



Published in final edited form as:

*J Addict Med.* 2019 ; 13(2): 104–112. doi:10.1097/ADM.0000000000000496.

## The Role of the Hospital in the 21<sup>st</sup> Century Opioid Overdose Epidemic: The Addiction Medicine Consult Service

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### Abstract

**Objective**—To explore and describe the structure and design elements of addiction medicine consult (AMC) services within selected U.S. hospitals.

**Methods**—As part of a larger mixed methods study, 10 qualitative semi-structured telephone interviews were completed with board-certified addiction medicine physicians affiliated with the Addiction Medicine Foundation’s Addiction Medicine Fellowship Programs at 9 U.S. hospitals. Interviews were transcribed, coded, and analyzed using a directed content analysis.

**Results**—Interviews completed with established AMC services in nine hospitals probed AMC structure and design commonalities and differences across four domains: 1) availability and coverage, 2) team composition, 3) scope and responsibility, and 4) financing. Only one service provided weekend consults and most services did not provide coverage in the emergency department. Interprofessional teams were common with a variety of discipline combinations. AMC service scope and responsibility, generally, included three types of activities: 1) education and culture change; 2) the delivery of psychosocial and medical services; and 3) hospital guidance document development. Finally, most AMC services existed within a fragile financial environment with idiosyncratic arrangements.

**Conclusions**—As OUD-related hospitalizations increase stakeholders look to innovative care delivery mechanisms to improve care and outcomes for persons with OUD. The implementation of an AMC service may be an organizational intervention for achieving these aims. Understanding the shared and different approaches to AMC service structure and design is an important first step for delivery systems interested in implementing or expanding these services.

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Competing Interests

Manuscript authors have no competing interests to declare.

## Introduction

As the opioid overdose epidemic worsens (Hedegaard, Miniño, & Warner, 2018), acute care delivery systems struggle with increases in opioid use disorder (OUD)-related hospital admissions (Weiss et al., 2016) that disproportionately burden public payers (Ronan & Herzig, 2016). Most hospital systems and providers do not address OUD specific treatment needs and provide sub-optimal (Frazier et al., 2017; Laroche et al., 2018; Rosenthal et al., 2015) and inappropriate care (Laroche et al., 2016; Naeger et al., 2016) during hospitalization and upon discharge. The under-treatment and subsequent preventable suffering and deaths of persons with OUD as it relates to the acute care system are urgent and largely unaddressed public health issues. Policymakers, hospital leaders, and health care professionals seeking to improve services for patients with OUD must recognize that hospitals are an emergent and important component of the OUD care continuum. Addiction medicine consult (AMC) services may help address gaps in care for patients with OUD. At present, little is known collectively about AMC services as a health services delivery intervention, both the prevalence of these services in the U.S., and the shared organizational and operational components.

## Background

There is historic precedent for OUD treatment in the hospital context, specifically withdrawal management. This was due, in part, to the backlash of the Supreme Court rulings on the interpretation of the 1914 Harrison Narcotic Act, in which the Justices ruled that physicians administering and providing opioids in the outpatient setting for the purpose of treating OUD was illegal (White, 2002). From 1924 to 1935, therefore, physicians focused on developing hospital-based opioid withdrawal management protocols (White, 2002). These protocols (e.g., the “Townsend-Lambert Treatment,” the “Petty Method,” and the “Nellens and Masse Method”) were trialed and delivered to affluent middle-aged patients in private hospitals (White, 2002). Over time, physicians recognized that hospital-based withdrawal management was ineffective for long-term OUD recovery and hospitals began denying hospital admission for OUD patients (White, 2002).

Today, there is a renewed interest in treating OUD, moving beyond withdrawal management, during acute hospitalization. Over the last decade, the primary literature base for the treatment of OUD and SUD includes care delivery reviews and checklists (Noska, Mohan, Wakeman, Rich, & Boutwell, 2015; Sharma, Lamba, Cauderella, Guimond, & Bayoumi, 2017; Thakarar, Weinstein, & Walley, 2016; Theisen-Toupal, Ronan, Moore, & Rosenthal, 2017; Weinstein, Wakeman, & Nolan, 2018), an implementation case study (Englander et al., 2017), retrospective cohort studies (Nordeck et al., 2018; Suzuki et al., 2015), single-site prospective evaluations (Trowbridge et al., 2017; Wakeman, Metlay, Chang, Herman, & Rigotti, 2017) and one clinical trial (Liebschutz et al., 2014). The literature suggests that care delivery for patients with SUDs in the acute care context is needed, possible, and effective.

OUD and SUD treatment checklists for the hospital setting provide details on what services should be provided and how these services should be delivered. Weinstein et al. (2018), for

example, recommended that an addiction medicine consultation should include five elements: 1) the history; 2) the physical examination and laboratory tests; 3) withdrawal management; 4) referral and linkage; and 5) long-term medication titration. Other checklists encourage the use of psychosocial interventions, the management of opioid withdrawal, and initiation of opioid agonist therapy (OAT) during hospitalization (Noska et al., 2015; Theisen-Toupal et al., 2017).

A case study examined the Improving Addiction Care Team (IMPACT) initiative to improve services delivery for hospitalized adults with SUD (Englander et al., 2017). The IMPACT program included an AMC service, rapid-access pathways to post-discharge SUD treatment, and a medically enhanced residential care model to integrate antibiotic infusion and residential services (Englander et al., 2017). The AMC service's interprofessional team (i.e., a physician, a social worker, and two peer recovery coaches) advised on withdrawal, pain, addiction assessments, initiation of pharmacotherapy, and counseling (Englander et al., 2017). Similarly, retrospective case studies assessed the ability of AMC services in Boston (Suzuki, 2016) and Baltimore (Nordeck et al., 2018) to implement OAT delivery during and post-hospitalization for patients with OUD-related admissions and infective endocarditis.

Two prospective single-site evaluations of AMC services studied the effects of AMC service on patient care and outcomes upon hospitalization (Trowbridge et al., 2017; Wakeman et al., 2017). Among patients who initiated OAT during their hospitalization, days of opioid use declined in the 30 days post discharge (Wakeman et al., 2017) and were more likely to enter ongoing care and to be retained in care (Trowbridge et al., 2017). These studies suggest that OAT initiation during hospitalization was feasible and that linking and retaining patients in care post discharge was challenging.

A randomized control trial assessed the effectiveness of the delivery of OUD-related services in the hospital setting (Liebschutz et al., 2014). Participants randomized to buprenorphine while hospitalized were more likely to engage in treatment post-discharge and be retained in care at six months post discharge compared to individuals randomized to a five-day buprenorphine taper (Liebschutz et al., 2014). Compared with the detoxification group, linkage participants reported less illicit opioid use in the 30 days prior to the six-month follow-up interview and linkage participants were more likely to report no illicit opioid use (38% vs 9%) (Liebschutz et al., 2014).

### **Purpose & Conceptual Framework**

To date, there is no research comparing, describing, and assessing shared and different AMC service organizational structures and design; thus, we compared and contrasted nine U.S. AMC services through the completion of 10 semi-structured interviews with addiction medicine physicians. These analyses were part of a larger mixed-methods dissertation assessing OAT delivery variation in the hospital setting for patients with OUD (the quantitative analyses are ongoing).

The conceptual framework for this study, created for a broader dissertation project, conceptualized opioids and OUD as socially constructed meta-influencers of external and internal environmental attributes for the treatment of OUD (Brown, 1995; Rosenberg, 1989)

and recognized that hospitals are sociotechnical (DiMaggio & Powell, 1991; Katz & Kahn, 1978; Scott & Meyer, 1991; Thompson, 1967), complex adaptive (Plsek & Greenhalgh, 2001), economic production systems (Lipsitz, 2012) that exist within a broader environmental context (Basole & Rouse, 2008; Ferlie & Shortell, 2001; Perrow, 1986; Sallis, Owen, & Fisher, 2015). The environment, inside and outside the hospital, includes the physical, technological, cultural, social milieu (Katz & Kahn, 1978; Plsek & Greenhalgh, 2001; Scott & Davis, 2015), and policy elements which are frequently both a product and influencer of social phenomena (Ingram & Schneider, 1990, 1991; MacCoun, Saiger, Kahan, & Reuter, 1993; Pierson, 1993; Schneider & Ingram, 1988, 1993; Skocpol, 1992). Hospitals are considered to be a rational unitary decision-making bodies that select actions with the highest potential payoff (Allison & Zelikow, 1999; Simon, 1985).

This perspective suggests that hospital decision-making related to the implementation of an AMC service reflects the strategic goals, organizational objectives, and a value-maximizing activity of that organization (Allison & Zelikow, 1999; Simon, 1985). Within the hospital environment, however, there are sub-systems of internal stakeholders (e.g., providers, staff, patients) and external stakeholders (e.g., payers, regulatory bodies, community, government, industry) that may influence decisions; thus, hospital behavior is in constant tension with the values and needs of all the stakeholders. The Health Care Access Framework (Levesque, Harris, & Russell, 2013) provided the dissertation's theoretical scaffolding. The broader study, and this analysis, focused on the supply-side (e.g., everything but the patient) influencers on hospital OAT delivery.

## Methods

### Recruitment & Study Cohort

A two-wave purposive sampling technique recruited participants from the publicly available Addiction Medicine Foundation's list of accredited fellowship programs (The Addiction Medicine Foundation, 2018). For sampling wave one, the fellowship list was searched for the word "consult." Twenty-six fellowship programs were identified from this search, of those programs 25 were contacted with an invitation to participate (one program was excluded because the program director's email address was not provided). After exhausting the first recruitment sample, a second wave of sampling proceeded with the remaining 20 programs without the word "consult" in the program description (excluding the two Canadian programs and three programs primarily based at the Veteran Health Affairs Administration).

The potential key informants from 46 programs received email invitations for participation a minimum of once and a maximum of three times. The email invitation requested the contact information of the most appropriate person to speak with at their institution regarding hospital-based services for patients with SUDs (which could include themselves). Recommendations from dissertation mentors and respondent-driven recommendations supplemented recruitment. The final dissertation study cohort included 17 key informants from 16 U.S. hospitals. The findings from this study are a sub-analysis of this cohort, which includes 10 key informants from 9 U.S. hospitals with established AMC services.

## Data Collection & Tools

Participants completed 45-to-60-minute telephone interviews and provided information on their individual demographics (e.g., age) and hospital characteristics (e.g., OAT on the formulary). Interviews were electronically recorded and subsequently transcribed. Open-ended questions examined health service delivery patterns for persons with OUD and probed for hospital OUD treatment delivery policies, procedures, and practice. Items assessed the presence, development, and composition of an AMC service (e.g., “Does your hospital have an addiction consult service? If yes, when did the service start? What was the context or catalyst for this change?”, “What sorts of elements within your organization supported the start of the consult service?”). Oregon Health & Science University’s Institutional Review Board reviewed and approved the study protocol and authorized the use of an information sheet rather than a formal consent process [IRB #18092].

## Analysis

The key informant interview transcriptions were coded using a directed content analysis, an effective tool for studying social phenomena supported by existing theory (Hsieh & Shannon, 2005). *Dedoose* (SocioCultural Research Consultants LLC, 2016) a qualitative analysis software organized and managed the qualitative data and analytic process. A preliminary code book, created prior to data collection, was based on the conceptual framework and a review of the literature on the treatment of persons with OUD in the hospital context. The interview guide was updated during the analytic process to reflect emergent and specific findings in the data (Hsieh & Shannon, 2005). Transcripts were coded and re-coded in iterative cycles. Upon the completion of primary coding (KCP), a second coder (DM) reviewed the code book and the ten coded transcripts. Coding discrepancies were discussed and reconciled (KCP, DM). A second coding review (KCP) further organized, consolidated and identified final themes.

## Results

### Participant & Hospital Characteristics

Study participants were board-certified addiction medicine physicians (n = 10) from family medicine, internal medicine, obstetrics and gynecology, and pediatrics. The mean age was 47.1 years. The four women and six men were predominantly white (n = 9) and non-Hispanic or Latino (n = 10).

Hospitals were located in the west (n = 2), mid-west (n = 3), northeast (n = 3), and south (n = 1). Most hospitals were located in states with ACA expansion (n = 7) and three of the hospitals were located in states with Republican governors. Five hospitals had affiliated or onsite addiction related services (e.g., opioid treatment programs [OTPs] and/or detoxification beds). Two hospitals had both OTPs and detoxification beds, one hospital had only an OTP, two hospitals had only dedicated detoxification beds, and four hospitals had neither. All hospitals had methadone and buprenorphine available for the OUD treatment.

## Addiction Medicine Consult Service Design & Operation

Commonalities and differences among AMC service structure, design, and operational elements were observed across four care delivery domains: 1) availability and coverage, 2) home department and team composition, 3) scope and responsibility, and 4) financing.

**Availability & Coverage.**—The nine AMC services provided in-person consults on weekdays and only one AMC service provided in-person consult on the weekend. The AMC service with weekend availability was staffed through the psychiatry consultation liaison service using trainees to provide weekend consults. The informants, in general, were frustrated with the limited AMC service availability because patients admitted or discharged over the weekend were not receiving life-saving addiction-related services:

...the good news is that we probably see at least 80% of [requested] consults ...the overwhelming reason we do not see someone...was that the patient was already discharged by the time the consult [team] was available. People who come in on Friday night and discharged Sunday...

These delivery limitations were predominantly due to staffing resources, workarounds included taking 'home consult' via pager, however, the use of home call did not mitigate the caseload post-weekend. An informant noted that after taking pager call over the weekend that: "Monday's are brutal. Totally brutal. We miss people and we...[have] a wall of consults."

Three of the nine AMC services provided consultation in the emergency department (ED). Study participants described ED consultation as an emergent and important care design and delivery issue. To be a "real" consult service, respondents believed that the AMC service should provide consultation in the ED and that service delivery in the ED was essential for improving care for persons with SUDs. Barriers to implementing ED consultation were primarily due to limited staffing resources and related to a lack of knowledge among ED staff about OUD treatment approaches and policies.

**Home Department & Team Composition.**—The AMC services existed within the family medicine, medicine, or psychiatry departments, or more than one department (e.g., psychiatry and medicine departments). Eight AMC services had a dedicated consult service staffed with addiction medicine physicians and one AMC service was part of the psychiatry consultation liaison service. Physician staffing resources varied. One service had access to over a dozen addiction medicine board-certified physicians and others services relied on a single addiction medicine trained physician. Medical trainees were common members of the AMC service, from all levels of training: addiction medicine fellows, resident physicians, and medical students.

Eight of the nine services were interprofessional. The most common non-physician team member were nurse practitioners (n = 4) and social workers (n = 4); less common members included alcohol and drug counselors (n = 2), physician assistants (n = 2), psychologists (n = 2), and peers (people in recovery trained to support others in recovery) (n = 1). Important organizational elements related to interprofessional team composition included the growth and change of the team over time, the need for role clarity among interprofessional team



members, the different approaches to physician staffing models, how to involve trainees in the service, how to include peer support specialists on the team, and how to manage the service. One participant stated that:

When thinking about scaling up to other area hospitals something to consider is who is going to be the medical provider. There is a lot of stuff around role clarity and what is the role of the addiction consult service social workers and the floor social workers...

Although not commonly a part of the AMC services assessed in this study, informants shared that peer support specialists were an emergent (and hopeful future) team member:

Yes... [the hospital has approved the idea of using peers and] we are going to find someone who can help patients stay in the hospital and help engage them...we have a lot of homeless patients using substances, [help them] navigate to residential program or better residential setting, while at the same time working with their outpatient medication assisted treatment provider.

Only one hospital had peer support specialists on their service at the time interview. The informant shared that the inclusion of peer support specialists on the AMC service created cultural and logistical challenges because peers were “unlicensed individuals.” Hospital staff unaffiliated with the AMC service were not used to having “fierce advocates” at the bedside. Overtime, the support for the peer support specialists among hospital staff grew as staff acknowledged that peers were uniquely equipped to provide de-escalation services and engage patients to stay hospitalized and remain in care.

**Responsibilities & Scope.**—Three primary AMC service responsibilities were identified: 1) provision of SUD-related treatment education to trainees, providers, and hospital staff; 2) delivery of psychosocial and medical services (e.g., motivational interviewing, pharmacotherapy, linkage to care); and 3) development of hospital guidance documents and policies (e.g., order sets, guidelines, and protocols).

**Education & Culture Change.:** Hospital-wide education related to OUD and SUD treatment was a prominent and important AMC service responsibility. Informants shared that AMC sponsored OUD and SUD treatment education and awareness facilitated culture change for hospital staff:

It has been quite impactful in terms of shifting providers views around the issue of addiction and also helping providers alleviate that “moral distress”... through treatment we can change culture and providers who were really struggling with how to care for people with [substance] use disorders feel so much more supported...by having the right teams in place in the hospital we can really change the hospital experience not just for patients but for the providers.

I think there is a morale booster, both for us and our colleagues. And then it just raises the profile of addiction in general when there is a consult service identified with it.

The existence of an AMC service enhanced hospital staff understanding that OUD should be treated within the medical context, as one participant said:

It [substance use disorder] is being recognized as a medical problem, so when there is a consult service, I think that validates that it is being treated more like how other medical problems are being treated.

Further, AMC service team members spent time debunking common misconceptions around federal OUD treatment policy in the hospital. An informant shared how emergency department physicians at their hospital believed it to be illegal to provide methadone for withdrawal:

I am going to talk at the [emergency] department meeting and explain that it is in fact legal and humane to treat withdrawal and that is how you can do it safely. There are really big gaps in knowledge.

Informants frequently observed these misconceptions among other hospital staff:

There is still the perception on the part of many providers that somehow it is illegal to engage in that practice [administer methadone in the hospital] .... [the] pharmacy has been a barrier, when suboxone or methadone-based maintenance and taper regimen has been ordered and the pharmacist says you can't do that, that is illegal.

But then also this idea that somehow you need a special license to prescribe methadone. There is a lot of misconception there. False ideas of course.

...The perception is that a provider making the order, even in the hospital setting, needs to have the DATA waiver to prescribe administer a buprenorphine product for that indication...

**Service Delivery.:** Generally, AMC services provided five common core services: 1) mental health and SUD assessments; 2) psychological intervention; 3) the medical management of SUDs (e.g., clinical activities related to pharmacotherapy initiation, continuation, and discontinuation of OAT, and the management of benzodiazepine and alcohol withdrawal); 4) the medical management of pain, and 5) linkage to care (e.g., referrals to treatment, care pathways, and bridge clinics). The AMC service was a key organizational mechanism for OAT delivery and other OUD-related services in the hospital. Variation in service provision among the other services occurred because of different interprofessional team compositions within each service. The psychological techniques described were dependent on staff training and disciplines represented on the team: brief intervention, cognitive behavioral therapy, dialectical behavioral therapy, and motivational interviewing. Some services described the provision of explicit harm reduction activities, specifically, the distribution of naloxone kits and overdose education, counseling on syringe exchange, and allowing patients to smoke:

One of the things I have had to learn. Is to prioritize our goals... You want to make sure somebody isn't going to die of a heroin dose when they leave, you want to make sure they complete their antibiotic course for endocarditis. So, we really focus on those things. And sometimes that means letting smoking slide. If for example the thing that is keeping them in the hospital is going out and smoking



every day, you let them go out and smoke. It is not ideal. But it is a first things first harm reduction approach and that has been a learning process for me.

Informants placed a strong emphasis on the fifth core element, linkage to care, as an essential and distinctive AMC responsibility. Informants described the use of four linkage to care modalities: 1) writing a bridge script; 2) referring to community-based services 3) admitting to a transition program; and 4) transferring to another health system's bridge clinic. Bridge scripts were a common approach. A bridge script occurred when an inpatient physician wrote a prescription for buprenorphine or buprenorphine/naloxone to "bridge" the patient until they established care with a community-based provider. Other linkage to care approaches included providing referral to community-based services. Referrals were primarily the responsibility of the case manager and social workers to obtain appointments in the community-based setting and to schedule intake appointments for direct transitions into residential treatment upon discharge.

Other less commonly used approaches were the use of transition programs and bridge clinics. The transition programs were described as "rapid access" and "reach-in" interventions, meaning that a community-based provider visited the patients during hospitalization to prepare them for discharge to their outpatient program. Further, only one hospital had an operational bridge clinic at the time of interview. The bridge clinic transitioned patients (during a two-week window) to an outpatient community-based provider for continued OAT. Both types of programs, transition and bridge clinics, were developed in collaboration with external partners.

The flow and standard work of service delivery processes were hospital specific, dependent on the addiction-related resources and technologies available (e.g., addiction trained staffing) and the knowledge base of non-addiction trained providers within the hospital (e.g., normative social structures). One approach, shared by two of the AMC services, was the creation of consult categories based on the different types of providers on the team. One type of consult was for a visit from a behavioral health provider (e.g., social worker) and the other type of consult was a consult from a clinical provider (e.g., physician).

**Hospital Policy Development.** The third category of AMC service responsibility was the expertise and leadership of the AMC service in the creation and implementation of hospital-wide guidance documents such as order sets, guidelines, and protocols related to the treatment of OUD. Typically, the AMC service leadership worked closely with pharmacy and therapeutics (P&T) committee, and other internal stakeholders, to ensure that OAT was available on the hospital formulary, and that standard procedures were in place for the administration of hospital OAT:

The addiction consult service took the lead in partnering with pharmacy and therapeutics committee to make sure we had access to buprenorphine, extended-release naltrexone, methadone, on the floors, wrote protocols for how those medications are used, just in terms of medical protocols that was helpful, similarly there have been protocols around urine, toxicology screening, behavioral agreements for patients having a difficult time sticking around, there has also been some interesting evolution of hospital administration view of security.

**Financing.**—A common concern across services, was planning for and acquiring financial resources, which consistently constrained or facilitated AMC service existence and operation. The AMC services were financed through a creative patchwork of financial streams—grants, in-house funding, third-party billing revenue, state funding, and fellowship funding. Some AMC services operated as pilot programs with grant funding from the hospital or an external organization (e.g., third-party payer). Many services received in-house funding, specifically for the salaries of the clinicians, and/or the funding of the addiction medicine fellowship slots—these funds were procured from either a specific department (e.g., medicine or psychiatry) or from hospital operations. In addition, some of AMC service operating funds came through revenue generated through billing third-party payers: “We bill just like any other consultant.” Services also received funding from state health care reform funds (e.g., accountable care organizations) and state indigent funds. A summary of the shared and different structure and design elements of AMC services are in Table 1.

## Discussion

### Study Implications

Although the existence of AMC services, in the published literature, dates over 20 years, relatively little is known about service care delivery mechanisms or the number of U.S. AMC services in existence. Through our sampling, we observed the existence of more AMC services (9 established, and 5 soon to be implemented) than the previously reported number of 5 (Weinstein et al., 2018). Future survey-based and multi-site research would help to characterize and provide a better understanding of the number of U.S. AMC services and the role of AMC services in other hospital contexts. A multisite research opportunity is forthcoming in the fall of 2018 as New York city is launching a multi-site AMC service program with six AMC services at six different hospitals by the end of 2019 (DeBlasio, 2018).

Two of the AMC services in this study cohort operated for decades, but most programs were established relatively recently; thus, facing ongoing challenges such as limited staffing and uncertain financing. Only one of the services provided weekend consults and most services had insufficient staffing to support care in the ED. The treatment of OUD in the ED is of interest to policymakers and hospital administrators because the number of patients visiting the ED with OUD-related issues is increasing (Weiss et al., 2016). OAT initiation is feasible and effective in the ED setting (D’Onofrio et al., 2017; D’Onofrio et al., 2015). Further, federal policymakers are considering legislation—*H.R.5176: Preventing Overdoses While in Emergency Rooms Act*—to provide financing for hospitals to develop services for patients who present following an opioid overdose (McKinley, 2018). Another policy approach, recently enacted in Massachusetts through House Bill 4866, *Prevention and Access to Appropriate Care and Treatment of Addiction*, is the requirement of hospitals to offer and provide evidence-based OAT for patients who seek care in the ED after an opioid overdose (Amendment H.4866, 2018). Similar legislation could be passed in other jurisdictions and could be expanded to include requiring hospitals to offer OAT to patients who are

hospitalized with a concurrent OUD. Addiction-related expertise, provided by the AMC service, could support the roll-out of these efforts in ED.

Interprofessional AMC services were common, most often including social workers and/or case managers. Health services research supports the use of interprofessional teams in the hospital context to deliver more effective care (Epstein, 2014). Further, the inclusion of peer support specialists as team members was an idea that several of the AMC services were contemplating but only one service had implemented at the time of interview. The use of peer support specialists as members of the AMC team is an emerging challenge. Licensed professionals, and hospital administrators are reluctant to add unlicensed individuals to teams and peer support services are not always billable (payer and context dependent). Although no studies have randomized AMC services to include or not include peers, evidence supports the use of peer support specialists for addiction related recovery in other care delivery contexts (Bassuk et al., 2016).

AMC service roles and responsibilities have been previously described to extend far beyond the traditional “health service delivery” model (e.g., medical and psychiatric management) (Weinstein et al., 2018). Our study supports this assertion, we observed that AMC services were active in the development of hospital guidance documents and policies related to the treatment of OUD and more broadly other alcohol and other drug use disorders. The existence of AMC services within the hospital setting elevated and integrated the concept of addiction treatment and management within the medical framework and the AMC services had a significant role in formal and informal hospital culture change, decreasing stigma among providers, and enhancing the quality of care and the effectiveness of care for persons with addictive disorders. Some of these educational efforts included time-spent debunking myths related to the legality of OAT provision in the hospital, an effort that should be led by federal agencies, in particular the Drug Enforcement Administration (DEA). In Title 21, Code of Federal Regulations, Section 1306.07(b) and (c), explicitly outlines the legality of providing OAT in the hospital under the 72-hour rule (DEA, 2005). This rule, which only applies to a patient who is primarily admitted for OUD withdrawal, allows the administration of OAT in the hospital for up to 72-hours (DEA, 2005). Further, if a patient is hospitalized for any other primary condition there are no limitations to OAT provision:

*This section [Section 1306.07] is not intended to impose any limitations on a physician or authorized hospital staff to administer or dispense narcotic drugs in a hospital to maintain or detoxify a person as an incidental adjunct to medical or surgical treatment of conditions other than addiction, or to administer or dispense narcotic drugs to persons with intractable pain in which no relief or cure is possible or none has been found after reasonable efforts (DEA, 2005).*

The DEA has previously provided clarification on this federal rule (Nagel, 2002), but the findings from this study suggest that confusion about these rules, and basic federal OAT delivery policies persists. The DEA, can and should provide new messaging on the legality of treating patients with OUD using OAT during hospitalization and include this information in any documentation or re-licensing information related to a provider’s general DEA license.

Financing consistently informed and constrained the other service delivery domains. Generally, informants shared that the AMC service business case was made through a cost-savings approach rather than a revenue generation strategy, asserting that the delivery of effective OUD services during hospitalization decreased treatment disengagement (e.g., leaving against medical advice) and rapid readmission (and the financial penalties associated with readmission rates). Policy strategies, to be considered by the Centers for Medicare and Medicaid (CMS), could provide some relief from the revenue generating constraints of the AMC service. CMS could increase reimbursement for OUD and/or SUD related Diagnostic Related Group (DRG) algorithms. Another approach could include requiring hospital coders/billing to specifically report on OAT delivery during admission using the Healthcare Common Procedure Coding System, this is necessary because DRG bundling masks the ability to see if OAT was delivered during admission—problematic for those interested in monitoring the quality of care delivered during hospitalization (third-party payers and researchers). CMS could also incentivize hospital-related addiction services through financial bonuses and penalties by including OUD and/or SUD related treatment metrics to hospital-based pay-for-performance programs such as the Hospital Value-Based Purchasing Program (CMS, 2017) or the Hospital Readmission Reduction Program (CMS, 2018).

### Study Limitations

The main limitation of this study is transferability. The hospitals with AMC services in this study were based predominantly in academic health centers that offered a continuum of services for persons with OUD. Findings are less likely to be applicable to smaller rural hospitals with less resources and expertise for addressing OUD. Many of the participating hospitals had addiction-resource rich environments, hospital leadership who understood addiction treatment in the medical context, and funding for research related to addiction services. Study findings, nonetheless, outline the basic delivery design of AMC services that could be tailored to meet the needs of different hospital environments.

### Conclusion

As OUD-related hospitalizations increase, and the opioid overdose epidemic continues, providers, administrators, and policymakers may seek to decrease length of stay, decrease readmissions, and improve care for persons hospitalized with OUD. The findings from this study suggest that innovative care delivery mechanisms, such as the AMC service, may facilitate achieving these aims. Effective AMC services require a champion for addiction medicine, an interprofessional staff that includes nurse practitioners and social workers, and adequate financing. Understanding the fundamental design and operational elements of an AMC service and the different approaches to service structure and design is a necessary first step for programs interested in implementing or expanding these services.

### Acknowledgements

We are grateful for the time, knowledge, and expertise shared by our study participants and their commitment to providing compassionate and evidence-based services to people with drug use disorders. Awards from the National Institute of Drug Abuse (F30- DA044700UG, UG1 DA-015815) supported the implementation and completion of the study. The Greenlick Family Scholarship Fund provided additional support.

## Sources of Support

Awards from the National Institute on Drug Abuse (F30 DA044700UG, DA015815) supported the design, implementation, and analysis of this study and the Greenlick Family Scholarship Fund.

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**Table 1.**

The AMC Service: Shared and Different Structure & Design Themes

Domain	Commonalities	Differences
<b>Availability &amp; Coverage</b>	<p><i>When services are delivered</i></p> <ul style="list-style-type: none"> <li>• Staffed weekdays but not weekends</li> </ul>	<p><i>Where services are delivered</i></p> <ul style="list-style-type: none"> <li>• The emergency department</li> </ul>
<b>Team Composition</b>	<p><i>Diverse team membership</i></p> <ul style="list-style-type: none"> <li>• Interprofessional team composition</li> <li>• Inclusion of trainees</li> </ul>	<p><i>Disciplines represented</i></p> <ul style="list-style-type: none"> <li>• Nurse practitioners</li> <li>• Social workers</li> <li>• Alcohol &amp; drug counselors</li> <li>• Physician assistants</li> <li>• Psychologists</li> <li>• Peer support specialists</li> </ul>
<b>Scope &amp; Responsibility</b>	<p><i>Three domains of responsibility</i></p> <ol style="list-style-type: none"> <li>1. Education and culture change</li> <li>2. Psychosocial and medical services                             <ul style="list-style-type: none"> <li>• Mental health and SUD assessments;</li> <li>• Psychological intervention;</li> <li>• Medical management of SUDs (i.e., clinical activities related to pharmacotherapy initiation, continuation, and discontinuation of OAT, the management of benzodiazepine and alcohol withdrawal)</li> <li>• Medical management of pain</li> <li>• Linkage to care (i.e., referrals to treatment, care pathways, bridge clinics).</li> </ul> </li> <li>3. Hospital guidance document development</li> </ol>	<p><i>Services available</i></p> <p>Availability of psychological techniques</p> <ul style="list-style-type: none"> <li>• Brief intervention, cognitive behavioral therapy, dialectical behavioral therapy, and motivational interviewing.</li> </ul> <p>Harm reduction services</p> <ul style="list-style-type: none"> <li>• Naloxone kit distribution; overdose education, counseling on syringe exchange; allowing patients to smoke</li> </ul>
<b>Financing</b>	<p><i>Nature of funding</i></p> <ul style="list-style-type: none"> <li>• Complex and uncertain</li> </ul>	<p><i>Funding sources</i></p> <ul style="list-style-type: none"> <li>• External grants, in-house financing, third-party billing revenue, state funding, and addiction medicine fellowship funding</li> </ul>