Evaluation of Music and Memory Program

White Paper

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**EXEClUITE SUMMARY**

**WHY WE EVALUATED MUSIC & MEMORY PROGRAM**

The Music and Memory (M&M) program has been increasingly adopted in nursing homes across the U.S. to support persons with dementia. M&M uses personalized music playlists delivered on digital music players set up and maintained by care staff trained in the program (Music and Memory, 2013). The underlying premise of M&M is that these musical favorites tap into deep memories not lost to dementia, thereby facilitating resident communication, engagement, and socialization. However, few rigorous evaluations of this popular non-pharmacologic alternative have been conducted.

As a part of ongoing efforts at improving dementia care, the State of Wisconsin decided to implement statewide the Music and Memory program as a non-medication based method that may: (1) reduce the rates of negative behaviors typically targeted by medication, thereby reducing the need for medication, and (2) improve the quality of life of persons with dementia by providing access to an activity enjoyed by the persons using it. In 2014, the Wisconsin Department of Health Services (WI DHS) awarded a grant to the University of Wisconsin-Milwaukee to evaluate the effect of the Music & Memory (M&M) program on outcomes for residents, staff, and family caregivers from nursing homes participating in the statewide M&M program initiative. With additional funding support from Claude Pepper Center, Florida State University, Bader Philanthropies, and My Choice, Family Care, the UWM research team conducted comprehensive evaluation of the M&M program between 2014 and 2016.

The M&M evaluation had multiple parts including: (1) a crossover study with 59 nursing home residents with dementia from 10 Wisconsin nursing home facilities; (2) a pre- and post- survey on medication use among 1,500 residents who received M&M in 100 facilities participating in Phase 1 of the M&M statewide initiative; (3) a secondary data analysis of the Minimum Data Set (MDS) to compare nursing home resident outcomes between facilities that
participated in the M&M at different time points; and (4) a key informant survey with administrators of Wisconsin nursing home facilities about implementation and sustainability of M&M.

WHAT WE FOUND

Some important methodological limitations of the evaluation notwithstanding, results from all components of the evaluation lead to a similar conclusion, that is, M&M had no or minimal effect on nursing home resident behavioral outcomes, and very modest effect on psychotropic medication use. However, many facilities viewed the M&M program as valuable, noting improvements observed in residents such as enjoyment and improved mood with caveats that neither the M&M program (or music), nor using headphones or iPods, work for everyone.

Several M&M program implementation related issues were also found, which provide at least some partial explanation for minimal effectiveness of the M&M program found in the evaluation. There was considerable variability in the rates at which the iPods were used across residents and across facilities with the rates at most facilities being low. In other words, many residents were not receiving M&M for long or often enough for the program to have sufficient effect.

Several key barriers to consistently and effectively delivering M&M for target residents were also found. They include a lack of buy-in from all levels of care staff and management and a lack of or limited time available to staff to implement and maintain the program. For many busy direct care staff, developing the individualized playlist for each resident was quite time consuming. Other barriers included difficulties in understanding the operation of the music devices, issues in identifying an accessible and secure location for storage and charging, problems understanding how the devices interfaced with computers, and issues associated with the costs of replacing broken equipment, purchasing additional new equipment and purchasing new songs.
WHAT WE RECOMMEND

Together, the findings from the evaluation of M&M and past research on music and dementia suggest that several improvements can be made to improve the program implementation fidelity, efficacy and sustainability. Recommendations to improve the program efficacy include: (1) select individuals who are most likely to benefit from M&M; (2) assess, identify and set specific goals for the M&M intervention; (3) develop individualized playlists and listening schedules tailored to each individual person; and (4) implement a systemic process evaluation of the M&M program and incorporate M&M into a formal care planning process.

Recommendations to enhance sustainability of the program include: (1) increase buy-in from all involved in the process; and (2) develop and test training programs for volunteers such as students to implement the M&M program. Buy-in may be increased by helping staff to recognize any positive impacts of M&M on residents. Another way to facilitate buy-in would be to approach M&M like other care interventions or programs that require a systematic approach to assess, develop the playlist, deliver and monitor consistently. To make this possible, offering incentives or education and training among direct care will be important for integrating M&M into care plans. To help facilities develop individualized playlists, which can be quite time consuming and a significant barrier for the program to be sustained over time, future efforts should focus on developing strategies to involve and train residents’ families as well as volunteers to develop playlists and deliver the music will help reduce burden on direct care staff.

In conclusion, the literature concerning the use of music-based interventions with persons with dementia suggests that there is the potential for such interventions to provide pleasure and aid in the remediation of undesirable behavioral symptoms. There is little reason to believe that the M&M program cannot achieve greater impact if carefully implemented.
BACKGROUND

DEMENTIA AND AGITATION
In 2014, more than five million Americans, nearly 1 of every 9 older Americans, were diagnosed with Alzheimer’s disease or another form of dementia. In cases of Alzheimer’s, the most common form of dementia, impairments occur in cognitive ability, memory, language, reasoning, and judgment.

Up to 90 percent of persons with dementia (PWDs) experience secondary behavioral or psychological symptoms, which become more prevalent in advanced stages. Among nursing home residents with dementia, secondary behavioral symptoms affect 75% of those with dementia, with the most frequent problems being apathy (36%), depression (32%), and agitation/aggression (30%).

These problems are challenging and distressing to not only PWDs but also to family and professional caregivers, and are often cited as the key reason for institutionalization. These behavioral symptoms are further associated with care-related stress by staff and increased costs of care in the nursing home environment.

TREATMENT APPROACHES TO AGITATION
A common approach to managing these symptoms, especially in nursing homes, is the use of psychotropic medication. One estimate suggests that 33%
of residents with dementia receive such medication\textsuperscript{11}. However, given the evidence for limited efficacy and serious potential side effects of pharmacological treatments, there has been an increasing effort to develop and implement non-pharmacological interventions to address the behaviors targeted by medications.

Approaches to reduce agitation and improve mood include staff/caregiver education and training; structured activities; stimulation-oriented treatments such as recreational activities; and therapies involving music, art, pets or programs that increase the number of pleasurable activities\textsuperscript{21,22}. The risks associated with these non-pharmacologic treatments, such as increased agitation for some residents, are less frequent and severe than those risks associated with anti-psychotic medications (e.g., mortality)\textsuperscript{7}.

One of the increasingly popular approaches being adopted in nursing home facilities is to use music, individualized music listening (IML) programs in particular, and the Music and Memory (M&M) program is an example of IML.

**POTENTIAL BENEFITS OF INDIVIDUALIZED MUSIC LISTENING**

Individualized music listening (IML) is a passive type of music intervention that involves PWDs listening to their preferred music with the goals of promoting relaxation and enhancing the emotional state. IML programs such as Music & Memory are increasingly used in long-term care facilities because of their low cost of implementation and ease of delivery.
Indeed, IML has the potential to improve quality of life among PWDs and the care practices of direct care staff. The literature on quality of life and dementia documents the clinical benefits of increasing pleasant events in treating depression and improving quality of life.\textsuperscript{4} The neuroscience literature also supports the conclusion that music enable PWDs to retrieve memories, and elicit positive emotions.\textsuperscript{5} Studies have reported that people with moderate to severe dementia\textsuperscript{24} are able to correctly perceive the pitch and melody of music\textsuperscript{25-27}, recognize the titles of familiar songs\textsuperscript{28} and also recall familiar lyrics\textsuperscript{29}. Preferred music listening may have important therapeutic benefits.

IMLs based on the PWD’s autobiographical memory and musical preferences can function as a pleasant sensory stimulation that helps trigger retrieval of pleasant memories, shifts attention away from stressful environmental stimuli, increases attention, improves mood, and reduces agitation. As a result of observing such positive behavioral changes, direct care staff relationships with and attitudes towards PWDs can improve, which are central to PWDs’ quality of life.\textsuperscript{6}

**EVIDENCE BASE FOR IML**

Despite the substantial body of literature concerning the therapeutic effects of music, surprisingly few rigorous empirical studies are available to date that
tested the efficacy of IML in reducing behavioral problems associated with dementia.

A comprehensive review of empirical research on music therapy or listening programs with PWDs by Vink, Bruinsma, Scholten\(^3\) found only ten randomized controlled trials (RCTs) that met their selection criteria for rigorous research design. This review was built on two previous literature reviews on the same topic, and three reviews together identified over 500 published articles that had reference to music therapy and dementia. Only 10 studies were RCTs that met their review criteria. Moreover, only three of the ten studies examined the effects of IML\(^34,35\). Since the publication of the 2011 review by Vink, only one study by Sakamoto, Ando, Tsutou\(^36\) was published which utilized an RCT design to examine the effect of IML. Overall, the combined evidence from these eleven studies support that the claim that IML and active group music therapy are more effective than no intervention in reducing agitation and aggression\(^33,36\). Methodological limitations of the small number of RCTs, however, precluded definitive conclusions regarding efficacy of IML.

The limited evidence-base that is comprised of relatively older studies on IML programs motivated the evaluation of M&M by the research team at University of Wisconsin-Milwaukee (UWM), which is described in this white paper.

THIS EVALUATION IS ONE OF THE FIRST LARGE, COMPREHENSIVE EVALUATIONS OF AN IML PROGRAM:

**Music & Memory (M&M)**
Music & Memory

To date, Music & Memory (M&M) has been adopted in over 1,000 nursing homes in the U.S. alone to support persons with dementia\(^{37}\). The program uses personalized music playlists delivered on iPods or other digital devices which are set up by care staff who are trained in the program\(^{37}\).

According to the resources and training materials available on the M&M website, M&M defines the “individualized” music playlist following Gerdner\(^{35}\), who stated that: “[Individualized music] is defined as music that has been integrated into the person’s life and is based on personal preference. The musical selection must have specific meaning to the person’s life” (p. 51).

The M&M program emphasizes creating a playlist based on music that has personal meaning. The program suggests that persons with dementia or family members are the best source for identifying an individual’s music preferences and songs significant to that person’s life experience. The program also suggests that in case a person is no longer communicative and family members have little information about their relative’s music preferences, caregivers can play music popular from the time the individual was a child or young adult, including music played on the radio or in popular television shows, and judge what is preferred based on the individual’s reaction to the music.

Music & Memory program was developed by Dan Cohen, who went on to create the Music & Memory non-profit organization in 2010. More information about the program can be found on their website: musicandmemory.org
Implementing M&M (from *How to Create a Personalized Playlist for Your Loved One at Home*) includes the following steps:

1. Create a regular schedule/system for delivering individualized playlists such as “three 30-minute listening sessions—morning, afternoon and evening”.
2. Deliver the music at certain times throughout the day (but the manual does not specify when). For persons with Alzheimer’s disease, the manual emphasizes that “timing is very important. You can greatly reduce or head off agitation by playing music to distract and calm”.
3. If an individual becomes more agitated while listening to music, try changing the music selection.
KEY FINDINGS FROM THE EVALUATION

OVERVIEW OF THE EVALUATION

The statewide initiative to implement M&M in Wisconsin began in July 2013 when the Wisconsin Department of Health Services began soliciting applications for participation in Phase I of the initiative. Training in the M&M program was conducted in October 2013 with the 100 nursing homes that were selected from the applicant homes to participate in Phase I of the initiative. Equipment for the M&M program was distributed to nursing homes starting December 2013 after the nursing homes completed the Resident Selection Survey. There were three phases of the statewide implementation: 2014 as the implementation year for Phase 1, 2015 for Phase 2, and 2016 for Phase 3.

The M&M evaluation by the UWM research team had four parts. The first study was conducted using a crossover study design with 59 nursing home residents with dementia from 10 Wisconsin nursing home facilities from Phase 1. The second study was a pre- and post- survey on medication use among 1,500 residents who received M&M in 100 facilities participating in Phase 1 of the M&M statewide initiative. The third study was a secondary data analysis of the Minimum Data Set (MDS) to compare nursing home resident outcomes between facilities that participated in M&M at different phases of the initiative, Phase 1, Phase 2, and Phase 3. The last study was a key informant survey with administrators of Wisconsin nursing home facilities about positive aspects and challenges in implementing and sustaining the program, and recommendations to address challenges or barriers.
OVERALL EFFECTIVENESS OF M&M IN IMPROVING RESIDENT OUTCOMES

The results from the crossover study suggest that, contrary to our expectations, the M&M program had little or no effect on improving resident outcomes in the areas of cognition, memory, agitation, mood, movement and medication use. For example, during the first 8 weeks of the crossover study, residents receiving M&M showed improvement in agitation and other behavioral symptoms while the control group without M&M did not. These differences, however, were not statistically significant and disappeared over time (see Figures 1 & 2). The analysis of the MDS data on nursing home residents further support the main findings from the crossover study, that there were no statistically significant differences in resident outcomes, behavioral problems, communication, Figure 1. Select findings from the cross-over study.
mobility, and mood. The MDS analysis, while showing decreases in medication use also indicted that the decreases were greater in the nursing homes not using M&M relative to the homes that had implemented M&M between 2014 and 2015. The pre- and post-survey findings suggest, however, that the implementation of the M&M program may have had a small effect on the reduction of the use of anti-anxiety medications among residents who were selected to participate in the program. There are several possible methodological issues related to the evaluation design and the M&M program related explanations for such findings. They include but are not limited to reliance on staff reports on key resident outcome measures, lack of...
randomization (despite matching) in the MDS data and pre- and post-survey, and lack of random sampling in pre- and post-survey.

**M&M Implementation Fidelity**

Music listening data from the crossover study and key informant survey with nursing home facilities data suggest there was either low fidelity to the guidelines recommended by the M&M program or that the M&M guidelines are insufficient when compared to the evidence-based practice guidelines on individualized music listening programs.

Two notable areas of low fidelity were: (1) improper development of the individualized playlist based on the principles of familiarity, and autobiography, and (2) inconsistent and targeted use of the devices.

The evaluation found that musical genre preferences varied considerably across residents although a few genres such as jazz, (then) contemporary pop and big band were fairly uniform across residents. This seems to show that efforts were made to include a variety of musical choices that would relate to the study participants. Further investigation of the specific pieces, however, showed that many would not have been used as listening choices by individuals in the years before the onset of dementia which is critical for memory connectivity. Songs with copyright in the past 10-20 years which were found in music listening data would likely have limited familiarity before
progression of the disorder, depending on the age of the subject.

Also, there was considerable variability in the rates at which the iPods were used across residents and a similar pattern was found between the nursing homes themselves but with the rates at most facilities being low. Some residents had a fixed schedule for M&M delivery and some had varying time depending on the mood of the resident as well as availability of staff to deliver M&M. Length of the delivery varied from 15 minutes per session to unlimited time per session. To some extent, nursing home staff were attempting to provide M&M at times that would assist with curbing behavioral problems, however the duration of M&M delivery varied considerably, and it is unclear how routinely the program implementation guidelines were followed.

**Value of M&M**

The key informant survey with administrators of Wisconsin nursing home facilities was a cross-sectional survey with a response rate of 40% from all Wisconsin nursing homes. The majority of key informant survey respondents valued the program and viewed the M&M program favorably.

Aspects of M&M that were valued included ease of use, fit for helping residents experience and maintain personhood, and better social interactions and engagement. Respondents noted that M&M had the effects of improving mood and enjoyment among residents if the program was implemented consistently.
SUBSET OF RESIDENTS MOST LIKELY TO BENEFIT FROM M&M

The M&M program is intended to be used with individuals who have a past connection to music listening in their lives. Case studies such as Cuddy, Duffin 46 and the EDGE Project in New York 49 demonstrate that individuals with an appreciation for, enjoyment of or experience with music have the strongest potential to benefit from this intervention. However, personal history of enjoying music may not always mean that the person with dementia would enjoy M&M. Anecdotally, the research team was told that some residents cherished their time listening and that more than one resident was said to be upset anytime the iPods were taken away from them. Other residents were said to have little or no interest in their use or to dislike their use outright. A similar observation was made by the majority of key informant survey respondents who observed that the M&M program or music as a therapeutic form in general does not work for everyone. Moreover, wearing headphones did not work for some residents, and instead speakers had to be used for some residents. Lastly, although reasons are not clear, Medicaid residents receiving M&M experienced improvements in overall behavioral problems and rejection of care.

RESIDENT OUTCOMES M&M LIKELY TO IMPROVE MOST

The overall evaluation results suggest minimal or modest effects of M&M in improving agitation, mood, and medication use. Still, the majority of key informant survey respondents valued the program. Respondents noted observing improved mood and enjoyment among residents, and emphasized that the personalized nature of the music was the key to enjoyment, triggering memories, and improving mood. Also noted were the calming effect of M&M, and the positive effect of headphones blocking noise and allowing each individual resident to listen to the music they prefer.
Therefore, M&M appears to function as a pleasant event to have at least short-term (i.e., within a few hours of listening to music) effects of eliciting positive mood and relieving boredom at least among residents who respond to music positively. Indeed, the literature on quality of life and dementia documents the clinical benefits of increasing pleasant events in treating depression and improving quality of life. Moreover, the neuroscience literature supports the effects of music in enabling PWDs to retrieve memories, and eliciting positive emotions.

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Thus, if the M&M playlist is developed based on the resident’s autobiographical memory and musical preferences, and delivered to residents who have past connections with music and respond positively to listening to music, M&M has the potential to increase attention, improve mood, and reduce agitation, at least for the short-term.
**Effects of M&M on Family and Direct Care Staff Outcomes**

Pre/post survey results from the crossover study generally did not indicate any significant changes in family satisfaction with care or relationship quality between the family members and residents. Direct care staff who completed both the pre- and post-survey regarding feelings about their jobs and about working with residents with dementia did not indicate any significant changes in those perceptions between the beginning and end of the data collection period (about 14 weeks in duration). Methodological issues such as errors or biases inherent in survey data collected from a small non-random sample with a low response rate may contribute to these results. Moreover, numerous factors are related to job satisfaction and burnout, and it is likely that other factors experienced by the respondents (such as changes in management) have a greater effect on the examined outcome variables than a single intervention or protocol.
There were two key barriers to implementation:

1. Lack of buy-in
2. Time required to implement

Adequately addressing these two barriers can increase fidelity of implementation, as well as rate of implementation.

**KEY BARRIERS**

**BARRIERS AND CHALLENGES IN IMPLEMENTING AND SUSTAINING M&M IN NURSING HOMES**

Two key barriers to consistently and effectively delivering M&M for target residents were: (1) a lack of buy-in from all levels of care staff and management, and (2) a lack of or limited time available to staff to implement and maintain the program.

Lack of buy-in affected all steps of the process of implementing and maintaining the program. Although M&M is a relatively easy and simple program to implement compared to other type of music interventions, for many activity and direct care staff, the time commitment required is not minimal. For example, developing a truly individualized music playlist does take time to interview not only residents but also family members. In fact, key informant survey respondents reported identifying preferred songs as a barrier because not all families know and often residents are not communicative. Hence, there will be trial and error to create an optimal playlist and delivery schedule.

Moreover, monitoring listening by the residents during the delivery and at the end of session also requires serious commitment on the part of staff. With residents located at different wings or floors with different direct care staff with varying schedules (and high turnover) in
nursing home environment, implementing M&M in a way that will maximize therapeutic benefits and result in concrete results is not easy.

Other barriers included difficulties in understanding the operation of the music devices, issues in identifying an accessible and secure location for storage and charging, problems understanding how the devices interfaced with computers and issues associated with the costs of replacing broken equipment, purchasing additional new equipment and purchasing new songs. Respondents acknowledged the grant from the state to be a valuable resource to initiate and implement the program. However, a remaining concern was sustainability of the program- how they will continue the program for existing and new residents as additional costs will be incurred to replace existing equipment and buy new songs.
The overall findings from the evaluation of M&M and past research on music and dementia suggest that improvements could be made to how the M&M program is implemented and monitored to increase its impact on resident well-being and quality of life. These are:

1. **Select individuals who are most likely to benefit from M&M**

First consideration for placement of residents in music listening programs like M&M is to assess the importance of music in the person's background.48 Similarly, the M&M program is intended to be used with individuals who have a past connection to music listening in their lives.

The Personal Music Assessment form, or something similarly designed at each facility could help understand the importance of music in resident’s lives. Autobiographical information about residents that can be taken at the time of intake include but not limited to personal interests in listening to music, specific listings of favorite songs, key autobiographical events with a music association, favorite genres and artists, etc. This information can be used
to identify persons appropriate for this type of listening intervention and allow for a more appropriate structuring of playlists at a future point in time.

Other additional considerations in selecting residents for the program are whether residents often experience agitation, enjoy listening to music, and can tolerate headphones being placed over their ears. Music listening conditions can be altered to accommodate certain residents such as a resident can listen to music over speakers while in his or her room instead of using headphones. Residents without agitation may also enjoy listening to individualized music playlists although they may not have the same behavioral problems that the use of M&M is intended to ameliorate. Nevertheless, residents who do not enjoy listening to music should not participate in the program, as participation may increase anxiety or agitation symptoms and could increase problem behaviors. Therefore, monitoring of their response to the intervention is important. While a benefit of this intervention is a "lack of side effects" 50, the neurocognitive connections outlined do have the potential to elicit negative as well as positive connections.

Lastly, it is helpful to keep in mind that persons with different forms of dementia may react differently to music. For example, the study by Hsieh,
Hornberger, Piguet, Hodges found persons with Alzheimer’s disease are more likely to maintain some ability to attach emotional meaning to facial expressions or music when listening to familiar music than persons with semantic.

### KEY CONSIDERATIONS IN IDENTIFYING APPROPRIATE RESIDENTS FOR M&M ARE:
- Whether residents have appreciation for music listening (i.e., residents have specific list of favorite songs, genres, and artists that are associated with autobiographical events), have agitation that needs to be treated, and can tolerate listening to music with a headphone.

### 2. Assess, identify and set specific goals for the M&M intervention

Notable non-pharmacologic interventions that have been shown to have positive effects are those that are directed at single behaviors such as agitation. Persons with dementia will manifest varying types and degrees of challenging symptoms. Some persons with dementia may have more reserved memory and cognitive abilities than others and for those, improving or maintaining cognitive function may be the desirable outcome. For others with a more advanced stage of dementia, the targeted areas may be agitation, aggression, anxiety, depression or apathy. The key is to identify and target one or two key symptoms that seem to affect the individual the most.

Hence, identifying the key target areas of M&M intervention will be a crucial step before developing the individualized playlist and music listening schedule. For example, the playlist for a resident with agitation or aggression symptoms may need to be developed with the goal to help the resident relax and increase positive mood, while the playlist for a resident who are emotionally or socially withdrawn may be need to focused on the goal to help the resident be energized and actively engaged with the environment.
IDENTIFYING THE KEY TARGET AREAS OF THE M&M INTERVENTION WILL BE A CRUCIAL STEP BEFORE DEVELOPING THE INDIVIDUALIZED PLAYLIST AND MUSIC LISTENING SCHEDULE.

3. Develop individualized playlist and listening schedule tailored to each individual person

The literature on music and dementia suggests that the individual’s familiarity of the music and autobiographical connection between the person and music are essential for the M&M program to positively affect the outcomes. The premise of this listening approach to therapeutic music is that the naturalistic task of music listening requires low retrieval demands making it accessible even as Alzheimer’s progresses. The rate of atrophy in the medial prefrontal cortex for Alzheimer’s is slower than other forms of dementia, allowing this region (which is responsible for associating music, emotions and memory) to be preserved longer and able to recognize musical structure which is key to memory retrieval cues. As cognition decreases in Alzheimer’s, the familiarity of musical works is crucial to activate prior connections.
Therefore, it is critical for staff or volunteers to identify some key autobiographical events and specific pieces of music or musical genre that might be associated with such events by interviewing residents as well as families.

Care should be taken in the selection of music and modification of playlists, especially when residents are not able to clearly communicate preferences for music. Care should also be taken to use devices for delivery of music that will not result in increased frustration for the residents, which could lead to problem behaviors and/or increased labor for staff beyond regular M&M program implementation requirements.

Another critical element to successful M&M intervention would be to timing and amount of exposure to music listening. Persons with dementia have different time of the day or events or tasks that may trigger agitation such as meal time, late afternoon, or bathing. Observation and assessment of specific
agitation which impacts an individual’s quality of life or activities of daily living can help staff to identify the period for targeted music listening. Also, according to listening guidelines, at least 30 minutes of listening from the individualized playlist should be utilized prior to the identified period to reduce the symptoms of anxiety and agitation\textsuperscript{36,48}.

\textbf{IT IS CRITICAL THAT THE MUSIC SELECTED HAVE SOME AUTOBIOGRAPHICAL CONNECTION FOR THE INDIVIDUAL. IT IS ALSO ESSENTIAL THAT THE TIMING AND EXPOSURE OF MUSIC LISTENING TO BE TAILORED TO EACH INDIVIDUAL.}

4. Implement a systemic process evaluation of the M&M program and incorporate M&M into a formal care planning process

The M&M program might best be utilized as a treatment intervention similarly to other specific therapeutic approaches, whether administered by a music therapist under specific prescription, or identified by a care team that involves a resident’s family members. Specific goals for reduction of physical, emotional or psychological disturbances should be identified as desired outcomes among persons with advanced dementia. Moreover, ongoing monitoring for success should be formalized and recorded\textsuperscript{48}. The protocol for developing individualized musical playlists, auditing the process for use designed around specific periods of agitation and ongoing assessment criteria should be clearly presented to facilities participating in training and demonstration.

Lastly, the initial and ongoing assessment and development of goals, and progress should be discussed and coordinated with other care team members routinely with facilities.
RECOMMENDATIONS FOR SUSTAINABILITY

To sustain the program, it is essential to have buy-in from everyone – residents, family members, direct care staff, activity staff, music therapists, IT staff, administrators, and volunteers. Buy-in may be increased by helping staff to recognize any positive impacts of M&M on residents.

Another way to facilitate buy-in would be to approach M&M like other care interventions or programs that require a systematic approach to assess, develop the playlist, deliver and monitor consistently. To make this possible, offering incentives or education and training among direct care will be important or integrating M&M into care plans. Respondents described M&M as a program that heavily relies on direct care staff to deliver to residents especially during evening and night time. Although activity and recreational staff may develop the playlist and set up a schedule, they also rely on direct care staff to deliver the iPod/headphone as needed and based on a set schedule even during day time. At the same time, care staff reported that while the program
enhanced the quality of life of PWDs, developing individualized playlists was too time consuming for staff, making it a significant barrier for the program to be sustained over time. Therefore, developing strategies to involve and train residents’ families as well as volunteers to develop playlists and deliver the music will help reduce burden on direct care staff. Several programs have indicated increased success in supporting their existing program through the recruitment of volunteers to help distribute the devices to the residents, track their use, maintain the playlists and music devices and by raising money for new equipment by reaching out to community-based groups including service societies, local schools and other volunteer groups.

In conclusion, efficacy studies should continue to review individual outcomes across the program in multiple facilities to determine the generalizability of the program’s success.

The literature concerning the use of music based interventions with dementia afflicted persons suggests that there is the potential for such interventions to provide pleasure and aid in the remediation of undesirable behavioral symptoms.

There is little reason to believe that the M&M program cannot achieve greater impact if carefully implemented.
REFERENCES


47. Variability in prefrontal hemodynamic response during exposure to repeated self-selected music excerpts, a near-infrared spectroscopy study. 2015.


## Table 1. Summary of Methods of Each Evaluation Component

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<td><strong>Purpose</strong></td>
<td>• To evaluate efficacy of M&amp;M to reduce residents’ behavioral problems, use of psychotropic medication, and to improve satisfaction with care and relationship quality between residents and family, and staff attitudes toward residents and job satisfaction.</td>
<td>• To evaluate effectiveness of the M&amp;M in reducing anti-psychotic and anti-anxiety medication use in 1,500 residents in facilities participating in the Phase I of the statewide implementation.</td>
<td>• To identify barriers and challenges in implementing and sustaining M&amp;M, and recommendations to address the barriers in facilities participating in the M&amp;M statewide implementation.</td>
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| **Research questions**     | • Does the M&M reduce anxiety, depression, agitation, and use of anti-psychotic and anti-anxiety medications?  
• Does the M&M reduce agitation-related movements and improve sleep quality?  
• Does the M&M improve family caregiver-resident relationship quality and satisfaction with care?  
• Does the M&M improve staff attitudes toward residents?  
• Does the M&M reduce anti-psychotic and anti-anxiety medication use?  
• Does the M&M reduce psychiatric medication use?  
• Does the M&M reduce behavioral problems and improve communication, mobility, and mood?  
• What are the barriers and challenges in implementing and sustaining M&M in nursing home facilities?  
• What is value of M&M?  
• What are the best ways to foster effective implementation and ongoing sustainability of M&M in nursing home facilities? | • Pre- and post- M&M implementation survey conducted online.  
• Secondary analysis of MDS data on nursing home residents in all Wisconsin nursing home facilities in 2014, and 2015. | • Cross-sectional mail or web survey to all nursing home facilities in Wisconsin |
<table>
<thead>
<tr>
<th>Table 1. Summary of Methods of Each Evaluation Component</th>
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<tbody>
<tr>
<td><strong>Crossover Study</strong></td>
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</table>
| **Sample** | • 59 residents from a stratified random sample of 10 nursing homes in Milwaukee, Ozaukee, Racine and Waukesha counties.  
• 28 Family members of participating residents.  
• 63 care staff from 10 nursing homes. | • 1,500 residents selected to participate in the M&M by 100 nursing homes that participated in the Phase I of the M&M statewide initiative.  
• Pre-survey was conducted between December 2013 and May 2014 while post-survey was conducted between February 2015 and January 2016. | • Residents in nursing homes participating in M&M statewide implementation at Phase I (2014), Phase II (2015) and Phase III (2016) with residents in non-participating homes serving as controls. | • 161 nursing homes (41%) in Wisconsin who responded to the mail survey. |
| **Data Collection and Measures** | • Staff report on memory/cognition (Clinical Dementia Rating Scale), agitation (Cohen-Mansfield Agitation Inventory), and mood (Neuropsychiatric Inventory).  
• Chart review on anti-psychotic medication use.  
• Movement measured by ActiGraph GT3X worn on the non-dominant wrists of nursing home residents.  
• Music data collected via app installed on iPods. | • Online survey | • Analysis of the MDS data | • Mail Survey or web-based survey format selected by respondents |
| **Analysis** | • Generalized linear mixed model (GLMM) ANOVA, randomization tests using a resampling approach, Wilcoxon Signed-ranks tests. | • GLMM and Generalized Linear Model (GLM) ANOVA. | • Differences-in-difference analyses using fixed effects conditional logistic regression. | • Descriptive and content analysis. |
### Table 2. Summary of Findings of Each Evaluation Component

<table>
<thead>
<tr>
<th>Crossover Study</th>
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<th>MDS Analysis</th>
<th>Administrator Survey</th>
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<tbody>
<tr>
<td><strong>Results</strong></td>
<td>• No statistically significant differences were found in: memory/cognition, agitation, and mood.</td>
<td>• Statistically significant mean reductions in antipsychotic and anti-anxiety medication use.</td>
<td>• Significant differences in difference tests for number of days of antipsychotic use and any use of antipsychotics for the Wave 1 versus Wave 2 and 3 nursing homes. Reductions in antipsychotic use were greater in nursing homes not participating in M&amp;M. No significant differences in difference tests for Wave 2 and Wave 3 comparisons. In sub-group analysis of Medicaid residents, reductions in anti-anxiety use days were greater in nursing homes not participating in M&amp;M while reductions in behavioral problems and rejection of care were greater in Wave 2.</td>
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<td></td>
<td>• Actual rates of use during the total days the iPods were available were quite low for the majority of the residents.</td>
<td>• It is unclear from the data the extent to which M&amp;M contributed to the medication use reduction due to data limitations.</td>
<td>• Other barriers included technology and cost as additional cost will be incurred to replace existing equipment and buy new songs.</td>
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<tr>
<td></td>
<td>• No statistically significant differences were found in staff or family outcomes.</td>
<td></td>
<td>• Value of M&amp;M include: enjoyment and improved mood, personalized nature of the music, the positive effects of headphones to block noise and allow each individual resident to listen to the music they prefer.</td>
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<td>• Tests of differences in vector magnitudes were all nonsignificant indicating M&amp;M had no apparent effect on movement.</td>
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<tr>
<td><strong>Implications</strong></td>
<td>• Results from the study call into question (1) the efficacy of the M&amp;M program in affecting the resident outcomes, and (2) other issues such as low fidelity to the guidelines recommended</td>
<td>• Findings provide some indication that the implementation of the M&amp;M program may have had some improvement or had worse improvements on use of psychiatric medication than no</td>
<td>• Although M&amp;M is perceived as a valuable program to enhance quality of life of residents, M&amp;M does not work for everyone, and more efforts are needed to enhance buy-in from all levels of staff in facilities, increase</td>
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## Table 2. Summary of Findings of Each Evaluation Component

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<td>by the M&amp;M program or insufficient guidelines from the M&amp;M program.</td>
<td>partial effect on the reduction of the use of anti-anxiety medications among residents.</td>
<td>M&amp;M while Medicaid residents experienced some positive improvements in behavioral problems and rejection of care.</td>
<td>support from families and volunteers, and to improve fidelity of the program implementation.</td>
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</tbody>
</table>

### Limitations

- Small sample size, use of global measures of functioning collected over several week intervals, and reliance on staff reports on key resident outcome measures
- Lack of random sampling of residents and facilities, and lack of random assignment (i.e., no control group)
- Lack of random sampling or residents and facilities, and lack of random assignment.
- Cross-sectional, descriptive survey with 40% response rate.

### Recommendations

- For the M&M Program: 1) select individuals who are most likely to benefit from M&M; (2) assess, identify and set specific goals for the M&M intervention; (3) develop individualized playlist and listening schedule tailored to each individual person; and (4) implement a systemic process evaluation of the M&M program and incorporate M&M into a formal care planning process.
- Additional research is needed to determine whether, and perhaps the extent to which, the use of the M&M program effects the use of psychotropic medications in nursing home residents.
- Additional research is needed to identify resident and facility level related factors accounting differential resident outcomes in Wave 1, 2, and 3, and to examine further on potential reasons for differences in outcomes between Medicaid and non-Medicaid residents.
- Buy-in may be increased by: (1) helping staff to recognize any positive impacts of M&M on residents; (2) approaching M&M like other care interventions or programs that require a systematic approach to assess, develop the playlist, deliver, and monitor consistently; and (3) offering incentives or education and training among direct care staff will be important, or integrate M&M into the care planning process.
- Support from families and volunteers, and to improve fidelity of the program implementation.
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