Increasing memory confidence: A novel intervention for obsessive-compulsive disorder

Study Protocol and Analysis Plan

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PROTOCOL

Research Problem/Background Analyses/Relevant Literature:

Obsessive-compulsive disorder (OCD) affects approximately 3% of the population (Stein, Forde, Anderson, & Walker, 1998). The disorder is characterized by obsessions, which are repeated intrusive thoughts, images or urges, and/or compulsions, which are repeated unwanted behaviours designed to reduce the distress associated with obsessions (American Psychiatric Association, 2013). OCD is a severe condition; it **causes quality of life impairments** (Eisen et al., 2006) and **creates a heavy burden on loved ones** (Cicek, Cicek, Kayhan, Uguz, & Kaya, 2013).

Although **exposure and response prevention**, a behaviourally based intervention (see Rowa, Antony, & Swinson, 2007, for a review) is the gold standard psychological therapy for OCD (Chambless et al., 1998), the treatment **is often marked by non-optimal response rates** (e.g., 62%, Foa et al., 2005), which have considerable room for improvement. Given the heterogeneity and complexity of the disorder, the addition of specific targeted and theory-based interventions are warranted to enhance treatment. Indeed, attempts have been made to incorporate cognitively-based interventions into ERP and to test cognitive approaches (see Clark, 2003; Rachman, 2003 for cognitive models of OCD), as there are several maladaptive beliefs known to be at play in OCD (OCCWG, 2005). **Unfortunately, these efforts using broad-based cognitive interventions have not improved treatment outcome** (Clark, 2005).

OCD is an extremely heterogeneous disorder (Radomsky & Taylor, 2005), with multiple presentations of different combinations of symptoms (Pinto, Mancebo, Eisen, Pagano, & Rasmussen, 2006). Perhaps **interventions need to be more targeted to the specific symptoms** and maladaptive beliefs that are at the root of the symptoms. **One of the most commonly reported lifetime symptoms is compulsive checking** (Ruscio, Stein, Chiu, & Kessler, 2010). Rachman's (2002) theoretical account of compulsive checking contains many elements, but among them is the self-perpetuating cycle between doubting and checking. In this cycle, **checking is caused by doubt, but the act of checking paradoxically increases, rather than decreases doubt**, thereby maintaining the urge to check. There is now a robust experimental literature demonstrating that repeated checking, both physical or mental of both virtual or real home appliances, leads to lower confidence in memory of the checks (e.g., Boschen & Vuksanovic, 2007; Coles, Radomsky, & Horng, 2006; Radomsky & Alcolado, 2010; Radomsky, Dugas, Alcolado, & Lavoie, 2014; van den Hout & Kindt, 2003). Other more recent experimental research has demonstrated that the inverse also occurs. Inducing low memory confidence with an experimental paradigm (using false feedback following a memory test) can cause urges to check (Alcolado & Radomsky, 2011). Indeed, if this is true, the **doubt in the OCD cycle may come in part from beliefs one has a poor memory** (see Radomsky & Alcolado, 2010). In line with this hypothesis, research has shown poor memory confidence predicts checking (Nedeljkovic & Kyrios, 2007), and beliefs about poor memory interact with other dysfunctional beliefs related to OCD to predict checking (Cuttler, Alcolado, & Taylor, 2013). There is also evidence to suggest that poor beliefs about memory are related to greater severity of compulsive checking in clinical samples (Nedeljkovic & Kyrios, 2007; Nedeljkovic, Moulding, Kyrios, & Doron, 2009; Alcolado & Radomsky, 2016).

My prior work has shown that challenging maladaptive beliefs about memory ability can lead to reduction in compulsive checking symptoms (Alcolado & Radomsky, 2016). We conducted a pilot study to develop and test the efficacy of an intervention designed to target maladaptive beliefs about memory (Alcolado & Radomsky, 2016). After just two sessions of this specific cognitive intervention for checking (CBT-C), the active treatment group, as compared to a waitlist control, had significant decreases in maladaptive beliefs about memory, and importantly, also exhibited significant decreases in checking symptomatology (with large effect sizes, all η_p^2s > .32). Critically, the decreases in those maladaptive beliefs predicted symptom improvement. **Thus, there is good preliminary evidence that such a targeted, theory-based approach is useful for the treatment of obsessive-compulsive checking. A number of pertinent questions remain, however.** At the forefront of these is whether such a brief intervention is durable and whether, for certain individuals, it is more effective than treatment as usual.

Study Objectives:

1. Replication of previous pilot study findings with a larger sample: Pilot testing (N = 24) was promising (Alcolado & Radomsky, 2016). This treatment was effective at significantly reducing global checking symptomatology and average daily time spent checking, with large effect sizes. Thus, the next logical step is to replicate these findings on a larger scale (N = 50).

2. Compare the effectiveness of the treatment to an active treatment: The pilot study used a waitlist control group against which the treatment (CBT-C) effects were compared. Therefore the current proposal aims to use a more active control condition. A treatment as usual (TAU) approach was chosen as this type of control is most applicable where one is trying to determine whether the therapy adds anything of benefit to existing interventions (for a review see Mohr et al., 2009).

3. Determine the long-term durability of the treatment effects: Another equally important step in this replication and extension study is to ascertain whether the effects of the intervention are durable beyond the end of treatment. A six-month follow-up assessment will therefore be administered.

4. Determine for whom the intervention is effective: This novel CBT intervention for checking (CBT-C) focuses on identifying and challenging maladaptive beliefs about memory, with the aim to increase patients' confidence in their memory for checking situations. In the preliminary treatment investigation, maladaptive beliefs about memory decreased significantly across treatment, and were predictive of decreased checking behaviours at post-treatment (Alcolado & Radomsky, 2016). However, it remains unclear for whom this intervention is most effective. Are all individuals with compulsive checking plagued by maladaptive beliefs about memory, and do patients need to endorse these beliefs in order for this treatment to be effective? These questions will also be examined in this investigation, where the larger sample size will allow for comparisons based on patients' degree of endorsement of maladaptive beliefs about memory.

Hypotheses:

Following directly from the project's objectives, the hypotheses are **(1)** that the treatment (CBT-C) will be effective, in replication of a previous pilot treatment; **(2)** this brief intervention will be more effective than the comparison condition (TAU); **(3)** the effects will be maintained at 6-month follow-

up; and that **(4)** although the treatment will be effective for all, it will be most effective for those patients with high pre-treatment levels of maladaptive beliefs about memory.

Design/Methodology

Participants:

Participants (N = 50: n = 25 in CBT-C, and n = 25 in TAU; allowing for the testing of an additional 5 participants [predicting an approximate 10% drop-out rate as was seen in the pilot study]) will take part. This sample size is reasonable given the number of OCD referrals our clinic typically receives in a year (approximately N = 50) in conjunction with the active recruitment we will do through the community support groups, allowing for ineligible participants and study attrition. This sample size is also adequately powered for the analyses (see Power Analyses and Statistical Plan, below). Participants will come from one of two sources, either our Anxiety Disorders Clinic or community (see Recruitment, below).

Inclusion criteria are that participants must be age 18 or older, with a diagnosis of OCD and clinically significant levels of compulsive checking. This is defined as being able to meet the diagnostic criteria for OCD according to the Diagnostic and Statistical Manual of Mental Disorders, *5th Edition* (DSM-5; American Psychiatric Association, 2013) based solely on checking symptoms. Other OCD symptoms may be present and checking does not need to be the primary symptom. This study will be offered through online video conferencing platforms or in-person appointments to adhere to pandemic restrictions and maximum safety. If pandemic restrictions are in place, participants must be available for appointments using an online video conference platform such as Zoom, Microsoft Teams, or Doxy.

Exclusion criteria include active suicidality, psychosis, mania, or a substance use disorder that would interfere with participation in the treatment. Participants do not have to be treatment or CBT naïve, and can be medicated, as we are interested in a real-world sample. This information will be collected and tracked in case any differences become relevant for analyses.

Power analyses conducted using G*power (Faul, Erdfelder, Lang, & Buchner, 2007) indicate the sample size of 50 participants will provide more than adequate power to conduct all analyses (see Statistical Plan, below). For the ANOVAs, assuming a medium effect size, 2 conditions, 3 time points, and requiring a high level of power, an N of 44 is needed. For a linear regression with one predictor, with similar effect size and power, N = 43 is needed.

Materials:

Measures: These will include a **background information** form (including age, sex, level of education, marital status, and work status). **The MINI International Neuropsychiatric Interview** (Sheehan et al., 1998) Version 6.0 will be administered to diagnose presence of OCD and any other co-morbid conditions according to the. OCD severity will be assessed using the gold standard **Yale-Brown Obsessive Compulsive Scale** (Y-BOCS; Goodman et al., 1989a). **Validated self-report questionnaires assessing OCD symptoms** (the Vancouver Obsessional Compulsive Inventory [VOCI]; Thordarson et al., 2005), **beliefs** (Obsessive Beliefs Questionnaire [OBQ]; OCCWG, 2005), and associated **affective symptoms** (Depression Anxiety Stress Scale, DASS; Lovibond & Lovibond, 1995) will be administered. To assess beliefs about memory, the new **Beliefs about**

Memory Inventory (BAMI; Alcolado & Radomsky, 2012) will be administered. The **Memory and Cognitive Confidence Questionnaire** [MAACS; Nedeljkovic & Kyrios, 2007) will also be administered as an additional measure of beliefs about memory. Participants will also be asked about alternative treatments and medication status at each assessment visit in case such differences need to be controlled for, and to accurately characterize the treatment as usual condition (see Treatment As Usual, below). The background information form, VOCI, OBQ, DASS, BAMI, and MACCS will be administered in one of two different ways. If the participant attends online visits, they will complete these measures using a secure online survey through Survey Gizmo. If the participant attends in-person visits once pandemic restrictions are lifted, they will complete these measures on a paper copy of the form. The Y-BOCS and MINI are semi-structured interviews and will be administered by the research assistant.

Audio Recordings: A random sample (n = 5) of the MINI audio-recorded interviews will be reviewed for the purposes of determining inter-rater reliability between the diagnostic decisions made by the PI and the research assistant. Audio recordings will only be identified by a number, not a name, and will be housed on the same secure computer servers as the study data. They will be deleted immediately after coding in order to enhance the level of privacy and protection. Similarly, a random sample of the treatment sessions audio-recordings will also be preserved for reliability coding by the research assistant (n = 5 of session 1 and n = 5 of session 2) in order to confirm that the PI remained consistent with the manualized treatment. These audio-recordings will be treated in the same manner as the MINI audio-recordings in order to ensure privacy. For online assessment appointments, an audio recorder will be used by the research assistant during administration of the Y-BOCS and the MINI. During the recording, no participant identifying details will be used. The recording will be securely emailed to the PI after the appointment and subsequently deleted from the audio recording device. The PI will retain copies of these recordings on a computer at St. Boniface Hospital. For online treatment appointments, an audio recorder will be used by the PI for the entirety of each session. These recordings will be securely uploaded to Qualtrics and password-protected. The participant will be emailed a link and the password to access the recording. They may listen to it online through Qualtrics in order to fulfill the homework portion of the study. The recording will be deleted from Qualtrics within a one-week time period and will be deleted from the audio recording device after uploaded to Qualtrics. We have consulted with the IT department at the University of Manitoba and been assured that Qualtrics is a secure and appropriate platform for study participants to be able to listen to the audio-recordings of their treatment sessions.

<u>Interventions:</u>

The novel intervention (CBT-C) to be used is that developed in the pilot study (Alcolado & Radomsky, 2016). This intervention is a manualized 2-session CBT treatment. Agenda elements, including psychoeducation, discussion prompts, and homework exercises are standardized across participants. In the first session, participants are taught about the cognitive theory of checking, the research support behind this theory, and how it may apply to their own checking behaviour. A homework exercise is introduced and practiced to test out this theory. In the second session, the homework results are reviewed. Further education is shared on the nature of memory and the relationship to checking, and a discussion regarding how this applies to the participant's checking then takes place. A second homework exercise is introduced to test this theory. Following each session, patients are also instructed to review a written hand-out of the information presented, as

well as listen to an audio-recording of the session material, in order to enhance their understanding and retention of the material learned between sessions. The hand-out will be emailed or mailed if the participant attends online appointments, whereas they will be provided with a paper copy if meeting in-person.

Treatment as Usual (TAU) during patients' time on our waitlist in our clinic will depend on at what point they have been recruited. It may consist of a 2-session group psychoeducational intervention on anxiety, any medications prescribed by their referring physicians, and/or independent therapy/counseling they may be seeking on the side. TAU for community participants will include any treatments they are currently seeking and will also be tracked during the course of the study Information about participation in such interventions will be collected during the course of the study (at each assessment visit) in order to accurately characterize participants' TAU in the current study. in order to enhance accurate characterization of TAU.

Procedures:

Recruitment phase: Patient participants will be recruited either at referral to the Anxiety Disorders Clinic, at the introductory psychoeducation sessions they receive while on our clinic's waitlist, or following completion of another treatment program in our clinic. Patients will be aware of this process as it will be described in the standard referral response letter they receive from our clinic acknowledging receipt of their referral. At this point patients may reach out to the research assistant themselves, or might be contacted directly by the research assistant if they seem appropriate (i.e., referral source flagged OCD symptoms). Our research assistant may also attend our clinic's introductory psychoeducational sessions and the last session of cognitive-behavioural therapy groups for OCD to explain the study to potential participants. Interested patients will be contacted by the research assistant to discuss the study further and conduct the usual phone screen (see Telephone Screening). All clinic patient contacts will be done by the research assistant to minimize a sense of coercion.

Community participants will also be recruited through the OCD Centre of Manitoba and the Anxiety Disorders Association of Manitoba support groups. We will include advertising on their websites, with flyers, give community talks on OCD through these organizations to generate interest, and conduct a press release through media relations in the department and hospital. Interested community members who contact us from our advertisement efforts will be contacted by either the research assistant or the principal investigator. Community participants will be recruited through the city of Winnipeg more broadly using major and community newspapers using the same advertisement.

Telephone Screening: All interested parties will receive an initial scripted telephone screen for eligibility. Participants who are clinic patients will be assured that their potential participation will in no way affect their waitlist for assessment and treatment services within our clinic. Participants will be informed that as part of the screening they are required to complete a checking monitoring form. Participants will be informed they are consenting only to have this data looked at that day for determining eligibility, and that regardless of eligibility or decision to participate in the study, this form will be destroyed and not used for data analyses.

Assessments: Eligible participants will undergo informed consent (see Process for Seeking Consent) and participate in a diagnostic interview consisting of the MINI and the Y-BOCS to confirm eligibility. If they are eligible to participate following these diagnostic interviews, they will complete a demographic questionnaire, and will be randomly assigned to receive the new treatment (CBT-C; administered by the principal investigator) or treatment as usual (TAU). The VOCI, OBQ, and DASS questionnaires will be administered at pre- treatment, post-treatment, and at 6-month follow-up. MINI interviews will be audio-recorded for later fidelity coding purposes (i.e., to determine whether different interviewers make the same diagnostic decisions). As previously described, assessment visits may be conducted online using a video conferencing platform such as Zoom, Microsoft Teams, or Doxy or in person at St. Boniface Hospital. In-person visits will only be available once pandemic restrictions are lifted. The questionnaires will be completed online via Qualtrics, a secure University-based online survey software program, for the duration of the pandemic.

Process for Seeking Consent: Participants will complete the consent process at their assessment online or in-person visit, prior to the collection of any data. This will occur following the phone screen to determine initial eligibility and interest. The consent form will be reviewed by the experimenter (either the research assistant or the PI) with the participant and they will have ample opportunity to ask questions. They will be reminded that they can withdraw their consent at any time and cease participation in the study, and that no more data will be collected. The experimenter at this point for any clinic patients will be the study research assistant, and they will remind individuals that their participation is voluntary and will not in any way affect their treatment trajectory or timeline in the clinic so as to minimize any sense of coercion.

CBT-C: Patients will attend 2, 1-hour individual CBT treatment sessions with a focus on maladaptive beliefs about memory, occurring approximately 1 week apart, whose content is described above. Similar to assessment visits, these sessions will be offered online using a video conferencing platform, or in-person once pandemic restrictions have been lifted. Sessions will be audio-recorded for two reasons. Firstly, as part of participants' homework (as noted above, review of the session content between sessions is required for maximizing understanding and retention). Secondly, a random selection will be reviewed by the research assistant and coded for fidelity to the treatment manual as a treatment fidelity check. Instead of participants providing paper copies of their daily checking activities, homework exercises, and instead of completing paper-based questionnaires at each visit, patients will be directed to fill this information out online, via Qualtrics.

Treatment as Usual (TAU): Patients in the TAU condition from the clinic will remain on the service waiting list and receive the offer of service when it is available. CBT-C has not been part of the OCD service in the past and it will not routinely be offered until the study has been completed and the results have been analyzed.

Debrief: Following the completion of the 6-month follow-up, patients will be fully debriefed as to the full purposes of the study. Regardless of condition assignment, upon completion of treatment, all patient participants who still desire assessment and treatment of their symptoms will remain on our clinic's waitlist for further assessment and treatment recommendations. In line with a stepped care model of treatment, those participants who no longer desire further treatment beyond CBT-C will be

discharged from our clinic. The number of cases for whom this is true will be recorded. For community participants who desire further services following their participation in the TAU condition may receive the active treatment (CBT-C) if interested, and/or, with a family physician referral, they can then access the next appropriate treatment option available in our clinic.

Compensation: Participants will be offered $10 at the end of each assessment visit (for a maximum of $30 per participant), as a monetary compensation for participants time and efforts, as well as to offset the costs of transportation for their appointments. They will not be offered compensation for their treatment visits. Compensation will be offered in-person, or, if a participant attends online visits, will be provided by mail.

Timeline:

Time point	Phone Screen	Pre-treatment Assessment	Treatment Week 1	Treatment Week 2	Post-treatment Assessment	6-mo. follow-up & debrief
Condition						
A) CBT-C	✓	✓	✓	✓	✓	✓
B) TAU	✓	✓	×	×	✓	✓

✓ = Study visit at this time point
× = No study visit at this time point

Statistical Plan:
Intent-to-treat (ITT) analyses will be conducted in order to accurately depict the progression of all participants through this treatment. As such, if there is drop-out, the last observation point for those participants will be carried forward for all subsequent missing data points of interest. To test **hypotheses 1, 2, and 3** (1 - that the treatment be effective, 2 – as compared to the control group, and 3 – that its effects last over the follow-up period), a mixed-model ANOVA will be conducted. The between-participants independent variable will be treatment condition (CBT-C vs. TAU), and the within-participants independent variable will be time point (pre-treatment, post-treatment, and 6-month follow-up). The dependent variable will be the checking subscale of the VOCI. A similar analysis using average daily time spent checking per week from the daily diaries as a dependent variable, as an alternate measure of checking.

A linear regression will be conducted to test **hypothesis 4** (that the extent to which maladaptive beliefs about memory are endorsed affect outcome). Pre-treatment BAMI total score will be entered as the predictor variable. The criterion variable will be a change score that subtracts pre-treatment VOCI score from post-treatment VOCI score. All analyses will be conducted using SPSS statistical software.

Budget details and available resources:

Student Research Assistant: $5510.	We intend to hire a graduate student (pre-masters level) in clinical psychology for part-time work as a research assistant. Their duties would include assistance with administrative, clinical, and research procedures. More specifically they would aid in managing recruitment, conducting initial phone screens, obtaining informed consent from participants, conducting diagnostic screening interviews (after receiving training and ongoing supervision from the principal investigator), entering data, conducting literature searches, and participating in preparation of the manuscript. It is estimated they would be working approximately 4-5 hours per week on average. (Towards the beginning of the study there would be a greater number of hours worked per week given the intensity of screening and testing, and fewer hours would be worked per week towards the end of the year. Additionally, although some 6-month follow-up assessments may fall outside the funding period, the resources required for follow-up are modest and the PI could administer these if the research assistant is no longer available.) **Cost explanation:** $18/hour (plus institutional 19.15% benefits and payroll levy) at 4.94 hours worked per week on average means the total for the year would be $5510.
The MINI International Neuropsychiatric Interview: $0.	The MINI is a validated and well-used semi-structured diagnostic interview used in outcome research. Its fee structure has changed since the time of original budgeting. It is free for use based on the parameters of the current study (they only require projects on a very large scale with large budgets to pay for its use).
Participant Compensation: $1410 ($850 from the study sponsor and $560 from another source)	All participants will receive $10 per visit for their assessment visits, of which there are three. Three participants have already completed the study, therefore this is for the remaining 47 participants still to be recruited. Therefore $1410 is needed in total. After paying for the newspaper advertisement (see below) there will be $850 left in the budget to devote to this purpose.

	The remaining $560 necessary to pay all participants will be taken from a start-up grant fund that the PI has recently received that is allowed to be used for miscellaneous research purposes.
The Winnipeg Free Press: $750	Based on a quotation from The Winnipeg Free Press, this allows for an ad to be run 1 time in the city newspaper.
Supplies: $250	This includes the cost of paper, printing, photocopying, and office supplies required for the large volume of questionnaires and worksheets to be used by participants. Given that this is a new treatment offering with additional questionnaires and worksheets beyond those typically used in our clinic, they will exceed normal use of the departmental printing and photocopying capacity, which is reserved primarily for those of a primarily clinical nature (i.e., assessment reports and chart notes).
SPSS License: $140	To be purchased for use by the principal investigator and the research assistant such that we will have software on our computers with which to input data and conduct analyses.
Available resources: PI's time	The PI has 40% protected research time as part of her contract, and as such, will have time to dedicate to this research project.
Available resources: Office space, including telephones and computers	There is protected private space for psychology staff at St. Boniface Hospital and research assistants, as needed. Each office is equipped with a computer and telephone, for ease of phone screening, in-person interviewing, conducting interventions, and entering data on secured computers.

Contract with Sponsor:

This study is supported by an internal grant from the University of Manitoba, the University Research Grant Program (URGP). This study is now also funded in part by start-up grant funding awarded to the PI.

Ethical considerations

Potential benefits to subjects and others:

It is hoped that this study will be of **benefits to subjects** by providing them with a novel treatment component which may have the ability to enhance their understanding of OCD and increase their treatment gains over traditional treatments. It is hoped that the decrease in symptoms will cause an increase in functionality which will be of benefit to participants.

It is hoped that this study will be of **benefit to others** in two key ways. **Practical benefits:** This project (if results are as expected) will allow the introduction of a new treatment intervention for patients with OCD, first in our clinic and ultimately for others, through dissemination of these research findings. Given that this intervention can be a component of a stepped care approach, it may also reduce wait times and increase access and the expediency of service to patients in our clinic, as this brief intervention can be offered to individuals with compulsive checking who are waiting for individual assessment and more intensive treatment of OCD. **Theoretical benefits:** If the proposed treatment of compulsive checking via targeting and challenging maladaptive beliefs about memory is found to be effective, it will have important implications for our understanding of the etiology and maintenance of OCD.

Potential harm to subjects and others:
There are a few areas of potential harm to be discussed. First, it is possible that participants will experience discomfort, i.e., increased anxiety, during the treatment sessions as they discuss and complete exercises related to their fears. If the participant becomes too distressed by the treatment, it will immediately be stopped, the participant will not leave the clinic until they have been debriefed and their mood has stabilized.

Secondly, participants may fail to respond to treatment, or to experience worsening of their symptoms. These harms will be minimized by reminding participants that they are free to discontinue their participation in the study at any time to pursue other treatments. Further, participants will be offered alternative treatments at the end of the study. These include our clinic's traditional intensive treatment options of either short-term traditional individual CBT for OCD, or our 16-session group CBT for OCD protocol. The identification of participants who are not improving or who are suffering during the treatment will be easily identifiable as the PI will be administering the intervention, and she is a registered psychologist in the province of Manitoba, and as such, has the required clinical skills for early identification of such risks.

Thirdly, it is possible that a patient could become suicidal during assessment/treatment. Participants who have severe suicidal ideation will be excluded from the study and offered alternate resources, but those who prove to be at risk will be monitored at every session by inquiring about their suicidal thoughts and plans, just as any therapist would in a regular clinical treatment setting. Participants at acute risk of suicide will be personally accompanied to the nearest emergency room or crisis response centre if needed. If meeting online, the appropriate service (i.e., Mobile Crisis, ambulance, or police service) will be contacted by the PI or research assistant, as deemed necessary. The participant's address, and confirmation that the participant is at home during the interview, will be acquired at the beginning of each appointment, in case of need to direct emergency services to their location.
Please note we anticipate a very low likelihood of any of these negative events, given that none of these circumstances (distress during treatment, worsening of symptoms, or increase in suicidality) occurred during the pilot study.

If this treatment is not demonstrated to be effective at reducing symptoms, it will not be administered to our other patients, nor will the techniques be disseminated with other clinicians

for use with their patients. Thus, there are no potential harms to others beyond the study participants.