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RESEARCH ARTICLE

Site-level factors affecting nursing home implementation of a personalized music intervention: Qualitative analyses from Music & Memory: A Pragmatic Trial for Nursing Home Residents with Alzheimer's Disease (METRIcAL)

Davoodi Natalie[1] | **Olson Miranda**[2] | **Uth Rebecca**[2] | **Baier Rosa**[1,2,3] | **Rudolph James**[1,2,3,4] | **Zediker Esme**[2] | **Shield Renee**[1,3] | **Ellen McCreedy**[1,2,3]

[1]Center for Gerontology and Healthcare Research, Brown University School of Public Health, Providence, Rhode Island, USA

[2]Center for Long-Term Care Quality & Innovation, Brown University School of Public Health, Providence, Rhode Island, USA

[3]Department of Health Services, Policy and Practice, Brown University School of Public Health, Providence, Rhode Island, USA

[4]US Department of Veterans Affairs Medical Center, Providence, Rhode Island, USA

Correspondence
Ellen McCreedy, Brown University, School of Public Health, 121 South Main Street, Suite 6, Providence, RI 02903, USA.
Email: ellen_mccreedy@brown.edu

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Abstract

BACKGROUND: Non-pharmacological interventions (NPIs) are preferred alternatives to using antipsychotic medications to manage disruptive behaviors in nursing home (NH) residents living with dementia. However, the implementation of these interventions is often complex in the NH environment. In this qualitative analysis of data from an embedded pragmatic clinical trial (ePCT) of a personalized music intervention, we describe NH-level implementation barriers and facilitators.

METHODS: In a 54-facility trial, we randomized 27 NHs from four US corporations to the personalized music intervention. In this qualitative analysis, we analyzed barriers and facilitators at 9 of the 27 intervention NHs, using (1) routinely collected data collector observations and (2) semi-structured interviews with NH staff. We iteratively developed codes to best describe these data and generated themes.

RESULTS: We found five qualitative themes related to the variation of intervention implementation across NHs: (1) turnover and institutional changes interfered with implementation; (2) consistent with pragmatic implementation, delivery strategies varied across NHs; (3) family members influenced residents' participation; (4) non-clinical program champions needed clinical buy-in, which was challenging and required demonstrating the intervention's clinical benefits; and (5) technological barriers among staff and residents impeded implementation.

CONCLUSIONS: Qualitative results from nine facilities participating in a NH ePCT of personalized music intervention highlight the importance of identifying an intervention's key components to ensure fidelity, while allowing the flexibility necessary for pragmatic implementation. Engaging family caregivers may improve the implementation of NPIs in the NH setting. Results may be helpful to other researchers implementing NPIs to manage neuropsychiatric symptoms for people living with dementia in NHs.

KEYWORDS
dementia, implementation, neuropsychiatric symptoms, non-pharmacological intervention, nursing home, personalized music, qualitative research

Highlights

- This was a real-world trial of a personalized music for nursing home (NH) residents with dementia.
- Pragmatic adaptations to intervention delivery may have compromised fidelity.
- Family caregivers are important to the success of behavioral interventions in NHs.

1 | BACKGROUND

People living with dementia experience agitated or aggressive behaviors that cause them and their caregivers emotional stress.[1] Antipsychotic medications, often referred to as chemical restraints,[2] are frequently used to alleviate these behaviors in nursing homes (NHs),[3] even though they are contraindicated for this purpose. Adverse effects of antipsychotic medications include sedation,[4] cognitive decline,[5] increased risk of falls,[6] and death.[7] NH staff may recognize the risks of antipsychotic medications, but family insistence, reoccurring or worsening symptoms, the physical risk to staff, and inadequate alternatives incentivize their continued use.[8] Non-pharmacological interventions (NPIs) are one promising solution to address harmful antipsychotic use for NH residents with dementia.[9] However, NPIs have proven challenging to implement consistently with high fidelity.[10]

Personalized music may reduce non-aggressive agitated behaviors secondary to social isolation and boredom in NH residents with dementia.[11,12] Personalized music may also improve mood[13] and overall quality of life in this population.[14] Music & Memory (M&M), a personalized music intervention currently used by ≈ 5800 US NHs in all 50 states, aims to help manage agitated behaviors by using resident-preferred music to trigger memories and positive emotions in older adults with dementia.[15] One previous M&M pilot study,[16] and one prospective cohort study,[17] captured decreases in agitated behaviors through direct observational measures, NH staff interviews, and resident-level administrative data. However, a prospective randomized controlled trial (RCT) in 10 NHs did not find significant reductions in antipsychotic medications or agitated behaviors.[18] Our recent pragmatic trial did not show a significant reduction in antipsychotic drug use or agitated symptoms among residents with dementia, as measured using routinely collected administrative data,[19] but we found significant decreases in verbally agitated behaviors and significant increases in pleasure, as measured using structured observations of residents at standardized times of day.[20] Based on these mixed findings, more research is needed to contextualize and clarify barriers to and facilitators of M&M implementation at the NH level.

In this qualitative analysis, we describe site-level factors, including barriers and facilitators, which affected intervention implementation in participating NHs, elicited from semi-structured interviews with NH staff and observational notes from trained data collectors. We then discuss lessons learned to improve future implementation efforts for NPIs in the NH environment.

2 | METHODS

2.1 | Aim, design, and setting

We conducted an embedded pragmatic clinical trial (ePCT) in partnership with 54 US NHs (27 intervention, 27 control) from four corporations. Music & Memory: A Pragmatic Trial for Nursing Home Residents with Alzheimer's Disease (METRIcAL) was designed to assess the effectiveness of the M&M intervention in reducing agitated behaviors in NH residents living with dementia. Between June 2019 and January 2020, we randomized 27 NHs with geographic and sociodemographic diversity to implement the M&M intervention. Details for this trial are presented elsewhere, including NH recruitment and randomization, resident recruitment, and NH training procedures.[21] Corporate leaders designed a program "champion," often an administrator, activities director, or nurse, at each participating NH to lead implementation efforts. Throughout an 8-month implementation period, each champion worked to initiate and scale the M&M intervention within their NH. Each resident was enrolled for 4 months.

Our reporting of qualitative analyses follows the Consolidated Criteria for Reporting Qualitative Studies (COREQ) guidelines.[22] The Brown University Institutional Review Board deemed this study minimal risk and issued a waiver of individual consent (#1705001793).

2.2 | Materials

To implement the intervention, researchers provided each NH with (1) a step-by-step implementation guide or protocol; (2) training for key staff members; and (3) necessary supplies, including iPods, earphones, and charging cables for each participating resident, small speakers for optional use, multi-port charging stations, a computer equipped with iTunes, and iTunes gift cards. We developed the implementation guide in a pilot phase, to train NH staff and maximize consistent delivery across participating NHs.

Corporate leaders and researchers provided study-specific, in-person training for participating NHs that included a practical review

RESEARCH IN CONTEXT

1. **Systematic review**: The authors conducted semi-structured interviews with nursing home (NH) staff and reviewed structured observations from data collectors, to describe barriers and facilitators to implementing a personalized music intervention in 27 NHs, as part of a pragmatic, cluster-randomized trial.
2. **Interpretation**: The authors found pragmatic variation in intervention delivery may have compromised fidelity, highlighting the importance of identifying and measuring adherence to intervention core components in real-world settings. They also found family caregivers were important to implementation. Technical barriers related to loading and charging devices are described.
3. **Future directions**: Pragmatic implementation, using existing financial and human resources to implement complex behavioral interventions, is difficult in NH settings. Family members and volunteers expand the reach of the traditional workforce, but equity considerations of which NHs and residents have access to these resources are important.

and discussion of the implementation guide. NH staff members occupying diverse roles were encouraged to participate, including the administrator, director of nursing, nurse manager, activities director, and social work director. One attendee from each NH was identified as the program champion and invited to complete the M&M Certification Training, sponsored by M&M, consisting of two 90 minute live webinars focused on practical aspects of starting and scaling up the intervention. NH leadership and study consultants also co-led monthly coaching calls. In these calls, NH staff shared M&M implementation experiences including strategies, challenges, and successes.

In each NH, frontline staff selected residents for participation and tested music with those residents to identify songs and artists they had preferred as young adults. Staff then created and downloaded an individualized iTunes playlist to each resident's iPod. Staff provided participants with personalized music at standardized times of day, in response to specific care behaviors, or as a preventative measure at early signs of agitation. The implementation guide advises clinical staff involvement and at least 30 minutes of music per day with each resident.

2.3 | Data and analyses

This paper presents primary findings from a qualitative analysis of two primary data sources. First, 10 trained data collectors completed daily notes during onsite visits to participating NHs, referred to in this paper as "observational notes," at baseline, 4 months, and 8 months. Second, two researchers with training in qualitative methods (E.Z., R.U.) conducted semi-structured follow-up telephone interviews with NH champions, referred to as "interviews," after obtaining verbal consent, which were audio recorded and transcribed. No characteristics were reported about the researchers. Researchers made field notes during and after the interviews.

We used a structured approach to data from both qualitative sources. Three researchers (E.Z., R.U., R.S.) independently reviewed the data and identified preliminary themes, and then applied labels, or "codes," to these data as concepts became apparent. The researchers met weekly throughout the analytic process to discuss these codes, refining them as needed until agreement was reached that the codes fit the data. The final coding scheme is included in the qualitative supplement in supporting information. The researchers used QSR International's NVivo software (version 12)[23] to sort the narrative data by codes and maintained an audit trail of analytic decisions.[24] The researchers discussed whether they had enough data to draw reliable conclusions from the champions' interviews and agreed that they had saturation among the sample because no new concepts were identified during interviews.

To fine tune the preliminary themes and identify additional subthemes, which qualify or expand understanding of the themes, two other researchers with training in qualitative methods (M.O., N.D.) then conducted an inductive analysis of the data. Working iteratively, they independently analyzed the coded data while meeting weekly to reach a consensus on final themes and subthemes. For each subtheme, they identified representative quotes. Champions and data collectors did not provide feedback on preliminary or final findings.

To contextualize these qualitative findings, we conducted descriptive statistical analyses using publicly available, quantitative NH characteristics data from Long-Term Care: Facts on Care in the US (LTCFocus). LTCFocus is sponsored by the National Institute on Aging (1P01AG027296) through a cooperative agreement with the Brown University School of Public Health, and is available at ltcfocus.org.

3 | RESULTS

We interviewed champions from 9 of the 27 NHs randomized to receive the intervention. NHs in which the champions completed the semi-structured interviews were smaller, served fewer Black residents, and had a greater proportion of rehabilitation patients than NHs which did not complete the interviews (Table 1). Importantly, eight of the nine NHs that participated in the semi-structured interviews implemented the intervention with moderate or high fidelity. The data collector reports were available for all 27 NHs.

In total, 11 champions from nine NHs participated in the interviews (two homes had two champions). The 11 participants included three administrators, two directors of nursing, five activities directors or life enrichment coordinators, and one social worker. The interviews were ≈ 20 minutes long, and no participants refused to answer specific questions or terminated the interview early. Participants provided verbal consent to record the interviews and disseminate findings while protecting their anonymity.

TABLE 1 Baseline characteristics for all nursing homes randomized to receive the intervention and for nursing homes completing the semi-structured interviews.

	All intervention nursing homes ($N = 27$)	Intervention nursing homes completing interviews ($N = 9$)
Resident characteristics		
Age, mean (SD)	79.8 (12.2)	82.9 (10.0)
Percent female, mean (SD)	65.7 (10.1)	69.4 (9.6)
Percent Black/African American, mean (SD)	21.1 (25.4)	18.5 (38.9)
Cognitive function,[a] mean (SD)	2.6 (.9)	2.5 (.9)
Percent of residents with any antipsychotic use in past week, mean (SD)	17.3 (7.4)	17.2 (6.8)
Nursing home characteristics		
For-profit, *n* (%)	15 (55.6)	5 (55.6%)
Non-profit, *n* (%)	12 (44.4%)	4 (44.4%)
Beds, mean (SD)	101.5 (42.3)	97.1 (39.6)
CMS 5-Star quality rating,[b] mean (SD)	3.5 (1.4)	2.6 (1.2)
Percent of residents with Medicaid as primary payer, mean (SD)	58.8 (25.6)	53.1 (23.9)
Percent of residents with Medicare as primary payer, mean (SD)	11.2 (7.0)	21.2 (15.4)
Percent of residents who self-pay, mean (SD)	30.1 (26.4)	25.7 (16.2)
Registered nurse hours per resident day, mean (SD)	0.3 (0.2)	0.4 (0.4)
Licensed practical nurse hours per resident day, mean (SD)	0.9 (0.3)	1.1 (0.6)
Adherence fidelity,[c] *n* (%)		
High	10 (37.1%)	5 (55.6%)
Medium	9 (33.3%)	3 (33.3%)
Low	8 (29.6%)	1 (11.1%)

Note: Data Source: LTCFocus.org, 2019 public access files.
Abbreviations: CMS, Centers for Medicare & Medicaid Services; SD, standard deviation.
[a]Cognitive Function Scale,[34] ranges from 1 to 4 with higher scores indicate more cognitive impairment.
[b]Ranges from one to five stars, with more stars indicating higher quality.
[c]Based on previously developed adherence fidelity total score.[26]

From the interview and data collector qualitative data, we identified five themes, each with subthemes, related to intervention implementation in the NH environment. We describe these themes with representative quotations from NH champions and study data collectors.

3.1 | Theme 1: Turnover and institutional changes interfered with program implementation

In interviews and observational notes, champions and data collectors described the effects of changes in the NH environment on site-level implementation. For instance, they shared leadership buy-in, changes in ownership, facility construction, understaffing and staff turnover, and competing clinical interests decreased a facility's ability to implement M&M. One data collector described the need for more personnel and resources to support M&M, particularly during ownership change:

> "They just need more staff/time to be able to get it all done. This is another center that said that they are dealing with a lot now with the changeover to another corporation." (DATA COLLECTOR I, SITE 133)

Relatedly, turnover in leadership positions made consistent staff buy-in and M&M use more challenging in some NHs. Administrators engaged with M&M encouraged broader staff commitment; however, when administrators did not align the intervention with their NH mission or prioritize it among clinical needs, implementation and uptake were suboptimal. For example, one data collector reported that a NH administrator with poor intervention uptake did not want to participate for resource prioritization reasons:

> "[The administrator] admitted that she never wanted to take on the M&M program because they had too much else going on. [The administrator] is leaving the [NH] as she was promoted to Regional Director." (DATA COLLECTOR B, SITE 144)

High staff turnover and frontline understaffing were associated with gaps in intervention delivery. One administrator associated infrequent and inconsistent M&M use with losing their activities staff:

> "But [when] the activities directors left, the whole activities team left, and they had a lot of the knowledge [about M&M]." (CHAMPION, SITE 104)

3.2 | Theme 2: Consistent with pragmatic implementation, delivery strategies varied across NHs

Champions noted the advantage of tailoring M&M delivery strategies. NHs varied in their routines for providing resident music; some provided it as needed while others followed a set schedule. One champion described an as-needed approach:

> "We just have everything [as needed]. So, when they [NH staff] use it [M&M], they are to log that they used it. But otherwise, it's not sending a notification to be given." (CHAMPION, SITE 149)

A data collector described the more structured approach another NH used:

> "Each resident currently active with the iPods has a three-inch music note on their door and documentation forms have a column with a music note in it if they are in the program. The earphones and iPods are very accessible and are used daily. CNAs [certified nursing assistants] and nurses report that they used the iPods on their shifts and report that they observe other staff also using the music for the same residents." (DATA COLLECTOR B, SITE 141)

Champions also identified creative approaches for incorporating M&M into their daily responsibilities and established NH workflows. One described personalizing music in daily one-to-one activities and visits with residents but not personalizing it relative to the timing of behaviors:

> "We just incorporated it [M&M] into our one-on-one activity, visiting with the residents and finding out what kind of music they liked." (CHAMPION, SITE 141)

One champion described a process that did not use the iPods to deliver the personalized music, but, rather, used staff cellular phones:

> "Some nurses will turn their phone on, put on music and just have the music going in the hall." (CHAMPION, SITE 122)

Several champions noted added benefits of shared music listening compared to individual listening. One described the shared listening experience of two residents:

> "We were doing two separate playlists for them [two ladies], and we set them up with their own headphones. And one got very upset because the other one looked like she was having an upbeat song, and hers wasn't. So, we had to tailor theirs to fit them because they did everything together. Now they're roommates. So, we set them up with a speaker, so they could listen together." (CHAMPION, SITE 149)

Further, another champion used M&M to successfully encourage residents' social interactions in group settings:

> "We were doing an activity, and as a group, we would start talking about music and thinking about times that they enjoyed singing certain songs. And then, someone would sing a little bit of a song, and they'd say, 'Oh yeah, that's so and so. And this is who sang it first.' So, it was almost like a trivia time with us." (CHAMPION, SITE 122)

3.3 | Theme 3: Family members influenced resident participation

Champions reported improved resident enrollment and retention when NH staff partnered with family members to advance M&M. Observations supported this association, including this data collector's description of one resident's wife ensuring their active participation in M&M:

> "One resident's wife is there almost all day every day. She wanted to make sure he had it [M&M] so he would not be lonely without her there. She has apparently been trained on putting it on him." (DATA COLLECTOR F, SITE 116)

Another facility used splitters and audio cords that allow two people to listen simultaneously to the same iPod. As the following data collector explains, the splitter allowed residents to listen to their music with family members, which may have encouraged participation:

> "Staff is trying to find a splitter for iPods so that residents can listen to the music when their partner is visiting them. They think it might help get some of them to listen better instead of refusing." (DATA COLLECTOR E, SITE 147)

Conversely, some champions shared that family members requested their loved ones not to participate in M&M:

> "We even had one family decline. They did not want us to have their loved one participate in it [M&M]." (CHAMPION, SITE 149)

3.4 | Theme 4: Non-clinical program champions needed clinical buy-in, which was challenging and required demonstrations of clinical benefits

Although this study aimed to designate nurses as M&M champions, observations and interviews showed that NHs delegated intervention

responsibility to staff in other roles, such as activities directors. A champion explained:

> "It was hard to just set aside the time and make yourself do it [M&M]. Our [activities'] hats are multiple. Anything non-nursing falls in the activity department. When we had our group meeting with our representative, she said everybody needed to buy into it, and it wasn't just meant for activities. But the reality is, it does come right back to us." (CHAMPION, SITE 138)

Without clinical staff involvement, non-clinical champions explained that M&M uptake was limited. One champion, with an activities role, described related challenges:

> "We probably didn't use it [M&M] as much as we would've liked, and I'm sure this was with everybody. There's always a constant struggle with nursing staff helping and assisting." (CHAMPION, SITE 149)

Some champions observed that the top-down NH hierarchy limited the authority of frontline staff, particularly in subordinate or non-clinical roles, to spearhead M&M implementation. Champions in activities roles shared that the active involvement and visible support of nursing leadership encouraged broader clinical staff uptake compared to solely non-clinical leadership. One activities director described this phenomenon, noting they did not want to "step on toes" of the clinical team:

> "At the beginning of getting it [M&M] going […] I [activity director] didn't want to step on toes. […] It's hard because I'm not the CNA supervisor. It needs to come from the nurse supervisor." (CHAMPION, SITE 141)

Another activities director expressed the importance of leadership within the nursing team for obtaining clinical staff buy-in:

> "Having a nursing leadership saying, 'Hey, this is important,' and explaining why. Because, of course, when it comes outside of non-clinical, it's not really a priority." (CHAMPION, SITE 149)

Site observers shared that demonstrating the intervention's benefits with an example resident was a key implementation strategy and encouraged M&M uptake among staff, particularly early in the intervention's rollout. One activities department champion described the clinical staff's increased excitement and engagement after observing early resident use:

> "Actually seeing it [M&M] on our residents here [was helpful]. We did it in front of some of the [clinical] staff, and actually seeing it, they wanted to do that program a little bit more. They were more interested just from seeing that reaction." (CHAMPION, SITE 104)

Another activities department champion explained that demonstrating the direct benefits of the intervention improved CNA buy-in and comfort:

> "The CNAs buy into it when then know it helps them directly. To CNAs, when you say, 'This is a tool that I have for you,' and show them how to do it. And that means, you're going to try and hit all three shifts, so everybody knows how to do it. Training them so they're comfortable, and they remember that it's there. The CNAs are going to be the second line of command for getting that implemented." (CHAMPION, SITE 138)

Continuing, this champion emphasized the importance of clinical staff sharing positive experiences using the intervention with one another by word of mouth. Once the utility was understood, CNAs felt the intervention was worth their time and participated.

3.5 | Theme 5: Technological barriers existed among staff and residents

Many sites reported that technological difficulties impeded M&M implementation and delivery. These ranged from devices being broken or lost to difficulties using the technology for residents with disabilities (e.g., low hearing). Other challenges included a lack of staff confidence in downloading music and forgetting to charge iPods, and increased disinfection protocols due to the COVID-19 pandemic.

Champions suggested strategies to overcome these technological and logistical challenges. Recommendations for preparatory changes included: providing additional M&M delivery training for frontline staff, pre-loading a shared music library, selecting a more user-friendly music player, and introducing the intervention in care plan meetings with CNAs present. Champions also suggested that NHs take a team-based approach to iPod set-up and music delivery, rather than relying on one staff member or department. Additional recommendations included hiring a college student or using volunteers to manage the technology, storing iPods in a central location, and using speakers when residents would not tolerate headphones.

4 | DISCUSSION

Our five themes highlight facilitators and barriers that are likely to affect the implementation of other NPIs in the NH setting. Some of the barriers we identified, including staff buy-in and institutional turmoil, are long standing, have been intensified by the SARS-CoV-2 pandemic, and are likely to persist for the foreseeable future. These findings are consistent with common barriers to NPI implementation in NHs

from previous work, such as poor staffing and absenteeism, staff time constraints, and inconsistent leadership buy-in.[25–27]

However, other themes are potentially more modifiable and provide insights for future ePCTs. For example, pragmatic trials require some flexibility, to enable health-care staff to align implementation strategies with existing workflows and constraints. A qualitative analysis of clinical staff and managers in NHs echoed the need to create strategies that customize delivery to the unique needs of each NH.[28] However, flexibility must be balanced with adherence to an intervention's core components. In this trial, some of the adaptations staff made to the intervention may have compromised fidelity. For example, NHs were trained to deliver the intervention at early signs of agitation or at times of day when behaviors were likely.[21] Yet, staff described using music during regularly scheduled activity sessions, not in response to agitated behaviors, and as part of group sessions, rather than individualized treatment. Identifying core components with partners is important to maintaining fidelity in pragmatic trials.[29]

Another potentially modifiable finding from these data is the importance of family members in the initiation and ongoing use of the intervention. Many family members continue to be involved in visitation[30,31] and direct care for their loved one after placement in a NH.[32,33] Encouraging NH staff to engage families in NPIs and to think about their delivery as dyadic may improve residents' uptake and ultimately NHs' adherence with recommended implementation strategies. Further, family members, who are familiar with residents' long-term history of music preferences and patterns of agitation, may help staff to better tailor or personalize these interventions' content and delivery. This process may help to build trust between NH staff and residents,[34,35] and provide an entry point for professional and family-shared caregiving.[36]

Our study has several limitations. While we had data collector observations for all 27 intervention NHs, only 9 of the 27 intervention facilities (33.3%) completed their follow-up interview. Implementation experiences for staff at the nine NHs that volunteered to participate in interviews likely differ significantly from those at the NHs we were unable to reach or who declined to interview. Based on previously reported adherence fidelity,[29] eight of our interviewed facilities were categorized as having High or Medium adherence fidelity; only one NH with Low adherence fidelity completed the interview. Results are likely generalizable only to NHs that engaged with the intervention to some degree. The semi-structured interviews were conducted with the site champion, whose knowledge and attitudes about the program may differ from a typical staff member at the NH. Data collector notes may capture more typical viewpoints, but those viewpoints were not systematically obtained.

5 | CONCLUSIONS

Demand for NPIs in NHs will continue to grow as the population ages and persons living with dementia increasingly require residential care. Our results highlight best practices and suggestions to improve the implementation and sustainability of a personalized music intervention in this setting. These findings provide useful experiences for NHs seeking to implement M&M and other NPIs. Specifically, our experiences suggest that NH staff require flexibility to tailor NPIs for their unique needs, while maintaining fidelity to the intervention's core components.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest. Author disclosures are available in the supporting information.

ETHICS STATEMENT

The Brown University Institutional Review Board deemed this study (ClinicalTrials.gov Identifier: NCT03821844) minimal risk and issued a waiver of individual consent (#1705001793).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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