



# Key implementation factors in telemedicine-delivered medications for opioid use disorder: a scoping review informed by normalisation process theory

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Telemedicine could improve access to medications for opioid use disorder (MOUD). Telemedicine-delivered MOUD (TMOUD) has expanded substantially in response to the restrictions imposed by the COVID-19 pandemic on in-person clinical contact, yet this expansion has not happened consistently across all health systems and countries. This Review aims to understand key factors in TMOUD implementation that might explain variations in uptake. We did a scoping review using three English language databases for articles reporting on the implementation of TMOUD services. 57 peer-reviewed articles were identified, subjected to open coding and thematic analysis, and further interpreted through normalisation process theory (NPT). NPT was originally used to evaluate telehealth innovations and has been applied extensively to describe, assess, and develop the implementation potential of a broad range of complex health-care interventions. By categorising our findings according to the four core NPT constructs of coherence, cognitive participation, collective action, and reflexive monitoring, we aim to rationalise the current evidence base to show the workability of TMOUD in practice. We find that variations in TMOUD models in practice depend on organisations' attitudes towards risk, clinicians' tensions around giving up control over standard practices, organisation-level support in overcoming operational and technological challenges, and evaluation methods that might neglect a potential widening of the digital divide.

## Introduction

WHO defines telemedicine as “the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities.”<sup>1</sup> Opioid use remains the largest contributor to mortality and morbidity among people with substance use disorders,<sup>2</sup> and extensive availability of medications for opioid use disorder (MOUD), such as buprenorphine and methadone, can reduce overdose deaths by at least 50%.<sup>3</sup> In this Review, we focus on the use of telemedicine in a triad of activities required to deliver MOUD. This triad incorporates the diagnosis of opioid use disorder, an assessment of suitability for MOUD, and then an offer of a prescription of the relevant medication. The provider of telemedicine-delivered MOUD (TMOUD) is typically a specially trained and licensed clinician, who will make repeat visits to the patient after the initiation of treatment for dose titration and review. TMOUD has the potential to overcome known barriers to accessing medications, such as prescriber shortages, stigma, affordability, restricted clinic or pharmacy opening times, pharmacy location and distance, and travel costs.<sup>4</sup> Unfortunately, despite the growth of digital technology and increasing acceptability of telemedicine in other areas of health care, regulatory and legal barriers have hampered TMOUD expansion.<sup>5</sup>

The COVID-19 pandemic has altered the risk environment for drug harms globally, causing

disruptions to treatment services,<sup>6</sup> increasing drug overdose deaths, and exacerbating inequalities in the impact of drug harm.<sup>7–9</sup> Through the pandemic, overdose deaths increased by 60% in some jurisdictions in the USA and by 58% across Canada.<sup>10</sup> Furthermore, these deaths have disproportionately affected Black and Latinx communities in the USA,<sup>11</sup> likely due to structural racism. COVID-19-related restrictions on human movement, together with diversion of health-care resources to manage the pandemic, has led to policy, regulatory, and service changes in addiction care.<sup>12</sup> Examples include a less restrictive regulatory environment, increased delivery of low-threshold MOUD, and the expansion of TMOUD.<sup>13–16</sup>

Low-threshold MOUD is a person-centred approach to treatment based on harm reduction principles.<sup>17</sup> Low-threshold MOUD incorporates the removal of treatment conditions, such as the need to be abstinent from illicit drugs or to engage in obligatory psychosocial therapy,<sup>17</sup> and minimises barriers, such as stigmatising regulatory policies.<sup>5</sup> The expansion of TMOUD and low-threshold MOUD are inextricably linked due to legislative changes that have facilitated both interventions, leading to the possibility of increased access to treatment. A reversal of the regulatory easing allowed by the Drug Enforcement Agency and the Substance Abuse and Mental Health Services Administration in the USA over the COVID-19 pandemic would probably be the end for TMOUD in this jurisdiction.<sup>5</sup> The successful implementation of an innovation like TMOUD within complex health-care settings requires an understanding of implementation processes and the contextual factors within which they are embedded.<sup>18</sup>

This Review applies an implementation science lens to facilitate an understanding of the processes and strategies used to progress TMOUD in various settings.<sup>19</sup> This understanding is important because during the COVID-19 pandemic, the implementation of TMOUD tended to be a bottom-up endeavour in which service providers engaged in creative problem solving to meet the demands of rapidly changing guidance, policy, and regulations, and the reversal of governance decisions.<sup>19</sup> Our approach allows us to capitalise on the COVID-19 pandemic by exploring the contingencies that organisations put in place and learning from the successes and challenges in implementation. We aimed to answer the questions: (1) what are the important mechanisms underpinning TMOUD implementation? (2) How do these mechanisms work to influence TMOUD implementation? (3) What are the important gaps in the TMOUD implementation literature?

## Methods

This Review is part of an exploration of the implementation of TMOUD. We focus here on implementation processes, defined as the social and cognitive work or effort conducted at individual or group levels to adopt and embed innovations into organisations' routine activities.<sup>18</sup> Equally important are the contextual determinants that affect implementation processes and contribute to innovation success or failure,<sup>18</sup> which we explore in a future publication. We used the normalisation process theory (NPT), which focuses on actions and processes at individual and social levels to implement an intervention. NPT was developed through empirical research into telemedicine adoption and has continued to be used extensively in TMOUD and other health-care innovations.<sup>20</sup> NPT is based on the premise that the implementation of an intervention, such as TMOUD, involves human actors in four processes: (1) adaptations in how actors interact with physical and virtual things (eg, hardware, software, and infrastructure); (2) changes in the way individuals interact with each other; (3) changes in policies, regulations, and resource distribution that make action possible; and (4) shifts in how whole systems are redefined and understood. Each of these processes is linked to specific kinds of work, referred to as the NPT constructs of coherence, cognitive participation, collective action, and reflexive monitoring.<sup>18</sup> Each construct is further subdivided into four subconstructs (panel 1).

We opted for a scoping review, allowing us to use a broad range of evidence types, draw on knowledge around TMOUD processes and contexts, and identify research gaps in relation to implementation.<sup>21</sup> We did this research following the JBI scoping review methodology<sup>22</sup> and report the research findings in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (known as PRISMA) extension for scoping reviews (appendix pp 1–3).<sup>23</sup>

## Search strategy and selection criteria

We searched OVID Medline (from inception), CINAHL (from inception), and PsycINFO (from inception) on July 16, 2021, and again on Aug 20, 2022. Search terms for problematic opioid use and MOUD, such as methadone and buprenorphine, were combined with terms for telemedicine, such as videoconferencing, telepsychiatry, remote consultation, or telehealth. The full list of search terms and strategies is in the appendix (pp 5–7). Publications were eligible if they were in English, peer-reviewed, and described the piloting, implementation, or evaluation of TMOUD. We included clinical trials, qualitative research, surveys, reviews, and service innovation reports. We did not include papers that were about digital health interventions that did not also deliver MOUD.

All the retrieved literature was imported to Rayyan, a review-management tool, and titles were inspected to remove duplicates and obviously irrelevant papers.<sup>24</sup> Abstracts were then screened by JTWT for a detailed evaluation, with a second author (AB) screening a random selection of 20% to check for consistency in screening. The final selection of included papers was downloaded into the qualitative analysis platform Atlas.ti for Mac version 22.1.0 (3475).

## Data extraction and synthesis

A data collection form was developed to include title, authors, source, date of publication, study design, whether the data related to the period before the COVID-19 pandemic, the use of implementation frameworks, and the key contribution to our research questions. Data extraction was carried out by JTWT and GZ. We undertook a thematic synthesis, as developed by Thomas and Harden,<sup>25</sup> to review literature addressing questions around intervention acceptability and implementation barriers and facilitators.

Thematic synthesis requires that free codes are generated, which are then organised into descriptive themes, which are then further interpreted to yield analytical themes. This process was carried out by JTWT. At the analytical phase, JTWT and GZ applied NPT constructs and subconstructs to structure the synthesis and to guide the critical assessment of implementation factors identified in the included studies. Such an open process with inductive coding is recommended when applying NPT because of its difficult technical vocabulary and overlapping definitions. NPT-based interpretations of review findings were assessed by JTWT and AG and discussed as necessary within the wider review team.

## Results

Our initial search on June 16, 2021, identified 93 records; a repeat search on Aug 20, 2022, identified a further 118 records. After the removal of duplicates there were 141 abstracts for screening, of which 66 were excluded

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See Online for appendix

**Panel 1: Normalisation process theory constructs and subconstructs****Coherence**

Coherence explains the important actions that lead to individual and organisational understanding of telemedicine-delivered medications for opioid use disorder (TMOUD) and includes actions to define and differentiate TMOUD from standard practice, to develop a shared understanding of its aims and objectives, to specify clear roles and responsibilities for implementation, and to internalise its potential value, benefits and importance.

**Subconstructs:**

- Differentiation: a shared understanding of TMOUD definitions, models, and processes
- Communal specification: a shared understanding of the aims, objectives, and expected benefits of TMOUD
- Individual specification: clear roles and responsibilities in TMOUD implementation
- Internalisation: understanding the potential value, benefits, and importance of TMOUD

**Cognitive participation (relationship work)**

Cognitive participation describes the actions of the people who would need to carry out the work of TMOUD and includes individual buy-in, sustainment, and ways of legitimising their involvement in its implementation.

**Subconstructs:**

- Enrolment: individual buy-in regarding the delivery of TMOUD
- Activation: the capability for individuals to sustain involvement in TMOUD
- Initiation: key members of the team must believe that TMOUD brings genuine benefits to their patients to drive its implementation forward
- Legitimation: key individuals believe they are the right people to deliver TMOUD and that it fits in with their roles

**Collective action (enacting work)**

Collective action explains how the work of TMOUD implementation happens through and consists of identifying necessary workforce skills and training, operational support, and building confidence in the robustness of the new system among front-line workers.

**Subconstructs:**

- Skill set workability: identifying training needs required to deliver TMOUD and being prepared to ask for these needs to be met
- Contextual integration: organisational receptiveness to front line requests for support in delivering TMOUD
- Interactional workability: TMOUD is adapted to contribute to improving individual workflow and efficiency
- Relational integration: confidence builds in the new TMOUD system among the various stakeholders

**Reflexive monitoring (appraisal work)**

Reflexive monitoring describes the psychological underpinnings of feedback loops or appraisal work necessary for iterative improvements to occur to TMOUD and, eventually, its systematisation and embedding within an organisation.

**Subconstructs:**

- Reconfiguration: individual efforts to adapt TMOUD to work for them
- Communal appraisal: the ways that stakeholders judge the value of the TMOUD service
- Individual appraisal: the ways that individuals appraise the effects on them and their work environment
- Systematisation: the ways that benefits or problems are identified, measured, and addressed

due to irrelevance to the topic of interest. 75 full-text articles were screened, of which 57 met our inclusion criteria (figure). 43 (75%) of 57 papers were from the USA. Eight (14%) articles were review papers. One of these focused on patient satisfaction with TMOUD<sup>13</sup> and three included studies on TMOUD as part of a wider discussion on other topics.<sup>26–28</sup> Four were scoping reviews focused on the changes occurring during the COVID-19 pandemic, with three specifically examining TMOUD<sup>29–31</sup> and one also looking at other service and policy-level innovation.<sup>32</sup> Dates of intervention implementation, as opposed to date of publication, were not consistently reported in each article, particularly those reporting on multisite projects.<sup>26,28,33,34</sup> Nevertheless, TMOUD projects that were implemented as a response to the COVID-19 pandemic tended to be clearly stated as such.

11 papers (19%) described TMOUD implementation in response to the COVID-19 pandemic.<sup>15,35–44</sup> Six papers

(11%) used qualitative interviews or participant observation to explore clinician, patient, and public perceptions of TMOUD, particularly in relation to regulatory easing, acceptability, and risk perceptions.<sup>16,34,45–48</sup> Four papers (7%) used surveys to look at the degree of adoption, penetrance, or successful implementation of TMOUD during the pandemic across different service delivery models; for example, national health-care provider, primary care service, and nationwide syringe service programmes.<sup>49–52</sup>

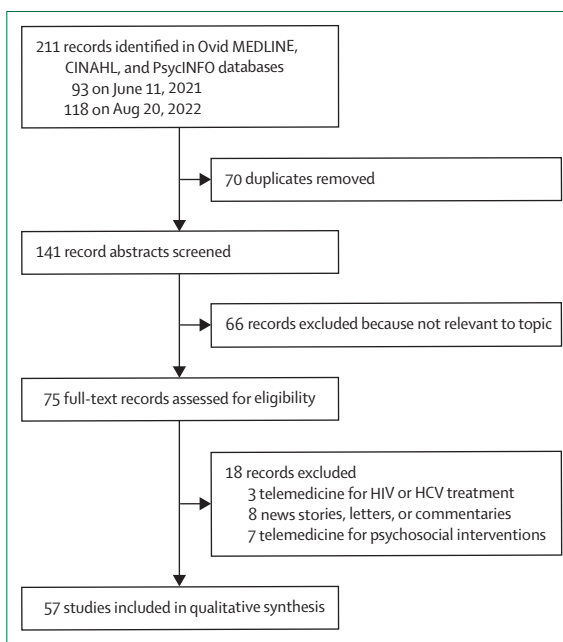
With regard to the evaluation of TMOUD efficacy, 13 studies (23%) used data obtained from retrospective chart reviews<sup>26,33,43,53–61</sup> and six (11%) collected prospective data from randomised or non-randomised interventional studies.<sup>14,62–66</sup> Only one study<sup>67</sup> used a formal implementation science framework (table). We have structured the rest of our findings according to NPT constructs (appendix pp 1–4).

### NPT construct: coherence

Coherence describes the work stakeholders do to make sense of TMOUD technology, processes, and practices. This coherence includes defining and differentiating TMOUD from standard practice (ie, differentiation), developing a shared understanding of its aims and objectives (ie, communal specification), specifying individual roles and responsibilities (ie, individual specification), and internalising its potential value, benefits, and importance (ie, internalisation).<sup>18</sup>

We identified three ways to differentiate various models of TMOUD. The first way was descriptive, based on the location of the patient relative to the prescriber. We identified a hub-home model in which the clinician connected from a clinic via the internet or phone to the patient, who remained at home, without the support of ancillary staff.<sup>16,26,28</sup> All other identified examples were of hybrid TMOUD approaches, which enabled the prescriber to work remotely in a hub, often supported by the substantial presence of in-person, non-prescribing colleagues in peripheral locations or in the patient's home.<sup>45</sup> Examples included a dyadic hub-spoke model in which the clinician connected to the patient located in a community site (eg, in a syringe service programme<sup>44</sup>) or a triadic hub-spoke model in which the clinician connected to the patient in a remote spoke health-care site (eg, a hospital ward or primary care centre) with another health-care worker present (eg, nurse, pharmacist, or health-care support worker).<sup>37,60,63</sup>

The second way was centred around the organisation's or clinician's perception of risk. The assumption was that TMOUD carried greater risk of medication diversion, concurrent illicit use, or overdose than did in-person care. Consequently, a tiered model evolved, incorporating varying levels of in-person contact, often by non-prescribers who were expected to provide a form of surveillance by proxy.<sup>45</sup> Examples included models that began with telephone screening and triage<sup>72</sup> followed by an in-person attendance for identity confirmation and to complete paperwork<sup>72</sup> or to conduct urine drug testing.<sup>16,63,72</sup> At the two extremes of risk tolerance were two services with no in-person component at all<sup>73</sup> and one service in which every clinical, but not counselling, session was in person, except for the most vulnerable 3% of their treatment cohort.<sup>49</sup> Despite this difference, the reported outcomes for these three services were equivalent with no evidence of increased harms and comparable retention rates.<sup>49,73</sup> The third perspective on TMOUD was focused on meeting patient needs where and when they arose. Examples included TMOUD that was offered in prisons through using the internet, supported by on-site nurses,<sup>36</sup> or given through street outreach,<sup>39</sup> syringe service programmes,<sup>14,37,44,59</sup> hostels for people experiencing homelessness,<sup>15,44</sup> rural<sup>74</sup> and urban environments,<sup>33</sup> hospital wards or accident and emergency departments,<sup>26,37,60</sup> and obstetric or perinatal care settings.<sup>63</sup>



**Figure: Study selection**

HCV=hepatitis C virus

Many services described their respective TMOUD projects clearly, including roles, responsibilities, and lines of accountability.<sup>37,38,43,63,67,72,76</sup> The Veterans Health Administration in the USA, a large integrated health-care system with an already established telemedicine programme, was able to use robust, tried and tested protocols, and infrastructure to scale up TMOUD implementation over the COVID-19 pandemic.<sup>47,67,73,80</sup>

Although much of the TMOUD literature has focused on the role of prescribers, health-care interventions typically involve multidisciplinary teams including a range of stakeholders with different skill sets and contributions to the patient journey (panel 2; appendix pp 16–24). The examples of communal specification provided so far are of multicentre organisations with an established telemedicine infrastructure or small one-site services with a fully integrated team.

Other examples of TMOUD provision involved non-clinical stakeholders carrying out in-person activities that would normally fall within the remit of the prescriber.<sup>14,44,59</sup> For example, in hybrid TMOUD models, in-person contact tended to be allocated to junior, lower-paid, non-prescribing team members.<sup>45</sup> This group had little or no autonomy in deciding who needed in-person contact, yet had to respond to requirements imposed by prescribers who were not on site. The effect of these power imbalances might be reflected in the results of a staff survey within substance use disorder services in the USA during the COVID-19 pandemic, in which junior colleagues reported anxiety, job insecurity, burnout, and little organisational support compared with senior colleagues.<sup>51</sup>

Stakeholders had different perspectives and priorities, which impacted on how they valued or did not value TMOUD (panel 2). For example, clinicians reported a range of perspectives on TMOUD, including anxieties

around legal liability and stigmatising attitudes towards patients in some cases.<sup>45</sup> Although evidence of efficacy, safety, and quality were important to these clinicians, these factors were unlikely to be the sole or even primary

	Publication type or study design	Country	Key contribution
Young (2012) <sup>38</sup>	Review	Two of the 50 papers included were relevant to TMOUD, both from the USA	Two studies that examined aspects of TMOUD. One examined the use of telephone contact to re-enrol patients who had left or disengaged from treatment. The second looked at gender differences in the acceptability of a therapeutic telephone system in primary-care buprenorphine maintenance. The review suggests telephone support as an adjunct to MOUD provision and outreach case management.
Tofighi et al (2015) <sup>68</sup>	Survey	USA	Although acceptable, the use of mobile devices in TMOUD delivery is restricted by difficulty in retaining mobile phones or the same telephone number. The use of peer distribution of TMOUD information via mobile phones should be explored.
Gustafson et al (2016) <sup>64</sup>	Randomised clinical trial	USA	Study examined a mobile application-based relapse-prevention programme with blood-borne virus screening service offered alongside MOUD.
Eibl et al (2017) <sup>33</sup>	Retrospective data analysis	Canada	Study identified 3733 patients who were initiating opioid agonist treatment. Patients treated mainly via telemedicine (n=1590) were more likely to be retained in therapy than patients treated mainly in person (n=1745; odds ratio=1.27 [95% CI 1.14-1.41]; p<0.001). Telemedicine patients showed a retention rate of 50% at 1 year, whereas the retention rate for in-person patients was 39%. The mixed group (n=418), which received between 25% and 75% of their medication via telemedicine, also had a greater likelihood of retention than the in-person group and had a retention rate of 47% at 1 year.
Eibl et al (2017) <sup>37</sup>	Review	Canada	Study describes variation in treatment access and TMOUD expansion by province according to regulatory decentralisation and easing.
Zheng et al (2017) <sup>61</sup>	Retrospective data analysis	USA	No difference between in-person MOUD and TMOUD in outcome measures, such as average time to 30 days and 90 days of abstinence, treatment retention rates, and additional illicit drug use.
Huskamp et al (2018) <sup>66</sup>	Retrospective data analysis	USA	Paper assesses regulatory and reimbursement barriers to TMOUD before COVID-19 vs improved access to treatment when patients face a scarcity of treatment providers or transport, and have physical or privacy barriers.
LaBelle et al (2018) <sup>38</sup>	Retrospective data analysis	Canada	Telemedicine can be effective in providing TMOUD to patients with opioid use disorder and co-occurring mental health disorders.
McIntyre (2018) <sup>42</sup>	Case report	Canada	TMOUD can address barriers to and improve quality of opioid use disorder treatment in correctional settings.
Weintraub et al (2018) <sup>69</sup>	Retrospective data analysis	USA	TMOUD with buprenorphine can be effectively delivered to patients with opioid use disorder in rural, underserved areas.
Lin et al (2019) <sup>26</sup>	Review	Three of 13 studies were relevant to TMOUD, one from Canada and two from USA	The three studies included in this review and relevant to TMOUD are by Zheng et al (2017), <sup>61</sup> Weintraub et al (2018), <sup>69</sup> and Eibl et al (2017), <sup>33</sup> summarised within this table.
Lingam and Caudill (2019) <sup>70</sup>	Regulatory policy document analysis	USA	Regulatory compliance flowcharts for TMOUD might support practitioners in telemedicine risk management, competency-based training, and policy development.
Brunet et al (2020) <sup>57</sup>	Service innovation	USA	Study gives detailed description of the use of a recognised quality improvement approach, the Consolidated Framework for Implementation Research.
Castillo et al (2020) <sup>35</sup>	COVID-19-related innovation	USA	Description of a novel model of TMOUD in which it is incorporated into the services offered in a syringe service programme.
Cavazos-Rehg et al (2020) <sup>62</sup>	Non-randomised pilot study	USA	Paper describes an app-based shared decision-making and informed-consent tool for TMOUD.
Coulter and Hintzsche (2020) <sup>71</sup>	Service innovation	USA	Paper describes generating a TMOUD maintenance service with virtual visits every 3 months.
Crowley and Delargy (2020) <sup>72</sup>	COVID-19-related innovation	Ireland	Paper describes a national TMOUD programme led by clinical and funding regulatory bodies and incorporating a secure electronic health-link system, allowing for prescriptions to arrive securely at the local dispensing pharmacy.
Eaves et al (2020) <sup>46</sup>	Ethnographic research	USA	Ethnographic research with stakeholders and opioid treatment providers in Arizona, including analysis of media reports reflecting attitudinal responses to policy changes allowing increased take-home doses of methadone or buprenorphine, and relaxed restrictions on telehealth delivery.
Guille et al (2020) <sup>63</sup>	Non-randomised controlled trial	USA	Comprehensive service description, including protocols for managing the clinic and models of collaborative care between perinatal, emergency, and addictions services.
Harris et al (2020) <sup>45</sup>	Case report	USA	A model of TMOUD with street outreach services.
Moore et al (2021) <sup>73</sup>	Service innovation	USA	Description of a TMOUD hub developed pre-pandemic to address gaps in the service of the New England Veterans Healthcare Administration. Lessons included the value in a centralised hub to support more distributed TMOUD services and to provide ongoing development of expertise. The basic training provided for clinicians to be able to prescribe buprenorphine might not be sufficient for tele-prescribing to occur.
Uscher-Pines et al (2021) <sup>16</sup>	Qualitative interviews	USA	Description of clinician perspectives on changing from in-person to TMOUD and their concerns about potential impact on care quality.

(Table continues on next page)

	Publication type or study design	Country	Key contribution
(Continued from previous page)			
Schramm et al (2020) <sup>65</sup>	Pilot randomised controlled trial	USA	Research protocol for a directly observed therapy service using a mobile health (known as mHealth) application. Risks in not providing directly observed therapy when delivering MOUD during the pandemic onset included treatment non-adherence, treatment failure, medication diversion, and lowered treatment retention.
Alexander et al (2021) <sup>39</sup>	Scoping review	Predominantly USA	Racial inequalities in access to MOUD and rates of overdose deaths were exacerbated by COVID-19. TMOUD uptake was highest for White people and most easily accessed for those already receiving MOUD, so those new to treatment were often excluded from accessing this treatment via telemedicine. There were gaps in the literature on how to reverse the digital divide faced by marginalised populations, especially those living in transitional housing or experiencing homelessness.
Aronowitz et al (2021) <sup>65</sup>	Qualitative interviews	USA	TMOUD improved access for some people, but there was evidence of digital inequality because of difficulties accessing devices, bandwidth, or technical skills. There was a layered digital divide due to service users not accepting virtual contact with a clinician. Hybrid arrangements facilitated service users who preferred or required in-person contact. Theories of technology acceptance (eg, the socio technical system model) could facilitate an understanding of ways to improve the engagement of marginalised patients with telehealth.
Caton et al (2021) <sup>30</sup>	Survey	USA	TMOUD became normative for existing patients but not for new patients due to a perception of high risk and too much liability. Other adjustments included longer prescriptions, more assertive outreach work, better attendance at appointments via telemedicine, and increased home working for staff.
Chan et al (2021) <sup>30</sup>	Scoping review	USA	Nine studies evaluating TMOUD were identified: three controlled trials (two randomised) and six observational studies. All studies showed similar outcomes between TMOUD and MOUD via in-person care. Small sample sizes limited the evidence, which suggested telemedicine might enhance access to MOUD with similar outcomes as in-person care. The potential effect TMOUD has on the digital divide affecting racial and ethnic minorities has yet to be understood.
Cole (2021) <sup>13</sup>	Review	USA	A review of existing tools to measure patient satisfaction with TMOUD. Presented results of a pilot survey-based measurement tool for TMOUD satisfaction among patients receiving this treatment in rural areas.
Duncan et al (2021) <sup>36</sup>	COVID-19-related innovation	USA	TMOUD alongside a reduced prison census enabled the sustained delivery of treatment throughout the COVID-19 pandemic.
Fiacco et al (2021) <sup>37</sup>	COVID-19-related innovation	USA	Description of a service that transitioned to TMOUD over 3 weeks in response to the COVID-19 pandemic resulting in a number of benefits, including increased flexibility in clinician time, improved capacity within the system, and improved client-clinician relationships.
Ghosh et al (2021) <sup>38</sup>	COVID-19-related innovation	India	Study of a synchronous, stepwise, mixed model incorporating telephone, video, and face-to-face elements. This model faced various barriers, including the digital divide, privacy, and issues around electronic prescribing.
Hser et al (2021) <sup>74</sup>	COVID-19-related innovation	USA	A feasibility study to develop and test implementation procedures of TMOUD in preparation for a large-scale, randomised controlled trial incorporating TMOUD in rural primary care. Notes multiple implementation barriers, including low detection of opioid use disorder at screening, low rates of TMOUD referral, technology, workflow and capacity, and insurance-coverage issues. Little empirical guidance for best TMOUD practice was identified.
Jones et al (2021) <sup>51</sup>	Survey	USA	33% (2429 of 7419) of service providers reported remote prescribing of buprenorphine to new patients without an in-person examination. Clinicians who prescribed routinely for large numbers of patients and who were used to TMOUD before the COVID-19 pandemic were more likely to do so. 5.5% (133 of 2419) reported difficulties with buprenorphine induction, most commonly withdrawal symptoms. Making this practice permanent beyond the pandemic is likely to expand access to buprenorphine treatment.
Krawczyk et al (2021) <sup>32</sup>	Scoping review	Countries in Europe, Asia, Africa, Oceania, North America, and Latin America	Review reporting that the COVID-19 pandemic accelerated innovations in models of care, associated policies, and increased uptake of technologies, including TMOUD, virtual therapy sessions, provision of smartphones, relaxed dispensing, take-home arrangements of medications, increased use of long-acting opioid medications, home delivery of services, outreach, and provision of a safe supply of opioids and other medications.
Levander et al (2021) <sup>40</sup>	Case report	USA	Study showing how trusted community partners, in association with low-threshold TMOUD facilitated by COVID-19 regulatory easing, enabled previously marginalised patients to enter treatment. These patients were previously disengaged for reasons including geography, lack of housing, transportation difficulties, and mistrust of traditional health-care systems.
Lin et al (2021) <sup>75</sup>	Retrospective data analysis	USA	Study including 7 years of data from the largest national health-care system in the USA, showing good retention rates of TMOUD and identifying less uptake by Black Americans than White Americans.
Mansour et al (2021) <sup>41</sup>	Survey	USA	Study with a US dataset based on a monthly audit of 4800 office-based physicians. Identified a rise in TMOUD as the COVID-19 pandemic unfolded, but primarily for established patients rather than new patients.
Treolar and Mayet (2021) <sup>66</sup>	Randomised controlled trial	UK	TMOUD was offered with a modified hub-and-spoke (ie, outreach) model. Patients attended an outreach clinic, where an outreach worker undertook drug testing and a telemedicine consultation via the outreach worker's laptop. Specialist addiction prescribers were located remotely at the hub. The study found a high level of patient satisfaction, including convenience (ie, reduced travel, travel time, and travel costs) and supportive staff providing ongoing human connection. Patient satisfaction was high for timings, information provision, privacy, enough time to talk, and opportunities for shared decision making.
O'Gurek (2021) <sup>76</sup>	Collaborative guidance development and evaluation	USA	The development of pre-arranged, organised workflows in response to emergencies, such as pandemics, supports the crucial service continuation of TMOUD. Incorporating telemedicine, in the context of relaxed federal regulations, has improved addiction care. The protocol implementation was evaluated with retrospective chart review.

(Table continues on next page)

	Publication type or study design	Country	Key contribution
(Continued from previous page)			
Tofghi et al (2021) <sup>43</sup>	Retrospective data analysis	USA	Describes three models of care to deliver TMOUD and unobserved buprenorphine induction at home: an urban and rural setting programme and a prison departure outreach service.
Tringale and Subica (2021) <sup>44</sup>	COVID-19-related innovation	USA	Description of two innovations, including a telephone booth model, which is a private, regularly sterilised space equipped for telemedicine consults based on a syringe programme, and a coordinated pharmacy model, as opposed to on-site dispensing.
Watson et al (2021) <sup>44</sup>	Randomised clinical trial	USA	Study intended to shorten the time between someone deciding to access treatment in a syringe programme and MOUD induction via telemedicine. The study also provided evidence regarding the positive and negative effects of pandemic-related regulatory easing.
Weintraub et al (2021) <sup>60</sup>	Retrospective data analysis	USA	Study showed that TMOUD is viable and sustainable in delivering buprenorphine to rural patients and has retention rates and toxicology results similar to in-person delivery, and that continuous cycles of service improvement could increase these factors. Other models and settings for TMOUD should be defined, evaluated, and disseminated, including home-based treatment, treatment for patients who are actively using drugs at treatment entry, treatment of incarcerated persons, and integrated treatment for people with co-occurring conditions.
Avalone et al (2022) <sup>53</sup>	Retrospective data analysis	USA	Review of 11 389 completed TMOUD consultations in four New York boroughs showed a high level of attendance compared with in-person visits regardless of age, sex, race, or insurance status. Most of these consultations were audio only. Continuing to make TMOUD available beyond the pandemic is likely to improve access and ongoing engagement.
Cales et al (2022) <sup>49</sup>	COVID-19-related innovation	USA	One of the largest networks of office-based multispecialty outpatient addiction clinics in Louisville, KY, USA, provided a hybrid system during the pandemic in which patient contact was in person by default with appropriate infection control precautions. Telehealth was provided by clinicians and counsellors. Only 3% (18 of 577) of patients at highest risk had exclusive TMOUD. Otherwise, it was mainly the counselling aspect of treatment that was offered virtually.
Cunningham et al (2022) <sup>54</sup>	Retrospective cohort study	USA	Study examined treatment outcomes following TMOUD introduced as part of COVID-19-related service changes across the full treatment journey, from initial visit to treatment induction, and treatment retention at 90 days. A key finding was a drop by 50% in new referrals during the pandemic with a larger proportion of those entering treatment having private care insurance. This number may reflect a widening digital divide because of the introduction of TMOUD.
Day et al (2022) <sup>55</sup>	Service innovation and evaluation	Canada	Alberta's Virtual Opioid Dependency Program began in 2017 to address barriers to MOUD, such as geographical distance, transportation, in-person induction requirements, childcare or employment demands, and limited treatment choice. This completely virtual model of care allowed low-barrier, immediate access to treatment, with 90% (396 of 440 patients) remaining in treatment for 6 months, and 58% (255 of 440) over 12 months. 90% (648 of 720 patients) reported a high level of satisfaction with the service. Reductions in drug use, overdose, and improved social functioning were also identified. The study suggests that entirely virtual delivery of opioid agonist therapy is feasible and effective, particularly for rural or underserved areas.
Durand et al (2022) <sup>77</sup>	National Delphi study	Ireland	In response to the COVID-19 pandemic, Ireland produced contingency guidelines that deviated substantially from pre-pandemic guidelines, making it possible to deliver TMOUD. This paper describes the development of consensus recommendations for opioid agonist treatment post-pandemic, specifically addressing whether the emergency guidance should be retained. Consensus was achieved about preserving the option of telemedicine for patients to have an initial health assessment and follow-up reviews, and ongoing use of providing electronic prescriptions directly to the person's pharmacy by the national electronic prescription transfer system.
Guillen et al (2022) <sup>31</sup>	Scoping review	USA	Review examined TMOUD using buprenorphine. Assessing 69 publications, the study found TMOUD was associated with treatment retention rates equivalent with standard care (ie, in-person MOUD) and higher levels of patient satisfaction at lower costs. Relaxation of federal guidelines in response to the COVID-19 pandemic has fuelled a rapid growth of TMOUD, increasing access to treatment. Benefits were not experienced equally across groups due to organisational obstacles, reliability of technology, and user-based concerns including privacy.
Harris et al (2022) <sup>39</sup>	COVID-19-related innovation	USA	Study describes the transition of a street-based MOUD service to TMOUD during the COVID-19 pandemic and 1 year treatment retention. TMOUD allowed improved flexibility, contributed to high retention rates, and served as a model for low-threshold treatment access. All visits were voice-only because of restricted patient access to technology. Visit frequency ranged from every 1 to 8 weeks, with most patients on a 4-week cycle. Prescriptions were called in or electronically prescribed to the patient's pharmacy of choice, along with a prescription for naloxone if needed.
Kaur et al (2022) <sup>57</sup>	Retrospective data analysis	USA	Examined the effect of TMOUD with buprenorphine introduced during the COVID-19 pandemic on treatment retention. The findings suggested that telemedicine is efficacious in retaining patients in MOUD. Telemedicine is an alternative to face-to-face treatment delivery for MOUD with buprenorphine treatment and should be available as an option post-pandemic.
Lambdin et al (2022) <sup>52</sup>	Survey	USA	Study surveyed syringe service programmes to identify changes in practice during the COVID-19 pandemic. Regulatory easing enabled syringe service programmes to partner with MOUD providers. Attendees at the syringe service programmes were connected to MOUD providers, with syringe service programme workers acting as intermediaries and facilitators. Non-statutory syringe service programmes and organisations with larger annual budgets tended to have more success in implementing TMOUD. Organisations with high need—exemplified by high drug-related death rates—were not more likely to implement TMOUD.

(Table continues on next page)

	Publication type or study design	Country	Key contribution
(Continued from previous page)			
Lambdin et al (2022) <sup>59</sup>	Retrospective data analysis	USA	Study evaluated TMOUD offered to attendees at a Californian syringe service programme between May, 2020, and March, 2021. Of 115 new participants, 100 (87%) were inducted on buprenorphine on the day of their referral. 106 (92%) of 115 participants were covered by Medicare or Medicaid, indicating that this approach might have improved equity and access to buprenorphine treatment.
Mattocks et al (2022) <sup>47</sup>	Semi-structured interviews	USA	Study comprised semi-structured Zoom interviews with clinicians at nine Veterans Association Medical Centers in eight states. Adaptations to the COVID-19 pandemic resulted in a shift towards low-threshold and harm-reduction approaches to MOUD, and rapid implementation of TMOUD. Video calls provided direct insight into the home lives of veterans, but more guidance is needed on how to incorporate these insights into care plans. Providers found telemedicine challenging and struggled with trusting patients.
Textor et al (2022) <sup>34</sup>	Participant observation and semi-structured interviews	USA	Study found that, despite regulatory easing and the expansion of TMOUD improving treatment access, substantial barriers remain at the pharmacy level. Pharmacy-level regulations and gatekeeping resulted in issues such as geographic restrictions, telephone prescription confirmations, prescription cancellations, and refusals. TMOUD alone is insufficient to remove treatment barriers and might cause them in some cases. Underpinning these issues are inconsistencies in policy implementation in which some agencies continue to work from a regulatory framework rather than a treatment framework. Pharmacies perceived themselves to be vulnerable to Drug Enforcement Administration sanctions, so prioritised bureaucratic hurdles, including the medico-legal legitimacy of prescriptions, self-defensive institutional practices, and reinforcement of ideologies of drug law enforcement.
Tofghi et al (2022) <sup>78</sup>	COVID-19-related innovation and evaluation	USA	Study described TMOUD processes including clinical histories, instructions on buprenorphine induction, opioid overdose education, and naloxone administration, and it identified other needs, such as primary and specialty care (eg, psychiatry, HIV, and pain management). The study confirmed the feasibility of low-threshold TMOUD as a bridge into community services for underserved people (eg, unstably housed, justice-involved, Latinx, and African American). Ongoing structural and class-based barriers to accessing buprenorphine after it was prescribed remained, including an inability to overcome bureaucratic hurdles, waiting on the telephone, finding transportation, or obtaining a private prescriber, potentially widening the digital divide.
Walters et al (2022) <sup>48</sup>	Semi-structured qualitative interviews	USA	Participants included patients on buprenorphine or methadone, providers, government regulators, and people not in treatment who use drugs. Increased take-home medication, home deliveries, and telehealth were positively viewed, allowing more balanced lives. The consensus was that keeping these changes beyond the COVID-19 pandemic was likely to increase MOUD retention. The digital divide is likely to reduce the benefits of TMOUD if challenges faced by some groups, such as people experiencing homelessness or specific racial or minority groups, are not addressed.
TMOUD=telemedicine-delivered medications for opioid use disorder. MOUD=medications for opioid use disorder.			
<b>Table: An overview of the studies included in this Review</b>			

consideration in deciding whether to continue to provide TMOUD after the COVID-19 pandemic. Other non-prescribing stakeholders, many with a sustained and direct connection with their patients, expressed concerns that only views of a clinician would be considered on whether TMOUD would continue in the future.

### NPT construct: cognitive participation

Cognitive participation refers to establishing working relationships and defining roles and responsibilities in the implementation of TMOUD. Implementation of TMOUD was often delegated to, or taken on by, a restricted group of leaders, managers, or professionals,<sup>38</sup> and the ways in which stakeholders are identified and recruited into the programme is covered by the initiation subconstruct. The range of necessary participants for successful TMOUD implementation is broad and the exclusion of key players could have substantial implications (panel 2). Pharmacies are a key stakeholder group identified throughout the international literature yet are often separated from those leading TMOUD projects.<sup>38,72</sup>

The international literature indicates an established resistance among pharmacists dispensing MOUD to patients<sup>34</sup> because of stigma, distrust of prescribers, distrust of patients, and the absence of robust ways of

monitoring inappropriate prescribing patterns or medication compliance and shared electronic medical records.<sup>35</sup> In the USA specifically, pharmacists faced triggering an investigation by the Drug Enforcement Administration should they dispense on an out-of-area TMOUD prescription.<sup>34</sup> Therefore, pharmacists are more likely to align their practice with law enforcement and legal gatekeeping than with health-care provision and patient outcomes.<sup>34,78</sup> In this context, finding ways to work with pharmacies is a crucial step in avoiding TMOUD inadvertently creating new barriers to the access of treatment.

We must consider how we enrol stakeholders, such as pharmacies, into the delivery of TMOUD. There are examples in this Review of how pharmacies have been positively engaged to deliver essential aspects of care. For example, in the USA, one service developed a coordinated pharmacy model in which patients were able to access buprenorphine locally with no delay following their virtual assessment and were supported by facilitators who helped with identity checks and waiver forms.<sup>44</sup> Other services arranged electronic prescriptions to be sent to designated pharmacies for MOUD and also naloxone.<sup>39</sup> Similar examples were observed in the UK,<sup>66</sup> Canada,<sup>55</sup> and Ireland.<sup>72,77</sup>

### Panel 2: Perspectives of stakeholders regarding the implementation of telemedicine-delivered medications for opioid use disorder (TMOUD)

#### Leadership and management

Examples included clinical, organisational, operational, and nursing managers.

##### Perspectives:

- TMOUD addressed gaps in coverage caused by scarcities in suitably qualified professionals in specific geographical areas
- TMOUD reduced non-attendance of patients
- TMOUD maintained the safety of patients and providers from the transmission of COVID-19 during the pandemic by reducing in-person contact
- TMOUD reduced complicated clinic logistics and staffing limitations
- TMOUD enabled greater flexibility and capacity within treatment services at reduced cost
- TMOUD enabled the development of redesigned innovative addiction services (eg, electronic consultations with hospitals and virtual group and individual therapy sessions)
- TMOUD provided opportunities to develop models of integrated care
- Stigmatising attitudes at leadership and management level towards people who use drugs affected the perceptions and acceptability of regulatory easing and TMOUD

#### Prescribers

Examples included medical directors, physicians, physician assistants, and nurse practitioners.

##### Perspectives:

- Some prescribers had a moral and ethical imperative to maintain access to opioid use disorder treatment during the pandemic and an opioid epidemic
- Many prescribers recognised the value of TMOUD in retaining patients in treatment
- Prescribers felt that telemedicine might have removed barriers to medications for opioid use disorder (MOUD) during the COVID-19 pandemic in various settings, including rural areas
- Some prescribers had a bureaucratic approach to risk, including anxieties around liability, medicines diversion, and overdose, blocking the local implementation of regulatory easing in prescribing
- Some prescribers held stigmatising attitudes towards people who use drugs and favoured strict regulation over regulatory easing when delivering MOUD. Stigma might have resulted in a resistance among clinicians to enrol and induct new patients into MOUD
- Providing TMOUD allowed some prescribers to enjoy a better work-life balance because of less clinic logistics and travel

#### Behavioural health personnel

Examples included social workers, clinical psychologists, mental health therapists, substance use counsellors, and case managers.

##### Perspectives:

- Some behavioural health personnel felt they might have to adapt to new ways of working and adjust to altered therapeutic relationships
- Some behavioural health personnel felt they might have to act beyond the scope of professional competencies
- Some behavioural health personnel felt hybrid models of TMOUD, such as a tailored service, could be provided to patients on the basis of their preference

#### Community and other front-line workers

Examples included housing support workers, staff in hostels for people experiencing homelessness, outreach or harm reduction workers, peer support workers, and volunteers.

##### Perspectives:

- The roles and attitudes of front-line workers are heavily influenced by the nature of the organisation (eg, community-based or grassroots organisations are more flexible and responsive than statutory equivalents)
- The front-line workers might have to act beyond the scope of professional competencies
- Front-line workers are excluded from the organisation's strategic decisions

#### Administrative

Examples included clinical administrators, programme coordinators, and IT administrators.

##### Perspectives:

- No information available; one study reported surveying this group but did not report their findings

#### Pharmacists

Examples include pharmacists local to the service and patient or in jurisdictions close to the patient but far from the TMOUD service, and pharmacists with an established working partnership with TMOUD services.

##### Perspectives:

- Some pharmacists might distrust patients or the decisions made by clinicians when prescribing MOUD via telemedicine
- Some pharmacists hold stigmatising attitudes towards people accessing MOUD, which might translate into their engagement with TMOUD
- TMOUD-based prescriptions are perceived to expose pharmacists to risks of sanctions (eg, by the US Drug Enforcement Administration)
- Pharmacists might seek to protect themselves (eg, against sanctions from the US Drug Enforcement Administration) by adhering to bureaucratic practices despite the regulatory easing introduced during the pandemic
- Pharmacists who developed partnerships with TMOUD services offered an integrated approach to meeting patient needs that included the provision of naloxone and vouchers to meet medication cost

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(Panel 2 continued from previous page)

- Some pharmacists participated in nominated pharmacy programmes, which meant that patients receiving TMOUD attended a specific pharmacy regularly for dispensing

#### Patients

Examples included patients already established on MOUD, new patients seeking to initiate MOUD, and disadvantaged patients (eg, experiencing homelessness).

#### Perspectives:

- There were high rates of satisfaction and acceptance of TMOUD by patients, with many seeing it as an effective alternative to in-person visits
- TMOUD offered a reduction in treatment delays
- TMOUD offered increased convenience or removal of barriers (eg, flexible appointment times, reduced costs, and geographical distances)
- TMOUD offered on-demand availability of support
- Patients tended to have a preference for home induction of buprenorphine
- TMOUD offered the ability to socially isolate during the COVID-19 pandemic
- TMOUD decreased stigma and patient anxieties regarding unfamiliar surroundings
- TMOUD offered continuity of care regardless of the setting (eg, when transitioning in and out of prison)
- Patients might have little or no access to technology and might experience other social challenges affecting their ability to obtain TMOUD
- Patients might have a feeling of disconnect and distrust between themselves and the provider, which could interfere in their engagement with TMOUD
- Some patients found virtual visits more acceptable than in-person contact, whereas others did not perceive virtual contact as being an alternative to clinical consultation and felt that an in-person consultation was still required
- Reductions in in-person clinic visits as a result of TMOUD might have reduced opportunities for clinicians to address other concurrent issues, such as poor housing or having little food

A good example of enrolment came from Ireland, where stakeholders such as psychiatrists, general practitioners, pharmacists, the Health Service Executive, and the National Social Inclusion office worked collaboratively to produce emergency guidance, enabling the delivery of TMOUD.<sup>72</sup> As COVID-19 pandemic restrictions started to subside, these same stakeholders, supported by an advocacy group for people who use drugs, a front-line, third-sector substance use service, the College of Psychiatrists of Ireland, the Irish College of General Practitioners, and the Pharmaceutical Society of Ireland, participated in a Delphi process to decide if emergency guidance should become standard practice.<sup>72,77</sup> The outcome of this deliberation has been an agreement that TMOUD and electronic prescriptions for MOUD that use the national electronic prescription transfer system are now legitimate standard procedures.<sup>72,77</sup> Activation, the processes needed to enable stakeholders to remain engaged in TMOUD implementation and delivery, might then take the form of ongoing training, financial incentives, and consistent legal and regulatory support.<sup>18</sup>

#### NPT construct: collective action

The collective action construct explains how the work of TMOUD implementation happens and consists of identifying the skill set required, integrating high-level support with front-line needs, facilitating localisation of new processes, and building confidence among stakeholders in the robustness of the new system.<sup>18</sup>

Within the subconstruct of skill set workability, little training and unfamiliarity with the technology and skills involved in providing TMOUD consultations was a common theme among clinicians.<sup>16</sup> In the USA,

compulsory training to license MOUD prescribers was described as insufficient to support TMOUD practice.<sup>16,73</sup> For example, clinicians voiced a need for training on processes, model development, and service implementation methods.<sup>16,67,73</sup> Training that did not incorporate the non-clinical team was also thought to be a barrier to scaling up TMOUD.<sup>73</sup>

Several TMOUD services developed bespoke workflow adaptations that were in accordance with local restrictions, regulations, and resources. For example, one service trained medical students to conduct patient assessments and to act as TMOUD facilitators.<sup>35</sup> This latter role involved familiarising patients with the technology and processes of TMOUD and identifying pharmacies that provided discounted medications to patients.<sup>35</sup> Other models involved outreach workers as TMOUD facilitators alongside their primary role of providing harm-reduction interventions.<sup>15,44</sup> There were also examples of the use of mobile applications to allow virtual, direct observation of treatment with MOUD, access to real-time psychosocial and relapse-prevention support, and patient information to guide informed decision making on the choice of medicine.<sup>65</sup>

Stakeholders found the reliability of the technology used to deliver TMOUD most challenging to relational integration. Issues such as dropped calls, poor quality image or sound, time lags disrupting communication flow, and fluctuating access to bandwidth created friction and impacted on clinician and patient confidence.<sup>16,30,31,38,79</sup>

Some providers were concerned that patients would be excluded from accessing TMOUD due to being unable to afford smartphones or bandwidth, having insufficient digital literacy,<sup>6,15,30,31,37,43,45,51</sup> or having inflexible

health-assistance programmes that refused to fund the service.<sup>37</sup> This exclusion was most likely to affect marginalised or socioeconomically deprived groups,<sup>5,15,37,43</sup> widening rather than narrowing the digital divide. Technical fixes to narrowing the digital divide, such as the provision of mobile handsets<sup>43</sup> or tablets,<sup>80</sup> telemedicine terminals within a syringe exchange facility,<sup>44</sup> and actively advocating for health insurance providers to begin funding TMOUD,<sup>37</sup> were a common theme in the literature.

#### **NPT construct: reflexive monitoring**

Reflexive monitoring refers to the process of evaluation and feedback loops, which are implicit or explicit mechanisms that allow stakeholders at multiple levels to assess the effectiveness of TMOUD and other innovations and iteratively improve upon processes as the intervention unfolds.<sup>81</sup> A key value of presenting results of an evaluation within an implementation science-focused publication is that the wider treatment community could use this evidence to modify their own practices. Several studies highlighted that the rapid changes occurring from the enforced natural experiment around TMOUD during the pandemic needed to be capitalised upon through robust data collection, evaluation, and dissemination of outcomes.<sup>5,13</sup>

We identified a diverse range of evaluation methods. Some leading providers used mixed-methods research and implementation science methodology to show the feasibility of providing low-threshold services through TMOUD.<sup>5</sup> Qualitative interviews with patients and providers have provided granular perspectives on the positive effects of regulatory changes, particularly in the USA, substantiating calls to make these permanent.<sup>5,16,31,79,82</sup> Quantitative measures that use electronic medical records might become a powerful means of showing effectiveness, particularly as comparison between pre-pandemic and post-pandemic records will soon be possible.<sup>16</sup> The importance of evaluating and disseminating prescriber experiences as a means to securing professional validation of TMOUD models and platforms was also identified.<sup>15,16</sup>

There was evidence in some studies of the sharing of evaluation data with other treatment teams triggering wider adoptions of service innovations.<sup>31,43,44,73,83</sup> Some projects managed to produce systems-wide changes; for example, Ireland completed a full feedback loop from the production and implementation of emergency protocols, making TMOUD possible to a Delphi process to ratify these changes throughout the country.<sup>72,77</sup> Research from Cole and colleagues,<sup>13</sup> who piloted a patient satisfaction survey for TMOUD, might standardise future surveys such that comparative longitudinal studies are possible.

#### **Discussion**

This Review synthesised diverse forms of evidence relating to the implementation of TMOUD, dominated by work done in the USA and by the onset of the COVID-19

pandemic. To the best of our knowledge, this is the first Review on this topic to utilise NPT to provide generalisable explanations for observed patterns in the literature. NPT constructs represent empirically demonstrated mechanisms that underpin implementation processes, but its use is not unproblematic. NPT tends to focus on the immediate site of implementation with little sensitivity to overarching contextual issues. For example, there is evidence of a large pool of prescribers in the USA ready and able to provide TMOUD but choosing not to owing to barriers, such as payment and reimbursement issues and stigmatising attitudes towards people who use drugs.<sup>45,51</sup> Introducing TMOUD might work to temporarily fill treatment gaps, but it will not actively address the issues behind qualified clinicians refusing to work in the addictions field.

A further limitation of NPT is that it does not explicitly acknowledge or address inequalities and power imbalances between stakeholders. A concerning observation in this Review was the consistent refusal of clinicians to take on new patients via TMOUD.<sup>29,39,41,45,50,51</sup> A survey of clinicians in the USA prescribing MOUD during the COVID-19 pandemic showed that 67% were unwilling to induct new patients without an in-person visit, despite regulatory easing.<sup>51</sup> This unwillingness was echoed by on a monthly audit of office-based physicians in which TMOUD was delivered far more often but primarily for established patients and not new ones.<sup>41</sup> Consequently, at the onset of the COVID-19 pandemic, Black people, Indigenous people, other minority ethnic people, people experiencing poverty, people with mental health conditions, people with involvement in the criminal justice system, and people with unstable housing were systematically excluded from TMOUD as they were less likely to be already known to services.<sup>29</sup> Implementation scientists have recommended that NPT is paired with participatory or collaborative approaches to enable inclusivity of under-represented views and opportunities for meaningful action to prevent worsening health inequalities.<sup>84</sup> We have consolidated our critical appraisal of the literature through the NPT lens into seven recommendations (panel 3), which should be applicable in diverse settings because of the broad scope of our Review.

Our findings coincide with those of the four scoping reviews examining TMOUD during the COVID-19 pandemic,<sup>29–32</sup> while also providing a deeper understanding through the critical lens of the NPT constructs. For example, although the COVID-19 pandemic has increased TMOUD adoption and provided further evidence to support wider implementation,<sup>29–32</sup> there has been inconsistent adoption across jurisdictions.<sup>85</sup> Under the construct of coherence, we can see how failing to understand competing stakeholder interests and power imbalances experienced by those still expected to be at the front line to facilitate TMOUD delivery might hamper its adoption by services.<sup>45,51</sup> Under the construct of cognitive participation, we observe that TMOUD delivery could fail

due to non-engagement of key stakeholders external to the service, such as pharmacies.<sup>34</sup>

We also concur that TMOUD has helped to narrow the treatment gap for some people while reducing access to treatment for minority ethnicities and races and other marginalised groups.<sup>29,30</sup> Our Review has provided some insights on this point through the construct of coherence, showing that indiscriminate and uncritical risk aversion by prescribers and stigmatising attitudes towards people who use drugs are at least partly contributing to this finding.<sup>39,50,51</sup> Specifically, marginalised groups tended not to be in treatment at the onset of the COVID-19 pandemic, so the reluctance of clinicians to initiate new patients into MOUD via telemedicine tended to exclude these groups more than others. Crucially, there were no identifiable ways in which these marginalised groups were able to contest their exclusion, become involved in sharing these risk decisions, or design alternate ways into treatment, which represents a key gap in the current TMOUD literature.

A further limitation is that we did not include grey literature in our study and so might have excluded some relevant contextual information. As a response to the COVID-19 pandemic, substantial material on TMOUD published in peer-reviewed journals allowed us to reach saturation in terms of no new themes emerging that matched the NPT constructs. 80% of the literature was from the USA, with minor representation from Canada, Ireland, India, and Denmark. The minimal representation from low-income and middle-income countries might limit the relevance and transferability of our findings and recommendations to these settings. Many studies did not provide sufficient detail on their TMOUD model, making comparisons problematic. Although individual papers did not go into much depth regarding contextual factors, when taken together we found examples of relevance to all NPT constructs and subconstructs.

Several research gaps have been identified in this scoping Review. First, TMOUD implementation projects informed by formal theoretical frameworks, such as NPT or the consolidated framework for implementation research, and based in lower-income and middle-income countries are required. Second, more work is required to address the tensions that clinicians experience when reducing regulatory and surveillance-based activities, such as urine drug testing and direct observation of MOUD consumption. Although there is support for these practices at the early stages of treatment to support treatment concordance and reduce the risk of harm to patients, they might also act as a barrier to entering treatment. Incorporating a person-centred and collaborative risk assessment<sup>86</sup> in deciding changes to these practices might be of benefit. Third, there are few studies comprehensively evaluating the effect of the COVID-19 pandemic on TMOUD development, implementation, and outcomes. International cross-case

### Panel 3: Recommendations from this Review

- Begin with a clear understanding of the necessary processes (ie, process mapping) involved in delivering telemedicine-delivered medications for opioid use disorder (TMOUD) and what the potential points of failure or risk are.
- Changes in prescriber attitudes to TMOUD will require an understanding that perceptions of clinical risk depend on social relationships, attitudes, trust, values, power relations, hierarchies, experience, and knowledge. Providing evidence of good outcomes alone without also addressing the risk culture is unlikely to be sufficient to enable change.
- Bureaucratic risk responses by prescribers in the absence of regular critical reflection and improvement loops might widen the digital divide and structural inequalities.
- Monitor and actively address the digital divide, paying attention to non-technical fixes, such as human connection and peer support. Providing technology and bandwidth alone is unlikely to address a patient's acceptability of telemedicine.
- Engage front-line practitioners and patients as partners in the design, implementation, and evaluation process of TMOUD. Participatory and collaborative approaches are a good fit with implementation science theoretical frameworks.
- Add a collaborative needs assessment to the process map to identify what will be missing from virtual contact and its effect on existing structural inequalities; for example, access to food, benefits advice, shelter, heating, and safety and housing support.
- Develop strong partnerships with pharmacies early in the design of TMOUD intervention to minimise the risk of added barriers to treatment that might derive from virtual prescribing.

comparison studies might increase the value and usefulness of the rapid TMOUD implementation activities seen through the pandemic. Finally, as highlighted by Aronowitz and colleagues,<sup>45</sup> non-engagement with TMOUD among marginalised populations is not solely because of access, affordability, or digital skills, but also because of the acceptability of telemedicine as a substitute for in-person contact; an issue requiring further exploration.

We conclude that the current literature around the implementation of TMOUD is usefully framed by NPT constructs. Mechanisms that underpin the implementation of TMOUD include ensuring there is a coherent understanding of it as an intervention, the engagement of key stakeholders, providing the necessary resource and skills, and iterative cycles of continuous improvement. Understanding the range of ways in which TMOUD can be delivered (eg, via hybrid methods) might help to reduce some of the anxieties that clinicians have around prescribing without an in-person consultation. Furthermore, understanding the relationships and power imbalances between stakeholders is key to the sustainability of TMOUD. Directing resources to building technological stability and valuing front-line worker and service provider creativity in developing bespoke workflows is a key mechanism. The use of standardised evaluation frameworks would allow organisations to share and build the evidence base around TMOUD, which is currently inconsistent. One of the most prominent gaps in the literature around the

implementation of TMOUD is regarding how to ensure already marginalised groups are not further disadvantaged by the expansion of this treatment method. Although NPT does not naturally incorporate constructs that explore issues of power and inequality, combining this theory with participatory research methods might offer a workable approach to the implementation of TMOUD.

#### Contributors

JTWT and AB conceived of the project, secured funding, and extracted data. AB supervised research activities. JTWT, AB, and AG conducted data analyses. JTWT drafted the manuscript and managed subsequent iterations following additions and edits from coauthors. All authors critically reviewed the manuscript and interpreted findings.

#### Declaration of interests

MNP has consulted for Opiant Therapeutics, Game Day Data, Baria-Tek, the Addiction Policy Forum, AXA, and Idorsia Pharmaceuticals; has been involved in a patent application with Yale University and Novartis; has received research support from Mohegan Sun Casino and the Connecticut Council on Problem Gambling; has participated in surveys, mailings, or telephone consultations related to drug addiction, impulse-control disorders, or other health topics; has consulted for and advised gambling and legal entities on issues related to impulse-control and addictive disorders; has performed grant reviews for research-funding agencies; has edited journals and journal sections; has given academic lectures in grand rounds, CME events, and other clinical or scientific venues; and has generated books or book chapters for publishers of mental health texts. SA has received speaker honoraria from Camurus, Indivior, Janssen, and Gilead. All other authors declare no competing interests.

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