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Caring for pregnant opioid abusers in Vermont: A potential model for non-urban areas

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ABSTRACT

Opioid addiction is no longer a primarily urban problem. As dependence on heroin and prescription pain relievers has become a significant issue in rural areas, the need for effective treatment of opioid-dependent pregnant women and their neonates has grown accordingly. In addition to the adverse perinatal outcomes associated with opioid addiction in pregnant women, the high costs of caring for these mothers and their babies motivate efforts to develop appropriate treatment models. We found that integration and coordination of services that promote maternal recovery and ability to parent are key requirements for treatment of opioid dependence during pregnancy. Unfortunately, lack of experience and resources makes such coordination a real challenge in rural areas. In this review, we discuss how we managed the challenges of developing a comprehensive program for treatment of opioid dependence during pregnancy. In addition, we outline our approach for facilitating the development of community-based programs to help these patients and families in rural regions of Vermont. Close relationships between our tertiary care center, local hospitals, community health care infrastructure, and legislators bolstered our efforts. In particular, appreciation for the severity and importance of the opioid-dependence problem in Vermont among health care providers and state legislators was paramount for our success in developing a state-wide treatment program. This approach can inform similar efforts in other rural regions of the United States, and has great potential to improve both access and quality of care for women struggling with opioid dependence.

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Background

Opioid addiction is a growing public health concern that has reached epidemic proportions in the United States (U.S.). Results from the 2013 National Survey on Drug Use and Health document a 40% increase between 2002 and 2013 in the self-reported use of heroin in the past year from 404,000 to 681,000 users. An additional 11 million people reported non-medical use of prescription pain relievers (SAMHSA, 2013). Following these trends, antenatal opioid use increased 5-fold from 2000 to 2009, while treatment for neonatal abstinence syndrome (NAS) increased 3-fold over the same period (Patrick, 2012). The association with higher neonatal morbidity, prolonged hospital stay, and significantly increased neonatal care costs motivates interest in addressing opioid dependence during pregnancy.

The demographics of opioid dependence have changed with its increased prevalence. Whereas heroin abuse in the U.S. has long been centered in cities, a recent large-scale study of heroin users indicated that 75% were in small urban or non-urban areas compared to 25% in larger urban areas (Cicero, 2014). We have observed a similar shift in Vermont, where opioids are the primary substance of abuse for over half of patients admitted for substance abuse treatment and opioid-related deaths have doubled from 2004 to 2013 (Vermont Department of Health, 2014a, b).

There is clear consensus that medication-assisted treatment (MAT), including opioid agonist therapy (OAT), is the most effective treatment for opioid dependence (Connery, 2015). Methadone, prescribed through opioid treatment programs (OTP), and more recently buprenorphine, prescribed in physician offices, have both been shown to reduce illicit drug use and increase retention in treatment programs. MAT is also effective in pregnancy; methadone maintenance is associated with improved prenatal care, fetal growth, and fewer preterm births (Jones, 2012). Physiologic stability that results from fewer repetitive cycles of opioid use and withdrawal may contribute to the beneficial effect of OAT among pregnant women.

Despite the undisputed efficacy of MAT, demand for treatment exceeds capacity in the U.S. (Peles, 2013) and access remains a significant barrier to MAT. This is especially true in rural areas, where access is further complicated by geography, long travel distances requiring time, money, and transportation (Sigmon, 2014). Pregnancy exacerbates these barriers, as obstetric and neonatal care must be coordinated with addiction treatment services.

This report presents the challenges encountered and reviews the interventions that were needed in developing and expanding MAT

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programs for pregnant women and their newborn babies in Vermont. Specifically, our model addresses four key barriers we encountered as we implemented community-based care in Vermont:

(1) Inadequate access to treatment for opioid-dependence in the community.
(2) Limited options for MAT during pregnancy.
(3) Lack of expertise among providers caring for opioid-dependent pregnant women and their opioid-exposed neonates.
(4) Insufficient resources to care for opioid-exposed neonates in low volume obstetric hospitals.

We review our approach to developing a multidisciplinary program, including disseminating program elements to smaller communities and hospitals throughout Vermont.

Inadequate access to treatment for opioid-dependence in the community

Opioid addiction is a chronic, relapsing disease. Long term OAT increases the duration of abstinence from illicit opioids and increases retention in treatment programs compared to detoxification and short term MAT (Fiellin, 2014; Mattick, 2009). The current inadequate number of treatment slots is a major limitation to offering maintenance therapy for opioid dependence. In 2013, nearly 6 million individuals in the U.S. needed specialty treatment for illicit substance use (SAMHSA, 2013); the same year, nearly 1000 people were on a waiting list for methadone treatment in Vermont (Vermont Department of Health, 2013). Such prolonged wait times for treatment increase the risk for hepatitis, HIV, overdose, or death (Sigmon, 2014).

Medication options

Medication-assisted treatment for opioid dependence includes opioid agonists (methadone, levo-alpha-acetylmethadol), partial opioid agonists (buprenorphine), antagonists (naltrexone), and medications to assist detoxification (alpha-2 adrenergic agonists). Methadone is a full mu opioid agonist with a long half-life; a single dose reduces withdrawal symptoms for 24 h. This pharmacologic property allows for daily, observed dosing in federally regulated opioid treatment programs (OTP). Most programs have integrated counseling and ancillary services on site, a feature that is integral to their success (NIH, 1998). Expansion of methadone treatment is limited by the space and personnel required to provide such intensive services. In rural areas, the OTP model is further limited by the cost of travel and the duration of travel time, which can create difficulty with employment (Sigmon, 2014).

Levo-alpha-acetylmethadol (LAAM) is a longer-acting derivative of methadone, with similar efficacy. Initially a promising option, use was abandoned due to safety concerns related to prolongation of the QT interval (Stotts, 2009).

Buprenorphine is a mu opioid partial agonist, also with a long half-life allowing for daily dosing. Because of combined agonist/antagonist properties, there is less risk of respiratory depression compared with methadone (although either can be fatal when combined with benzodiazepines or alcohol) (Bonhomme, 2012; Schuman-Olivier, 2013). In 2000, the U.S. Congress passed the Drug Addiction Treatment Act, which provided the legal basis for office-based treatment for opioid dependence. Physicians must apply for waivers and receive specific DEA numbers linked to buprenorphine prescribing (SAMHSA, 2015a). The most common formulation of buprenorphine is a tablet or film combined with naloxone. Naloxone, an opioid antagonist, lacks bioavailability when administered sublingually, as directed, but can precipitate opioid withdrawal symptoms if injected or snorted. This combination of buprenorphine and naloxone was developed to reduce diversion or misuse (Orman and Keating, 2009).

Medications to alleviate symptoms of acute opioid withdrawal during detoxification block sympathetic over-activity and anxiety (clonidine, antihistamines). Following detoxification, opioid antagonists may be used to block the reinforcing properties of opioids to prevent relapse (Stotts, 2009). Naltrexone is a mu opioid-antagonist available as an oral daily medication, monthly intramuscular depot, or subcutaneous sustained release reservoir formulation. Data regarding efficacy of naltrexone are mixed; although the treatment retention rate of oral naltrexone is poor, the sustained release formulations reduce illicit opioid use with high rates of compliance (Krupitsky, 2011). Such sustained release formulations would make this an excellent choice for rural areas, although more data are needed to compare efficacy of naltrexone versus opioid agonists before widespread recommendations can be made (Bart, 2012). Increased mortality associated with relapse following detoxification or cessation of naltrexone remains a safety concern (Evans, 2015).

Medication expansion

Nationally, improved access to both methadone and buprenorphine was key in the expansion of MAT for opioid addiction. Mobile units that are fully equipped to provide OTP activities, including medication and counseling, have been shown to increase access in disenfranchised urban populations (Hall, 2014). BAART Behavioral Health Services (BBHS), for example, is a mobile methadone program first developed in the San Francisco area, which is now providing care across the country. Initial expansion of OTP into rural areas of Vermont utilized these mobile units, which increased access from one treatment center serving 100 patients in 2002 to three treatment sites serving 290 patients by 2006, providing OAT 100 miles from the major treatment center. As of 2013, approximately 450 individuals were receiving methadone or buprenorphine treatment through 2 mobile units (Vermont Department of Health, 2013). While the mobile OTP model expanded services, daily dosing is still required and can be a barrier to treatment.

Buprenorphine prescribed in the office setting provides greater flexibility with patient travel and scheduling demands. With recognition that expansion of medication options and community-based care were required to address the growing opioid abuse problem in Vermont, physicians in rural Vermont became early adopters of office-based treatment with buprenorphine. In a recent poll of family physicians in Vermont and New Hampshire, nearly three quarters reported that they felt a personal responsibility to treat opioid addiction (DeFlavio, 2015). From 2002 to 2006, Vermont expanded MAT from virtually no buprenorphine to approximately 400 patient treatment slots. Office-based prescribing has not been without challenges. In particular, concerns about medication diversion arose. Careful analysis revealed that diverted buprenorphine was often used for prevention of withdrawal rather than recreational use (American Association for the Treatment of Opioid Dependence, 2014; Monte, 2009), reinforcing the need for additional MAT access. Vermont implemented a Care Alliance initiative between the agencies of Drug Abuse and Prevention (ADAP) and the Department of Vermont Health Access (DVHA). Initiated in 2013, these agencies collaborated to create a coordinated, systemic response to opioid (and other) addictions. The key components included the modalities above (OTP, mobile methadone, office-based buprenorphine) but also included an administrative structure that facilitates patient transition based on the acuity of care. This model creates a HUB within the regional OTPs for the highest acuity patients in need of extensive daily services and a SPOKE for the office-based treatment of the stable patient. The strength of this model lies in the ability of patients to move easily between treatment programs as addiction symptoms improve or relapse. Further actions to improve access under consideration include smaller HUBS in the pharmacy or office, although legislative changes would be needed for execution (Vermont Department of Health, 2014c). Overall, these models address the lack of psychosocial and mental health supports identified as the

major barriers to office-based buprenorphine prescribing (Hutchinson, 2014).

In summary, the model used to improve access for medication-assisted treatment included expansion of existing services in OTP, early adoption of new medications such as buprenorphine, and collaboration between providers and the legislature to develop community and regional systems to facilitate treatment access at the patient level. A detailed description of the state approach to expansion of MAT is available (Vermont Department of Health, 2014c).

Limited options for MAT during pregnancy

During pregnancy, MAT choices for opioid dependence are limited. LAAM, even when available, was not used in pregnancy due to maternal and post-implantation toxicity (York, 2002). Small studies suggest that sustained-release naltrexone, which is orally bioavailable, may be an effective treatment but concerns of in-utero opioid antagonism have hindered its use (Jones, 2013). Detoxification can be effective in select settings to reduce neonatal exposure (Stewart, 2013), but high relapse rates are reported, even in residential programs. On the other hand, early studies suggested that methadone treatment during pregnancy was associated with improved birthweight and lower rates of prematurity compared to ongoing heroin use (Finnegan, 1978). More recent data supports OAT with methadone during pregnancy to improve rates of prenatal care, lessen the duration of neonatal abstinence, and increase the number of neonates discharge to the care of their mother (Buckley, 2013). Despite federally mandated priority access to OTPs for pregnant women (SAMHSA, 2005), travel to the OTP remains a barrier to treatment. In Vermont, the average travel time to an OTP is 1 h (Sigmon, 2014). This is often prohibitive for pregnant women who may be the only caregiver for other young children or have work obligations.

The first report of four neonates born to women prescribed burprenorphine came from Belgium (Reisinger, 1995). All neonates were appropriately grown and delivered at term; one may have had delayed symptoms of withdrawal. Other reports of buprenorphine treatment during pregnancy soon followed (Fischer, 2000). In the U.S., buprenorphine use during pregnancy became more widely accepted after less severe neonatal abstinence was observed in the infants exposed to buprenorphine compared to methadone in a randomized trial, the MOTHER study (Jones, 2010). It is notable that while most studies in pregnancy have examined buprenorphine monotherapy (without naloxone), a small study found no difference in pregnancy outcomes with combination buprenorphine/naloxone compared to monotherapy (Wiegand, 2015). Although neither methadone nor buprenorphine is approved for use in pregnancy by the FDA, opioid agonist therapy is recommended for medication-assisted treatment during pregnancy (Jones, 2012).

Lack of expertise among providers caring for opioid-dependent pregnant women and their opioid-exposed neonates

An experienced multidisciplinary team is recommended to adequately care for opioid-dependent pregnant women and their opioid-exposed neonates. In Vermont, the effort to coordinate multidisciplinary care began in 2002 with obstetricians, pediatricians, and specialists in addiction medicine. At this time, patients throughout Vermont were referred to the one OTP and one high risk pregnancy/neonatal care unit in the state (although some Vermont patients went to the OTPs or high risk pregnancy/neonatal care units in adjoining states for proximity). Given the favorable short- and long-term outcome data on the use of methadone in pregnancy, women entering the program were initiated on methadone therapy. Patients currently treated with buprenorphine were offered transition to methadone therapy during pregnancy. Those that declined continued their buprenorphine therapy. Care was coordinated through a series of increasingly structured meetings with the limited physicians, nurses, and social workers involved in the care of treated patients.

As the program grew and the number of enrolled patients increased, the state offered increasing support. Multidisciplinary meetings expanded to include a skilled facilitator, visiting nurses, social workers, and representatives from child welfare and the judicial system. The inclusion of child welfare agencies and the judicial system required the development of a Memorandum of Understanding signed by all agencies to act in the best interest of mother and child. Coordinating care required substantial sharing of sensitive information, for which patient consent was requested (90% of enrolled patients provided consent). Two Vermont statutes were passed that further supported the group's mission. The first allowed the development of a group of empaneled professionals to share relevant patient-specific information for the purpose of child safety. The second allowed the initiation of a child safety investigation within 30 days of expected delivery for women with substance abuse who were not in a treatment program. As the program matured, collaborative consensus guidelines were developed that outlined the necessary elements of care from each specialty (obstetrics, pediatrics, and addiction medicine). These guidelines were then published on a state website for easy access by any provider (Vermont Child Health Improvement Program, 2015). The result of this collaboration was a multidisciplinary program that could be replicated in other communities. Details of the development of this team were recently reviewed (SAMHSA, 2015b).

The development of this multidisciplinary approach was coincident with increased use of buprenorphine during pregnancy. Buprenorphine was initially offered only to those patients who were stable in treatment prior to pregnancy and declined transition to methadone through the OTP. In 2004, only 17% (4 of 24 pregnant patients in MAT) of pregnant women in our program were treated with buprenorphine but by 2006 this number increased to 37% (19 of 51 patients) and by 2011, 75% (57 of 76) of our patients were treated with buprenorphine, almost half of whom began treatment prior to pregnancy. Most women were prescribed buprenorphine in the obstetric clinic, which facilitated the coordination of prenatal and addiction care. The combination of the multidisciplinary group and office-based practice provided promising results: patients were engaged in treatment at an earlier gestational age, more women were in treatment prior to pregnancy, fewer infants needed treatment for neonatal abstinence symptoms, and more infants were discharged home and in the care of their mother at one year of age (Meyer, 2012).

Consistent with data from the MOTHER study, maternal and neonatal outcome in our cohort supported the use of buprenorphine during pregnancy (Meyer, 2015). In our cohort, buprenorphine treatment during pregnancy was associated with increased gestational age at delivery, improved birth weights, reduced rates of preterm birth, a 50% reduction in need for treatment for NAS, and, for those that required treatment, less medication for abstinence symptoms compared to methadone treatment. Our cohort differed from the MOTHER study in two significant ways, however. First, treatment was not randomized; women were treated with the medication that was best suited for the patient based on disease acuity and medication access. The second difference was the method of buprenorphine induction. In the MOTHER study, buprenorphine was initiated at relatively high doses with the onset of mild withdrawal symptoms (average CINA score 4) (Holbrook, 2013). In contrast, in our cohort, women were prescribed buprenorphine only after demonstrating moderate withdrawal (average CINA score 10) in an inpatient induction. The starting dose of buprenorphine was 2 mg which was slowly titrated in 2 mg increments until the patient had minimal symptoms. This induction method was similar to that used with methadone in our institution. Compared to a 30% drop out during buprenorphine induction in the MOTHER study, no patients in our cohort requested a change to methadone during induction; only 2.2% (3/137) requested a change from buprenorphine to methadone later in pregnancy due to medication dissatisfaction.

Overall, these results further support the feasibility, safety, and efficacy of an office-based approach to treatment during pregnancy.

Initiation of office-based therapy was begun with a small core of providers. This approach overcame the limitations each provider group had in treating pregnant patients with opioid-dependence. These core providers also attended facilitated meetings that coordinated services, developed practice guidelines, and tracked outcome measures. Although the care model was developed largely in the tertiary care center, the treatment approach was shared with referral providers. This familiarity with the multidisciplinary program provided the framework for community hospitals to consider building similar programs.

Insufficient resources to care for opioid-exposed neonates in low volume obstetric hospitals

Community hospitals and treatment programs began to express interest in keeping patients in the community during pregnancy and delivery. Collaborative work with smaller communities began in 2006 to identify the local resources that could be coordinated to allow the provision of treatment for opioid-dependence, obstetric, and neonatal care. Education and training sessions occurred formally (on site) and informally (phone consultations), using the established treatment guidelines previously developed. Locally, these teams partnered existing community health centers, community substance abuse treatment centers, and local healthcare providers. The primary focus of our assistance was to "adapt" rather than "adopt" our approach, encouraging communities to work together to identify unique needs (Sorensen, 2011). Using this approach, 7 additional community treatment teams were developed within the state. These teams provided the infrastructure to coordinate counseling, medication treatment, and obstetric and newborn care for opioid-dependent mothers and their neonates. This has reduced the distance between adjacent treatment hospitals to less than 70 miles.

Discomfort in the diagnosis and treatment of neonatal abstinence symptoms was a major barrier for community hospitals. A neonatologist and nurse from the tertiary care center provided on-site training for all medical and nursing providers in the assessment of the opioid exposed newborn. Computer-based and video trainings (including the creation of a DVD reviewing neonatal abstinence symptoms) provided further instruction in NAS scoring. Some hospitals requested additional training for the medical management of neonatal abstinence with morphine sulfate; others chose to assess neonates for NAS and transport only when medication was needed. At this time, providers in four community hospitals in Vermont treat neonatal abstinence syndrome.

We have observed a transition from tertiary to community-based care for the pregnant woman and her neonate. The number of women that remained in their community for pregnancy and delivery doubled from 2010 to 2014, from 2.5% (88/3266) to 5.7% (216/3440). Over the same time, opioid-exposed infants assessed in community hospitals for NAS due to illicit opioid exposure (as opposed to maternal treatment) decreased from 27% (24/88) to 18% (39/216) and fewer infants were transported to a tertiary care center for NAS evaluation or treatment (10.1% (25/216) vs. 37.5% (16/88)) (unpublished, Vermont Department of Health, 2015 Perinatal Statistics Report).

Conclusions

Comprehensive care for the treatment of opioid-dependence for the pregnant woman and her neonate can be achieved in a small community-based setting. We have outlined both specific and general approaches other communities can consider as they care for pregnant women and their neonates. Our tools improved access to MAT in smaller communities, developed protocols for office-based therapy with buprenorphine, trained provider groups who care for pregnant women and their neonates, and developed care models in low volume hospitals. Whether outcomes experienced by each individual community will mirror those observed at the tertiary care center remains unknown.

Our approach can be considered in the Re-AIM framework of implementation of care (Gaglio, 2013): Reaching the population; developing an Effective treatment in the community; increasing the Adoption and Implementation of community based care; and hopefully, observing the Maintenance of care in these communities. A key element to successful implementation was coordination among health care providers, legislators, and the community.

The challenges we faced are not unique to Vermont, but neither will one approach fit all communities. Implementation requires not only health care providers, but also serious commitment at the community and state legislative level. Community-based care for this complex disease can be achieved only by working collaboratively at every level.

Conflicts of interest

The authors declare that there are no conflicts of interests.

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