACS services, exhibit booths at conferences and site visits. MACS staff attended 288 face-to-face outreach events. Because of these efforts over 43% (*N* = 170) reported on their sign-up form of hearing of MACS through a face-to-face outreach event (i.e., “presentation at my practice,” “drop-in visit to my practice,” “MACS training,” and “conference/professional meeting”).

Penetration

MACS reached prescribers in all 24 (100%) counties in Maryland through a combination of prescriber sign ups, training, outreach, and calls to the warmline. Prescribers have signed-up for MACS services in 23 (96%) counties. MACS staff traveled to 18 (75%) counties to conduct practice outreach visits and 11 (46%) counties to deliver training and education. Lastly, prescribers from 16 (67%) counties called the warmline for clinical consultation. See [Table 2](#).

To further examine penetration rates for various MACS encounters, we also examined penetration for rural and urban counties. This is particularly relevant in Maryland, where over 75% of Maryland is designated as a rural area, yet due to high population densities in the Baltimore-Washington metropolitan area, only 25% of the Maryland population is designated as rural.⁵¹ As can be seen in [Table 2](#), MACS' statewide penetration for all types of encounters is driven by a higher rate of penetration in urban counties, with the exception of practice outreach visits. This is a reflection of intentional, targeted outreach strategies to prescribers in more rural counties.

All counties have at least one type of MACS encounter, but only 8 (33%) counties had all four types of MACS encounters (Range = 1 to 4, Mean = 2.9, Median = 3, Mode = 3). As expected, total prescriber engagement was lowest in the eight counties with five or fewer waived providers. This is due to the overall shortage of prescribers in those areas. However, MACS enrolled a total of 15 prescribers in seven of those counties, eight of which attended a MACS training event. Four calls came from two of these counties. Unsurprisingly the majority of calls came from urban counties ($N = 126$, 61%).

Discussion

MACS is a targeted service to reduce barriers to providing MOUDs in the community. The rapid statewide adoption and penetration of MACS is initial evidence of its utility for prescribers and its promise as a feasible model for states seeking to increase access to MOUDs. Results from the first 18 months illustrate a consistency with previous studies that consultation warmlines provide valuable clinical knowledge through an acceptable modality to prescribers.^{35,36,41,52} High demand for access to consultation and training with an addiction medicine specialist is illustrated as the majority of calls (62%) were triaged for further consultation with a MACS physician consultant, and nearly a third of callers utilized the warmline repeatedly.

Although penetration in all counties within 18 months is considered to be a success, measuring penetration by county has limitations. It is not clear to what extent these implementation outcomes would be generalizable to other phone consultation services. However, without an active census of primary care prescribers, MACS does not yet have a reliable way to track penetration by all eligible prescribers at this time. According to the SAMSHA Buprenorphine Treatment Practitioner Locator, there are over 850 buprenorphine waived prescribers in the state of Maryland as of October 2019 and over 30,000 physicians statewide.^{53,54} Yet these lists lack

information on the prescriber's specialty, practice setting, patient capacity, if the prescriber is actively treating patients with buprenorphine or accepting new patients. Additionally, this list is not updated when a prescriber moves, retires, or stops practicing medicine.²⁰ Therefore, these lists do not provide an accurate account of the total number of buprenorphine-waivered prescribers practicing in each county.¹⁹ The MACS team is continuing efforts to understand penetration by prescriber by contacting all prescribers listed on the SAMSHA Buprenorphine Locator list with bi-annual follow-up to produce a more accurate, up to date list of active prescribers in Maryland. As a future direction, the MACS team would like to use the results to calculate MACS penetration by dividing the number of prescribers with MACS encounters by the total number of buprenorphine-waivered prescribers practicing in each county.

Many prescribers are still hesitant to treat patients with SUDs, even those who have already obtained their waiver. A recent study found that only 13% of waived prescribers treat close to their patient capacity.⁴³ This reality resulted in early low utilization and required MACS to expand its initially targeted audience beyond those already waived to prescribe buprenorphine, to include all eligible prescribers and to cover all SUDs. Additionally, many prescribers are unwilling to accept patients prescribed opioids for chronic pain and several pain clinics were closed across Maryland in 2018.⁵⁵ MACS responded by expanding its scope again to include chronic pain management consultation and training with additional support of a board-certified pain medicine physician to assist prescribers caring for patients with chronic and complex pain histories.

The opioid epidemic has revealed a glaring lack of addiction medicine training for prescribers nationally.^{21,22,56} While national programs, such as the SAMHSA-funded Providers Clinical Support System (PCSS) exist to provide training and mentoring, evidence suggests the importance of face-to-face outreach and relationship building for engaging prescribers, and most MACS-enrolled prescribers reported hearing of MACS through face-to-face contact.⁵⁷⁻⁵⁹ MACS staff have implemented routine internal evaluations of prescriber engagement and outreach efforts to inform targeted outreach strategies. For example, low PA engagement in MACS components resulted in the coordination and completion of several waiver trainings for graduating classes of PA students. However, since waived PAs may only prescribe buprenorphine if their supervising physician is also waived, this has limited the ability of PAs to utilize their waiver.^{60,61} While the MACS team is working to better understand the most effective methods of outreach for optimal prescriber engagement, evidence suggests that ongoing mentorship and training beyond the waiver training would be most beneficial to ensure prescribers are utilizing evidence-based treatment.^{57,62} As a future direction MACS aims to provide systematic follow-up to all prescribers engaged in MACS hosted waiver trainings to understand if they are actively prescribing and/or what barriers they face. This follow-up will include invitations to engage in individualized technical assistance (TA) to support prescribers as they implement, expand and improve their office-based

addiction treatment services through a blend of onsite and tele-based services.

MACS appears to be a feasible and scalable solution to increase and enhance access to and quality of substance use treatment and chronic pain management that other states could replicate. Maryland has developed and implemented many strategies to address the opioid crisis, both at the state and local levels. Providing much needed consultation, training, and referral support this program is an acceptable approach to increasing access to high quality, evidence-based addiction treatment. Though, the unexpected number of time-intensive calls around starting a new office-based prescribing practice as well as the requests for in-person CME events highlighted the need for additional services. Future directions for MACS include individualized TA services, as well as a Project ECHO® (Extension for Community Healthcare Outcomes). Project ECHO is a collaborative, low-cost, tele-mentoring model of medical education that improves access to specialty care by linking MACS consultants with local prescribers through real-time, online learning sessions.⁶³ Project ECHO leverages technology to make the best use of physician time to deliver CMEs and expand the capacity of local prescribers to provide evidence-based addiction medicine.⁶⁴ Additionally, MACS will begin to evaluate practice changes made as a result of engagement with MACS, self-reported confidence gained, as well as surveying prescriber waiver status, capacity, and patient case-loads. Similar state programs could be beneficial and feasible to replicate to increase the availability and accessibility of addiction treatment, specifically to MOUDs.

Acknowledgements

MACS is funded by the Maryland Department of Health's Behavioral Health Administration and is available to prescribers across Maryland at no charge.

Funding

This work was supported by Maryland Department of Health, Behavioral Health Administration. The funding organization had no role in the design and conduct of the study; the collection, management, analysis, and interpretation of the data; or decision to submit the manuscript for publication. The funding organization contributed to the review and approval of the manuscript for publication.

Author contributions

All authors were involved in the conception and implementation of the study and approved of the final manuscript. SS collected data, performed analysis, and drafted and revised the manuscript. KC drafted portions of the Methods section and revised the manuscript. EC oversaw analysis, drafted portions of the Methods section, and revised the manuscript. KRF reviewed and revised the manuscript. CW drafted portions of the Introduction and Discussion sections and revised the manuscript. EW drafted portions of the Introduction and Discussion sections and revised the manuscript.

Sources of support

NIMH 1K08MH116119-01A1.

References

- [1] Volkow ND, Frieden TR, Hyde PS, Cha SS. Medication-assisted therapies - tackling the opioid-overdose epidemic. *N Engl J Med*. 2014;370(22):2063–2066.
- [2] National Center for Health Statistics C for DC and P. Drug Overdose Mortality by State. https://www.cdc.gov/nchs/press-room/sosmap/drug_poisoning_mortality/drug_poisoning.htm. Published 2019. Accessed April 4, 2019.
- [3] Hedegaard H, Warner M, Miniño AM. Drug overdose deaths in the United States, 1999–2015. *NCHS data brief*, no 273. Hyattsville, MD: National Center for Health Statistics; 2017.
- [4] Hogan L, Rutherford B, Schrader Secretary DR. Drug-and alcohol-related intoxication deaths in Maryland, 2016 Maryland Department of Health and Mental Hygiene; 2017. https://bha.health.maryland.gov/Documents/Annual_Drug_Intox_Report_2016_revised.pdf
- [5] Wen LS, Warren KE. Combatting the opioid epidemic: Baltimore's experience and lessons learned. *J Public Heal (United Kingdom)*. 2018;40(2):e107–e111.
- [6] Schwartz R, Gryczynski J, O'Grady K, et al. Opioid agonist treatments and heroin overdose deaths in Baltimore, Maryland, 1995–2009. *Am J Public Health*. 2013;103(5):917–922.
- [7] Bart G. Maintenance medication for opiate addiction: The foundation of recovery. *J Addict Dis*. 2012;31(3):207–225.
- [8] Connery HS. Medication-assisted treatment of opioid use disorder: review of the evidence and future directions. *Harv Rev Psychiatry*. 2015;23(2):63–75.
- [9] Volkow ND, Jones EB, Einstein EB, Wargo EM. Prevention and treatment of opioid misuse and addiction: a Review. *JAMA Psychiatry*. 2019;76(2):208–216.
- [10] Jones CM, McCance-Katz EF. Co-occurring substance use and mental disorders among adults with opioid use disorder. *Drug Alcohol Depend*. 2019;197:78–82.
- [11] Knudsen HK, Abraham AJ, Roman PM. Adoption and implementation of medications in addiction treatment programs. *J Addict Med*. 2011;5(1):21–27.
- [12] Knudsen HK, Lofwall MR, Walsh SL, Havens JR, Studts JL. Physicians' decision-making when implementing buprenorphine with new patients: conjoint analyses of data from a cohort of current prescribers. *J Addict Med*. 2018;12(1):31–39.
- [13] Beetham T, Saloner B, Wakeman SE, Gaye M, Barnett ML. Access to office-based buprenorphine treatment in areas with high rates of opioid-related mortality: an audit study. *Ann Intern Med*. 2019;171(1):1.
- [14] Lagisetty PA, Ross R, Bohnert A, Clay M, Maust DT. Buprenorphine treatment divide by race/ethnicity and payment. *JAMA Psychiatry*. 2019;76(9):979.
- [15] Levin FR, Bisaga A, Sullivan MA, Williams AR, Cates-Wessel K. A review of a national training initiative to increase provider use of MAT to address the opioid epidemic. *Am J Addict*. 2016; 25(8):603–609.
- [16] Substance Abuse and Mental Health Services Administration. Medication Assisted Treatment for Opioid Use Disorders Reporting Requirements. Final Rule; 2016.
- [17] United States Congress. Comprehensive Addiction and Recovery Act of 2016. *Public Law*. 2016;114(114):695–779. <https://www.congress.gov/114/plaws/publ198/PLAW-114publ198.pdf>.
- [18] Knudsen HK, Abraham AJ, Oser CB. Barriers to the implementation of medication-assisted treatment for substance use disorders: The importance of funding policies and medical infrastructure. *Eval Program Plann*. 2011;34(4):375–381.
- [19] Hutchinson E, Catlin M, Andrilla CHA, Baldwin LM, Rosenblatt RA. Barriers to primary care physicians prescribing buprenorphine. *Ann Fam Med*. 2014;12(2):128–133.
- [20] Andrilla CHA, Coulthard C, Patterson DG. Prescribing practices of rural physicians waived to prescribe buprenorphine. *Am J Prev Med*. 2018;54(6 Suppl 3):S208–S214.
- [21] Tesema L, Marshall J, Hathaway R, et al. Training in office-based opioid treatment with buprenorphine in US residency

- programs: a national survey of residency program directors. *Subst Abus.* 2018;39(4):434–440.
- [22] Sharfstein JM, Olsen Y. Making amends for the opioid epidemic. *JAMA - J Am Med Assoc.* 2019;321(15):1446.
- [23] Knudsen HK. The supply of physicians waived to prescribe buprenorphine for opioid use disorders in the United States: a state-level analysis. *J Stud Alcohol Drugs.* 2015;76(4):644–654.
- [24] Substance Abuse and Mental Health Services Administration. Medicaid coverage and financing of medications to treat alcohol and opioid use disorders. 2014. HHS Publication No. SMA-14-4854
- [25] University of Maryland BSEC. Opioid treatment programs in Maryland needs assessment report; 2016. https://bha.health.maryland.gov/Documents/Combined_OTP_Needs_Assessment_Report_and_letter11.18.16.pdf.
- [26] Sarvet B, Gold J, Bostic JQ, et al. Improving access to mental health care for children: the Massachusetts Child Psychiatry Access Project. *Pediatrics.* 2010;126(6):1191–1200.
- [27] Stein BD, Kofner A, Vogt WB, Yu H. A national examination of child psychiatric telephone consultation programs' impact on children's mental health care utilization. *J Am Acad Child Adolesc Psychiatry.* 2019;58(10):1016–1019.
- [28] Gloth FM, Schwartz J. Developing a physicians' palliative care pain hotline in Maryland. *Am J Hosp Palliat Care.* 2000;17(1):24–28.
- [29] Massachusetts Consultation Service for Treatment of Addiction and Pain. <https://www.mcstap.com/>. Published 2019.
- [30] University of Wisconsin S of M and PH. UW addiction consultation provider hotline. <https://www.fammed.wisc.edu/addiction-hotline/>. Published 2019. Accessed December 13, 2019.
- [31] MATRIARC. <https://psychiatry.uams.edu/clinical-care/cast-2/matriarc/>. Published 2020. Accessed December 13, 2019.
- [32] Michigan Opioid Collaborative (MOC). <https://medicine.umich.edu/dept/psychiatry/programs/michigan-opioid-collaborative-moc>. Accessed December 13, 2019.
- [33] Goldschmidt RH, Graves DW. The national HIV telephone consultation service (Warmline): a clinical resource for physicians caring for African-Americans. *J Natl Med Assoc.* 2003;95(2 SUPPL. 2):8S–11S.
- [34] Egan JE, Casadonte P, Gartenmann T, et al. The physician clinical support system-buprenorphine (PCSS-B): a novel project to expand/improve buprenorphine treatment. *J Gen Intern Med.* 2010;25(9):936–941.
- [35] Carr CH, McNeal H, Regalado E, Nelesen RA, Lloyd LS. PALMED CONNECT®: a telephone consultation hotline for palliative medicine questions. *J Palliat Med.* 2013;16(3):263–267.
- [36] Hilt RJ, Romaine MA, McDonnell MG, et al. The partnership access line: evaluating a child psychiatry consult program in Washington state. *JAMA Pediatr.* 2013;167(2):162–168.
- [37] Eaton JL, Mohr DC, Mohammad A, et al. Implementation of a novel occupational and environmental medicine specialty teleconsultation service: the VHA experience. *J Occup Environ Med.* 2015;57(2):173–177.
- [38] Harrison J, Wasserman K, Steinberg J, Platt R, Coble K, Bower K. The five S's: a communication tool for child psychiatric access projects. *Curr Probl Pediatr Adolesc Health Care.* 2016;46(12):411–419.
- [39] Marcus S, Malas N, Dopp R, et al. The Michigan child collaborative care program: building a telepsychiatry consultation service. *Psychiatr Serv.* 2019;70(9):849–852.
- [40] Clinician Consultation Center. California Substance Use Line. <https://nccc.ucsf.edu/clinician-consultation/substance-use-management/california-substance-use-line/>. Published 2020. Accessed December 13, 2019.
- [41] Grigg J, Arunogiri S, Manning V, et al. The drug and alcohol clinical advisory service: a model of telephone-delivered addiction specialist support. *Drug Alcohol Rev.* 2020;39(3):238–245.
- [42] Andrilla CHA, Moore TE, Patterson DG. Overcoming barriers to prescribing buprenorphine for the treatment of opioid use disorder: recommendations from rural physicians. *J Rural Heal.* 2019;35(1):113–121.
- [43] Jones CM, McCance-Katz EF. Characteristics and prescribing practices of clinicians recently waived to prescribe buprenorphine for the treatment of opioid use disorder. *Addiction.* 2019;114(3):471–482.
- [44] Pidano AE, Honigfeld L, Bar-Halpern M, Vivian JE. Pediatric primary care providers' relationships with mental health care providers: survey results. *Child Youth Care Forum.* 2014;43(1):135–150.
- [45] DeFlavio JR, Rolin SA, Nordstrom BR, Kazal LA. Analysis of barriers to adoption of buprenorphine maintenance therapy by family physicians. *Rural Remote Health.* 2015;15(1):1–11.
- [46] Pearson ACS, Eldridge JS, Moeschler SM, Hooten WM. Opioids for chronic pain: a knowledge assessment of nonpain specialty providers. *J Pain Res.* 2016;9:129–135.
- [47] Knickman J, Krishnan R, Pincus H. Improving access to effective care for people with mental health and substance use disorders. *JAMA - J Am Med Assoc.* 2016;316(16):1647–1648.
- [48] Connors EH, Arora P, Blizzard AM, et al. When behavioral health concerns present in pediatric primary care: factors influencing provider decision-making. *J Behav Health Serv Res.* 2018;45(3):340–355.
- [49] Haffajee RL, Bohnert ASB, Lagisetty PA. Policy pathways to address provider workforce barriers to buprenorphine treatment. *Am J Prev Med.* 2018;54(6 Suppl 3):S230–S242.
- [50] Huhn AS, Dunn KE. Why aren't physicians prescribing more buprenorphine? *J Subst Abuse Treat.* 2017;78:1–7.
- [51] Maryland Department of Health. Federal and State Designated Rural Areas. https://pophealth.health.maryland.gov/Documents/RuralHealth/Federal_and_State_Designated_Rural_Areas_11.13.2015.jpg. Published 2015. Accessed October 18, 2019.
- [52] Platt R, Pustilnik S, Connors E, Gloff N, Bower K. Severity of mental health concerns in pediatric primary care and the role of child psychiatry access programs. *Gen Hosp Psychiatry.* 2018;53:12–18.
- [53] Young A, Chaudhry HJ, Pei X, Halbesleben K, Polk DH, Dugan M. A census of actively licensed physicians in the United States, 2014. *J Med Licens Discip.* 2015;99(2), 11–24.
- [54] SAMHSA. Buprenorphine Practitioner Locator | SAMHSA - Substance Abuse and Mental Health Services Administration. <https://www.samhsa.gov/medication-assisted-treatment/practitioner-program-data/treatment-practitioner-locator>. Accessed October 1, 2019.
- [55] Lagisetty PA, Healy N, Garpestad C, Jannausch M, Tipirneni R, Bohnert ASB. Access to primary care clinics for patients with chronic pain receiving opioids. *JAMA Netw Open.* 2019;2(7):e196928.
- [56] Braithwaite V, Nolan S. Hospital-based addiction medicine healthcare providers. *J Addict Med.* 2019;13(4):251–252.
- [57] Gunderson EW, Fiellin DA, Levin FR, Sullivan LE, Kleber HD. Evaluation of a combined online and in person training in the use of buprenorphine. *Subst Abus.* 2006;27(3):39–45.
- [58] Arora PG, Connors EH, Coble K, Blizzard A, Wissow L, Pruitt D. Pediatric primary care providers' use of behavioral health consultation. *Psychiatr Serv.* 2017;68(6):531–534.
- [59] Davis MT, Bateman B, Avorn J. Educational outreach to opioid prescribers: the case for academic detailing. *Pain Phys.* 2017;2(20):S147–S151.
- [60] Andrilla CHA, Jones KC, Patterson DG. Prescribing practices of nurse practitioners and physician assistants waived to prescribe buprenorphine and the barriers they experience prescribing buprenorphine. *J Rural Heal.* 2019;36(2):187–195.
- [61] Varghese R, Johnson K, Feng B, et al. Final research report: buprenorphine prescribing by nurse practitioners, physician assistants, and physicians after CARA 2016. 2019. <https://www>.

- macpac.gov/wp-content/uploads/2019/11/Buprenorphine-Prescribing-by-Nurse-Practitioners-Physician-Assistants-and-Physicians-after-CARA-2016.pdf.
- [62] Miller WR, Sorensen JL, Selzer JA, Brigham GS. Disseminating evidence-based practices in substance abuse treatment: a review with suggestions. *J Subst Abuse Treat*. 2006; 31(1):25–39.
- [63] Arora S, Thornton K, Murata G, et al. Outcomes of treatment for hepatitis C virus infection by primary care providers. *N Engl J Med*. 2011;364(23):2199–2207.
- [64] Komaromy M, Duhigg D, Metcalf A, et al. Project ECHO (Extension for Community Healthcare Outcomes): a new model for educating primary care providers about treatment of substance use disorders. *Subst Abus*. 2016;37(1):20–24.