

Measurement-based care using DSM-5 for opioid use disorder: can we make opioid medication treatment more effective?

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ABSTRACT

Context and Purpose Measurement-based care (MBC) is an evidence-based health-care practice in which indicators of disease are tracked to inform clinical actions, provide feedback to patients and improve outcomes. The current opioid crisis in multiple countries provides a pressing rationale for adopting a basic MBC approach for opioid use disorder (OUD) using DSM-5 to increase treatment retention and effectiveness. **Proposal** To stimulate debate, we propose a basic MBC approach using the 11 symptoms of OUD (DSM-5) to inform the delivery of medications for opioid use disorder (MOUD; including methadone, buprenorphine and naltrexone) and their evaluation in office-based primary care and specialist clinics. Key features of a basic MBC approach for OUD using DSM-5 are described, with an illustration of how clinical actions are guided and outcomes communicated. For core treatment tasks, we propose that craving and drug use response to MOUD should be assessed after 2 weeks, and OUD remission status should be evaluated at 3, 6 and 12 months (and exit from MOUD treatment) and beyond. Each of the 11 DSM-5 symptoms of OUD should be discussed with the patient to develop a case formulation and guide selection of adjunctive psychological interventions, supplemented with information on substance use, and optionally extended with information from other clinical instruments. A patient-reported outcome measure should be recorded and discussed at each remission assessment. **Conclusions** MBC can be used to tailor and adapt MOUD treatment to increase engagement, retention and effectiveness. MBC practice principles can help promote patient-centred care in OUD, personalized addiction therapeutics and facilitate communication of outcomes.

Keywords DSM-5, measurement-based care (MBC), medications for opioid use disorder (MOUD), opioid use disorder (OUD), patient reported outcome (PRO), psychological intervention.

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PURPOSE AND BACKGROUND

In this *Addiction Debate* article, we describe the concept, clinical procedures and probable benefits of a simple measurement-based care (MBC) approach for opioid use disorder (OUD [1]). MBC can be applied to any treatment in the substance use disorders field, but we focus on first-line medications delivered in primary care and specialist clinics. This is because the current opioid crisis and dramatic increase in fatal opioid-related poisonings in the United States, Canada, Australia and several other countries in Europe [2–5] have led to an urgent call to

increase provision in primary care [6] and a national initiative in the United States to increase the capacity and integration of treatment in hospitals, state health departments, specialist programmes and the criminal justice system [7].

MBC is an evidence-based health-care practice in which disease symptoms, signs or biomarkers are used to inform clinical actions, with feedback given to patients about their progress in treatment to increase engagement, adherence and beneficial exposure to evidence-based therapies. Physical health conditions are almost always treated like this (e.g. hypertension and diabetes, in which blood

pressure and glycated haemoglobin, respectively, are primary biomarkers in clinical practice).

In mental health, many clinical decisions are guided by the presence and severity of patient-reported symptoms. For example, the nine-item version of the Patient Health Questionnaire (PHQ-9) [8] was constructed from the symptoms of major depressive disorder in DSM-IV. Following pivotal randomized controlled trials of antidepressant medications [9,10], the PHQ-9 has become the most widely used measure for MBC in depression [11,12]. The PHQ-9 total score informs the selection and switching of medications, the patient's response to psychological therapy and provides a standard metric to communicate outcomes.

Why do we need an MBC approach?

Pharmacotherapeutic and psychological approaches for OUD are delivered in out-patient clinics and offices and in-patient hospital settings and residential settings. Ongoing prescriptions of medications for OUD [MOUD; oral methadone (MET) and sublingual buprenorphine (BUP)] are the first-line treatments used in many countries world-wide and are our focus here. Meta-analysis of randomized controlled trials concludes that MET and BUP are associated with the suppression of non-medical opioid use and increased periods of abstinence [13,14]. Observational follow-up studies of treatment routinely delivered show reductions in drug injecting [15,16], opioid overdose [17], blood-borne viral infections [18] and crime [19]. Recent randomized controlled efficacy trials have shown clinical benefit for extended-release injectable depot formulations of naltrexone (an opioid antagonist) and BUP [20–22].

Given these positive findings, why do we need MBC? One compelling reason is that the average treatment effect from MOUD research masks many patients' actual experience. Up to 40–50% of patients discontinue MOUD treatment, most within a month [23,24], and many follow a repeating cycle of re-admission and early discontinuation [25]. In an influential randomized controlled study of MOUD for people with prescription medication OUD, Roger Weiss and colleagues observed that more than a quarter of their sample were unable to stop non-medical opioid use after 2 weeks of BUP, with this early non-response strongly predictive of drug use 3 months later in treatment [26]. In England, among a national cohort of 12 745 patients who received 12–26 weeks of MOUD, 64% used heroin on 10 of the past 28 days at follow-up [27]. In a further study of 7719 patients who were continuously enrolled in MOUD for 5 years, one-seventh made early gains, but then relapsed after approximately 6 months, with a tendency to use heroin on approximately half the days of the month prior to every subsequent bi-annual review [28]. There has

been a sustained effort to improve MOUD outcomes, with study of adjunctive psychological interventions the most common research strategy. However, pooled results from a Cochrane Review of 13 different interventions have been interpreted to indicate weak evidence, with no one modality judged effective (relative risk for abstinence = 1.03; 95% confidence interval = 0.98–1.07) [29].

Much has been learned from long-standing efforts in the alcohol and drug field to develop clinical outcome monitoring systems [30–32]. A patient's response to treatment will be influenced by several factors, including their ability and motivation to adhere to their prescription (e.g. distance travelled to receive dosing and clinical practice on directly observed or self-administered dosing and attendance).

Another reason that MBC is needed is because repeated calls for treatment services and systems to monitor outcomes [33,34] has not led to widespread action. Several relatively brief instruments are in routine use in health-care systems, including the Brief Addiction Monitor developed for the US Veterans Administration [35] and the Treatment Outcomes Profile, the national outcome standard for drug and alcohol treatment services in England for the past decade [36]. However, neither instrument was designed to diagnose substance use disorder (SUD) or classify remission. There is no consensus on which indicators are most relevant for MBC and few services would describe themselves as MBC-driven.

MBC using DSM-5 symptoms

The DSM-5 OUD checklist is usually completed solely for administrative reasons (e.g. to seek insurance authorization for treatment) or to document eligibility criteria for a research study. Surprisingly, these questions are rarely used in the clinic either as a means of planning treatment or classifying remission. Many practitioners are attuned to their patients' signs and symptoms and respond when OUD worsens or improves, but time pressures often mean that treatment is not monitored closely.

We suggest that for OUD the logical starting point for an MBC orientation designed to increase engagement and response is to focus on the 11 symptoms of the disorder in DSM-5. Although the APA system is used in the majority of research reports, we acknowledge that some readers work in treatment systems which diagnose opioid dependence using the World Health Organization International Classification of Disease (WHO ICD) system. The proposals in this article apply equally well to the latest release of the ICD (WHO; ICD-11) [37]. It will be interesting to determine whether ICD-11 has any advantages over DSM-5 for MBC.

DSM-5 OUD is widely used and known, but a brief summary is warranted. OUD is a latent construct with 11 symptoms (each scored as met or not-met) which fall

on a single severity dimension [38]. Six items address physiological and cognitive behavioural aspects causally related to neurobiological and neurocognitive adaptations following opioid exposure (i.e. tolerance; withdrawal symptoms; using more than intended; problems controlling consumption; time spent involved with opioids; and distressing craving). The remaining five items capture risk of harm and harmful social consequences caused by opioid use and intoxication (i.e. physically hazardous use; using despite health problems caused or exacerbated; failure to meet role obligations; continued use despite social problems; activities reduced or given up). Conceptually, each symptom is a response (either direct or indirect) of exposure to opioids or is a harm that is maintained or worsened by chronic use.

Scoring DSM-5 OUD is straightforward: a diagnosis is met if at least two symptoms are experienced within the same period in the past 12 months. OUD severity is judged by the number of symptoms met: mild, 2–3; moderate, 4–5; or severe, 6–11. The minimal score for severe OUD may not include any negative consequences, but a higher level of severity must involve some health and/or social impairment. A person diagnosed with OUD is classified as being in ‘early remission’ if no symptoms are met for at least 3 months. The craving symptom is not counted, nor an item referring to tolerance and withdrawal if the person is enrolled in and fully compliant with MOUD.

Practical proposals for MBC

Establishing a clinical diagnosis will always be an essential clinical task, but even minimal probing for additional information for each endorsed item can provide valuable insight for care planning, delivery and adaptation as treatment progresses. Each symptom can be extensible with further probing questions as needed, including administration of a clinical instrument developed for treatment planning [39].

To the best of our knowledge, the DSM-5 OUD working group selected a 3-month point for evaluation of early remission because it has long been believed that this is the point from which clinically meaningful outcomes are observed [40]. We think this is sensible, but we also recommend evaluation at 6 months from treatment initiation. ‘Stable remission’ is assigned to someone who has no OUD symptoms for at least 12 months (not including craving and discounting tolerance and withdrawal, if enrolled in and fully compliant with MOUD). A specifier denotes whether the person is living in a controlled medical or custodial setting. For those patients retained in longer-term treatment, it would seem reasonable to expect that a remission status evaluation is performed twice-yearly and at exit.

In the following sections, we describe a basic MBC approach using the example of MOUD delivered in primary care and specialist clinics. In these services, we will assume that patients are able to access adjunctive interventions

directly or by referral. Space limitations preclude discussion of: populations with complex needs (e.g. severe mental health; personality factors; neurocognitive impairment; chronic medical conditions); transfer procedures to hospital in-patient or residential programmes; and system-level factors which bear heavily on access and the delivery of effective MOUD. By ‘basic’ we mean activities that do not unduly compete with time for direct care and have a minimal administrative burden on the patient. We do not summarize medical management to increase adherence, but note that this is an important partner procedure.

At treatment initiation and review, a focus on each OUD symptom helps to structure discussion and helps the clinician and patient to formulate a testable hypothesis about why OUD has occurred, how biological, psychological and social factors are linked to opioid use and harms and the options available to capitalize or strengthen the patient’s resources for recovery [41]. There is a logic in targeting interventions on the first 6 items of OUD to address its negative consequences. In addition to needed adjustments to MOUD dosing (i.e. to attenuate distressing craving and achieve opioid blockade), early clinical tasks should include education on risk reduction and/or either a watchful waiting approach for improvements in social functioning or making an early referral.

It can be expected that reducing and quitting use of illicit opioids (and/or analgesic products containing opioids not taken as directed or non-prescribed) will ameliorate negative consequences but some social harms may endure, or emerge either because other contributing factors were not modified or were due to new causes. Although the craving symptom is not used for remission diagnosis, we think it is an important and actionable item for MBC, because distressing craving experiences may trigger the use of drugs and this symptom can persist long into abstinence. Optionally, and according to capacity, a patient who describes distressing craving could be asked to complete a single-item rating scale or a multi-dimensional questionnaire (e.g. [42]). Even a brief discussion could help to build therapeutic alliance, increase change motivation and interest to engage with treatment.

A basic MBC framework is summarized in Table 1. The third column shows examples of how each domain could be optionally extended with additional questions. These are examples, and there are numerous ways in which this basic framework could be expanded. At a minimum, we suggest that basic information on substance use should be recorded. In OUD, opioid use (and the route of administration and frequency) is an essential behavioural descriptor and an indicator of health risk, so a minimal set of questions should also be asked about recent illicit and non-medical drug use.

Given the increased risk of fatal poisoning when opioids are consumed with other central nervous system

Table 1 DSM-5 opioid use disorder (OUD) criteria and examples of extended questions.

<i>Domain</i>	<i>Class/type/criterion</i>	<i>Example of questions</i>
A. Substance use	Opioids Sedatives Stimulants (e.g. cocaine) Heavy alcohol use	Used in the past 3 months or 6 or 12 months? If yes, frequency: every day; 5–6 times a week; 3–4 times a week; twice a week; once a week; 1–3 times a month; less often. Were drugs injected? USA: drank more than 4 (women) or 5 (man) standard drinks on a single occasion of 2 hours or less in the past 3 months (same response scale as above for frequency)?
	<i>OUD criterion (not met/met)</i>	<i>Examples of question topics if criterion met</i>
B. Physiological	1. Usual dose of opioid has diminished effect, or need to take higher dose for required effect ^a 2. Experience of opioid withdrawal symptoms (or use to avoid) ^c	Self-reported typical dose? use of other opioids? motivation for seeking drug effect? Settings when experienced withdrawal symptoms; drugs taken to avoid/manage
C. Cognitive and behavioural control	3. Using opioids more often, or for longer than intended 4. Unsuccessful attempts to reduce or quit opioids 5. Time spent obtaining, using, recovering from opioids 6. Bothered/distressed by strong urge (cravings) for opioids ^c	Typical settings for obtaining and using (places and people). What were the thoughts and beliefs that accompanied compromised intention? Actions taken to avoid opioid use and reasons for lack of success? ^b Has time spent obtaining opioids caused problems? Examples of negative experiences during and after using? Last time: strength of urge to use (0–10; not at all–extremely). Situations, triggers, feelings, intentions/plans, desistance experiences.
D. Health risks and harms	7. Using opioids in physically hazardous situations 8. Opioid use despite known psychological or physical health problem caused or exacerbated	Which hazardous situations (e.g. driving, using machinery)? Which problems are affected? How does opioid use make the problem worse? NB: any screening indicated for comorbid conditions?
E. Negative social consequences	9. Failure to meet major role obligations because of opioids 10. Continued use of opioids despite social problems 11. Important activities reduced or given up because of opioids	Recent specific examples of how opioid impacted on personal roles at home, work or in education? Who has been affected? How often does this happen? Specify current inter-personal (e.g. primary relationship; family) or occupational conflicts affected by opioid use. How often does this happen? Which social, occupational, vocational, recreational activities? What opportunities are there to help restart?

^aItem not met if patient enrolled in opioid substitution treatment and is abstaining from non-prescribed and/or illicit opioids. ^bCan also assess patient's motivation, capability/opportunity and personal resources to address. ^cItem not met if the patient enrolled in opioid substitution treatment and is taking medications for OUD (MOUD) medication as directed. A review of adequacy of ongoing prescription dose and/or dispensing arrangements indicated if the patient is abstaining from all non-medical opioids (verified by urine drug screen) but reports opioid withdrawal symptoms. Scoring: Admission: past 12 months severity (items 4–14): 2–3 = mild; 4–5 = moderate; 6–11 = severe. After 3 months in MOUD: 3-month remission = no items met (item C6 not counted). After 6 months in MOUD: 6-month remission = no items met (item C6 not counted). After 12 months in MOUD: 1-year sustained remission = no items met (item C6 not counted).

depressants, the patient should also be asked about recent use of sedative medications and heavy alcohol consumption [43]. Cocaine use could also be monitored, as this is prevalent in some populations with OUD and can moderate MOUD engagement and response [44]. Informed by the

research literature on differential response to treatment, we suggest an early assessment of illicit and non-medical opioid use after the first 2 weeks of MET or BUP prescribing. For every patient retained after the onset of treatment, DSM-5 OUD remission should then be assessed at the first

clinic visit after 3, 6 and 12 months. For patients enrolled in longer-term MOUD, a 6-month frequency of remission status is also appropriate.

Given the causal logic underpinning DSM-5, if a patient enrolled in MOUD is completely abstinent, then the criterion for remission is met, even if a psychological intervention is still indicated for distressing craving. Conversely, while occasional opioid use does not have a direct bearing on OUD status, monitoring change in consumption is valuable to the patient and clinician, and a biochemical measure (e.g. urine drug screen) may be helpful to verify recent abstinence so that lapses can be discussed and interventions implemented.

A patient report outcome (PRO) will also help to identify the patient's perspective and promote collaboration with them when assessing remission status. With no interpretation required from the clinician, this is a simple measure of the impact of treatment (or broader progress themes) in terms of what is important to the patient. PRO measures are being used increasingly for research in several disease-specific areas. Comprehensive OUD-specific measures have been developed which record personal perceptions of progress towards recovery [45] and quality of life [46].

If there are time pressures, a single global PRO for change in OUD symptoms following a period of treatment could be used instead (e.g. very much improved; much improved; a little improved; no change; a little worse; much worse; very much worse). Administering this PRO measure as part of the assessment of remission could be very informative, especially when a patient's OUD status and their own perception of change do not match. This measure should not replace DSM-5 monitoring as the primary focus, but will be very informatively linked to it.

There are many combinations of OUD symptoms that describe non-response. In cases where remission is not attained, there are several key questions to be asked:

- Is there a change in the severity of OUD?
- Has OUD improved or has it worsened?
- what does change in OUD severity say about response to preceding interventions?
- How should this inform opportunities to adjust the care plan and add additional treatment?

Checking which symptoms are met in comparison with intake assessment will help to update the case formulation and could point to an alteration in the patient's care plan. For example, early continued use of illicit opioids might prompt an increase in medication dose, a review of dosing arrangements and a discussion of safety issues. One or more heavy drinking days could prompt provision of guided self-help information. The nature of each DSM-5 symptom met could also inform a specific psychological intervention or referral to accessible medical, welfare and social services in the local community and/or a peer

support group. Screening for depression (e.g. the two-item version of the PHQ-9 [47] and the item on suicidality) and physical health conditions [HIV, hepatitis C virus (HCV)] is also indicated. Some people with OUD will have co-existing problems (e.g. with stimulant drugs) and also longstanding social problems (e.g. housing instability; unemployment; and family conflict).

These factors add complexity to treatment planning and may risk discontinuation and poor outcome. The opportunity to respond here will depend on time and resources. Even if remission is elusive or is not achieved for long, MOUD may provide some symptom control and protection against opioid poisoning. The clinician should also not be disheartened if a MOUD-resistant patient refuses an adjunctive intervention, as they may accept this offer in the future. If there is no response after continuous treatment, clinicians might consider whether to shift to another MOUD medication, as they have different pharmacological properties that might be more suitable for some patients than others. Another consideration is the timing of treatment intervention during ongoing care (early versus later). More research is needed to address the current absence of evidence on which patient characteristics predict response to one MOUD versus another.

MBC research

We hope that pragmatic randomized controlled trials will be performed to evaluate the effectiveness of MBC for MOUD and other OUD interventions. Our proposals for MBC can guide end-point selection and analysis in clinical trials (where DSM-5 remission status is not often used in end-point evaluations). At the very least, a single-item PRO measure could be helpfully included in treatment trials as secondary outcome measures. Cohort research on MBC delivery for OUD within health-care systems would also provide additional insights on response to specific interventions received, generating valuable real-world evidence for the system itself as well as for the wider OUD treatment community.

CONCLUSIONS

The current opioid crisis in many countries provides a pressing rationale for adopting an MBC approach to increase treatment effectiveness for OUD. We need to act quickly and effectively to address non-response to MOUD in the face of unprecedented levels of treatment need. We believe that implementing MBC practice principles will promote patient-centred care in the treatment of OUD with MOUD primary and specialist care. MBC has the potential to stimulate the development of personalized addiction therapeutics and improve patient engagement and retention in all treatments for OUD so that health and social

harms are reduced or prevented, as well as promoting a common metric for communicating outcomes. It is essential for OUD remission status to be recorded, as a basic minimum, so that progress can be measured effectively and consistently. MBC will not sit comfortably in the busy clinic if health-care professionals see it as a burden that competes with time spent with the patient; but as DSM-5 is recorded already, all we are advocating is the discussion of these symptoms with the patient as part of care planning, building and sustaining therapeutic engagement and adapting treatment to clinical response. Using DSM-5 for MBC should be the minimum standard for MOUD treatment.

Declaration of interests

During the past 3 years, J.M. declares research grants from the NHS England and the English Department of Health and Social Care [prison setting maintenance medication for opioid use disorder (OUD)]; the National Institute for Health Research (NIHR; randomized controlled trial of depot naltrexone for OUD and a randomized controlled trial of acamprosate with behavioural intervention for alcohol use disorder) and the NIHR Biomedical Research Centre for Mental Health at South London and Maudsley NHS Mental Health Foundation Trust (SLaM; randomized controlled trial of novel cognitive therapy for cocaine use disorder). He has part-time employment as Senior Academic Adviser for the Alcohol, Drugs, Tobacco and Justice Division, Health and Wellbeing Directorate, Public Health England (PHE) and is a clinical academic consultant for the US National Institute on Drug Abuse, Centre for Clinical Trials Network. J.M. declares an unrestricted research grant at IoPPN and SLaM from Indivior via Action on Addiction for a randomized controlled trial of tailored psychosocial intervention for non-response to ongoing methadone and buprenorphine treatment. He has received honoraria and travel support for from Merc-Serono (2015; oncology medical education); Reckitt-Benckiser (2016; treatment of OUD and PCM Scientific and Martindale for the Improving Outcomes in Treatment of Opioid Dependence conference (2015–18; contributions and chairing). He holds no stocks in any company. A.J.R. declares consulting fees from Akili, Brain Resource Inc., Compass Inc., Curbstone Consultant LLC, Eli Lilly, Emmes Corporation, Liva-Nova, MindLinc., Sunovion, Takeda USA, Taj Medical; speaking fees from Liva-Nova and Sing-Health; and royalties from Guilford Press and the University of Texas Southwestern Medical Center, Dallas, TX (for the Inventory of Depressive Symptoms and its derivatives). He is also named co-inventor on two patents (US Patent no. 7795033: Methods to Predict the Outcome of Treatment with Antidepressant Medication, Inventors: McMahon F.J., Laje G., Manji H., Rush A.J., Paddock S., Wilson A.S.; and US Patent no. 7906283: Methods to Identify Patients at Risk of

Developing Adverse Events During Treatment with Antidepressant Medication, Inventors: McMahon F.J., Laje G., Manji H., Rush A.J., Paddock S.). R.A. has received untied educational grants from Reckitt Benckiser and Mundipharma for the post-marketing surveillance of opioid substitution therapy medications in Australia. He acknowledges an untied educational grant from Reckitt Benckiser/Indivior for a study on pharmacogenetic predictors of opioid agonist medication treatment success. All other authors have no declarations. The views expressed in this article are those of the authors.

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