

SOME BENEFITS OF NEARBY NATURE FOR HOSPITAL VISITORS:
RESTORATIVE WALKS IN NICHOLS ARBORETUM

by

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Abstract

The natural environment has restorative and stress reducing benefits. This study analyzes the use of nearby nature by hospital visitors, a group of people who are typically at risk for stress and mental fatigue. Study participants were visitors of the University of Michigan Hospital System (UMHS) who were residing at the Ann Arbor Ronald McDonald House (RMH), a residence for family members of hospitalized children. The study involved suggested walking routes in Nichols Arboretum (Arb) and a series of before and post walk survey instruments to measure mental fatigue and stress. In addition, a survey instrument to measure awareness and perception of the Arb was administered.

The results of this study indicate that walking in nature is restorative and stress reducing for hospital visitors. In addition, these results indicate that there is a need to better inform hospital visitors about nearby nature. The results also suggest that longer-term visitors may take more walks in nearby nature and that walk materials, such as short defined routes and guidelines, may be particularly useful for hospital visitors. It should be noted that the results of this study are based on a small sample size. Additional research should be conducted to provide greater statistical evidence. This paper concludes by recommending methods to increase hospital visitor awareness of nearby nature and ways to enhance hospital visitors' experiences in nearby nature.

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Chapter 1: Introduction

This pilot project seeks to facilitate nature's healing effects, specifically mental restoration and stress reduction, for visitors of patients at University of Michigan Hospital System (UMHS). Visitors of patients at UMHS are typically navigating new physical surroundings as well as unfamiliar emotional and cognitive issues, facing unpredictability, changes in their daily routines, and a variety of emotions. As a result, they are likely to experience significant stress and mental fatigue. To further this difficulty for visitors, hospitals are typically designed with the practitioner and patient in mind. The experience of the visitor may be overlooked and as a result, the visitor population may be further burdened and stressed.

The natural setting has been shown to have substantial psychological benefit for adults and children. Contact with nearby nature has been shown to help people restore their ability to focus, reduce stress, and ease reflection on and processing of challenging issues. These benefits extend beyond perception and are evident in tests of mental functioning and improved physical manifestations of stress such as normalizing heart rate, reducing headaches, and decreasing digestive illness (Irvine, 2004; Canin, 1991, R.Kaplan, 2001, Schweitzer et al).

Just across the street from UMHS is the University of Michigan's Nichols Arboretum (Arb), a 123-acre preserve with maintained trails, beautiful views, and a variety of native ecosystems and gardens. This natural area has the potential to be a source of healing for those visiting the hospital. Although entering the Arb is as simple as crossing the street and walking less than 100 feet, many hospital visitors either do not know that it exists or do not think to take advantage of its presence.

This pilot project lays the groundwork for creating a strong link between the hospital and the Arb and for making the Arb one of the many outstanding resources accessible to patients and their families while they obtain care at UMHS. The goal of this pilot project is to show that UMHS visitors benefit from spending time in the Arb and specifically find it to be mentally restorative and stress reducing. In addition, the pilot program, which

encourages hospital visitors to walk in the Arb, hopes to inform future wellbeing programs for hospital visitors.

The pilot program targets residents of the Ann Arbor Ronald McDonald House, a residence for family members of hospitalized children that is adjacent to the Arb, and encourages these residents to walk in the Arb and to complete survey instruments about their experiences.

Chapter 2: Framework and Possible Solution

Conceptual Framework

Attention Restoration Theory

This project is an application of Attention Restoration Theory (ART), a conceptual model which describes the human ability to direct attention, how this ability fatigues, and the conditions under which it can be restored (S. Kaplan, 1995, 2001). The ability to focus or attend to something is both depletable and renewable. Consciously directing one's attention occurs through the inhibition of distraction and this ability to ignore distraction fatigues with use. The capacity to focus can be restored by allowing the mind to rest through time spent in fascinating settings. When something is fascinating, it does not require effort to focus on it. As a result, the ability to focus, or to direct attention, has an opportunity to restore. Humans find a wide range of things innately fascinating such as "strange things, moving things, wild animals, bright things, pretty things metallic things, words blows, blood, etc., etc., etc." (James, 1892/1985. p88). The natural environment is full of scenes and processes that humans find innately fascinating, such as running water, bright colors, animals feeding, scents and breezes.

In addition to those things that humans find innately fascinating, individuals find things that are personally interesting easier to attend to. This may explain why caregivers can become fascinated with the illness or procedure at hand and become micro experts. Attending to the ill family member may be all encompassing and the ability to direct attention is required to attend to other responsibilities, such as attending to normal daily events, healthy children or earning income. Typical life activities, such as working or responding to the needs of other family members, such as healthy children, can increase the fatigue suffered by the caregiver (Gaugler et al., 2005).

The Hospital Visitor Faces Mental Fatigue and Stress

Hospital visitors are at risk for mental fatigue. They face a multitude of distractions both from the physical environment and from their inner thoughts. The hospital is full of

distractions including unfamiliar sounds and sights, healthcare professionals to meet, and unfamiliar corridors to navigate. These distractions can take their toll on visitors' ability to focus, prioritize thoughts, and make decisions. The visitor may become distracted, feel lost and thus experience additional anxiety and stress.

Many hospital visitors are caretakers of an ill family member. They experience ongoing mental fatigue and stress which can manifest itself in psychological and physical illness. Manifestations of stress include increased heart rate, muscle tension, and over time a weakening of the immune system. Early research on cancer caregivers “. . . suggested that family members experience heightened symptoms of depression, anxiety, psychosomatic symptoms, restrictions in roles and activities, marital strain, and diminished health (Gaugler et al., 2005) (citing Ell et al., 1988; Johnson, 1988; Keitel et al., 1990; Northouse, 1984; Oberst et al., 1989s). In fact, several studies found that family members report as many or more psychosocial problems than patients, further emphasizing the considerable stress family members undergo when caring for relatives suffering from cancer” (Gaugler et al., 2005) (citing Baider et al., 1998; Baider and Kaplan De-Nour, 1988; Cassileth et al., 1985).

Nature Restores the Ability to Direct Attention and Reduces Stress

The natural environment has the potential to increase hospital visitor wellbeing and quality of life by facilitating restoration of attention capacity and stress reduction. According to ART, a restorative environment is one that provides four separate elements: a sense of being away, fascination, extent to maintain mental engagement, and is compatible with the user's needs and purposes (Kaplan, 2001). The natural environment often meets these criteria. With urbanization, humans tend to have less interaction with nature and spending time in nature provides a sense of being away. The natural environment is full of fascinating stimuli, such as falling leaves and shadows, and is rich in detail which provides the opportunity for ongoing engagement. Lastly, the natural environment can be compatible with a wide variety of human purposes because it is softly fascinating. Soft fascination is uniquely valuable because although it holds one's

attention it does not command all of it. Natural scenes and processes, such as running water and animals foraging for food, hold attention but one still has the capacity to maintain a train of thought, engage in conversation or reflect. In fact, the pleasure of being engaged by natural stimuli can ease potentially painful contemplation (S. Kaplan, 1992).

Parks, gardens, and other landscaped natural environments have the potential to be particularly compatible with people's restorative needs. Such spaces tend to be more coherent and less threatening than wilderness. In addition, paths and landmarks make landscaped natural environments easier to navigate with less use of directed attention.

Restoration of the capacity to direct attention helps people to manage their anxieties and reduce stress. Enhanced ability to focus both helps people to work through their concerns and helps them put aside their anxieties in order to function normally.

People seem to seek environments with natural elements when they are stressed. Immediately following September 11, many thousands of New Yorkers flocked to Central Park just as others flocked to houses of worship (Haberman, 2001). Spas, which sell health and relaxation, often incorporate natural elements and images of nature in their treatments and in the images they invoke with their product labeling. A study conducted by Mary Krehbiel Honeyman showed that photographs of scenes with natural elements helped reduce stress levels and that urban scenes without vegetation elevated stress levels (Honeyman, 1992). In *Healing Gardens*, Clare Cooper Marcus and Marni Barnes report that in their study on the “. . . use of outdoor space in hospitals, 95% of those interviewed reported a positive change in mood after spending time outside, from feeling depressed, stressed, and anxious to a more calm and balanced outlook”(p.5).

Nature and Healthcare

The purposeful presence of nature in healing settings dates back to the Medieval times and perhaps earlier (Marcus & Barnes,1999; Gerlach-Spriggs, Kaufman & Warner,1998).

At that time nature was intuitively associated with healing. With modernization and the technical revolution, the role of nature in healthcare became obscured and healthcare facilities made minimal use of nature. Recently, there has been a reawakening of interest in nature and healing and an effort to scientifically support the relationship between the two (Marcus & Barnes, 1999). Gardens are present in a variety of healthcare settings including hospitals, hospices, rehabilitation centers, nursing homes, and mental health facilities. “The organization that accredits 85 percent of U.S. acute care hospitals now requires that for certain patient groups (pediatrics, long-term care) and those experiencing long stays, the hospital provide “access to the outdoors through appropriate use of hospital grounds, nearby parks and playgrounds, and adjacent countryside” (Marcus & Barnes, 1999). Opportunities for contact with nature in healthcare settings range in form and include views of gardens or hills from windows, expansive arboretums that one can access, and manicured small gardens within the hospital grounds that one can enter and rest. Gerlach-Spriggs et al. write that a common theme across healthcare settings with gardens is a greater attentiveness to individual patients. Benefits of contact with nature in healthcare settings include improved healthcare results for patients and greater satisfaction and less burnout for staff (Marcus & Barnes, 1999; Irvine, 2004). Although seemingly undocumented, nature in healthcare settings likely provides restorative benefits for non-patient hospital visitors as well.

A Possible Solution: Nature at the UMHS

The value of incorporating nature into the healing process and into healthcare settings is gaining recognition. At the University of Michigan Hospital System (UMHS) natural lighting is being maximized and the cafeteria is offering expansive natural views. In addition, the Friends Meditation Garden, located at the center of the hospital, was “. . . designed to provide an outdoor space of comfort and respite for patients, visitors and staff” (UMHS Friends Meditation Garden) and is advertised in a pamphlet at elevator banks throughout the hospital as a place to restore, refresh and find peace. The Motts Children’s Hospital that is in the process of being developed promises to incorporate nature even more fully and to have patient rooms facing the Arboretum (Arb).

Incorporation of the Arb into the healing resources of UMHS both complements the existing natural elements of UMHS and greatly expands UMHS' natural offerings. The Arb is a magnificent site including developed gardens and natural areas that draw visitors from Ann Arbor and beyond. It may have the potential to provide a restorative opportunity as great or greater than that provided by the Friends Meditation Garden and it can serve more people at the same time due to its greater size. While just a couple of minutes walk from UMHS, the Arb offers an invaluable sense of being away and the gently fascinating surroundings soften the pains of dealing with difficult medical and family situations.

Currently, information available to hospital visitors about the Arb is limited to an Arb brochure that is occasionally present at the hospital's main information desk. Professor Bob Grese, the Director of Nichols Arboretum, recalls conversations with visitors of the hospital that happened upon the Arb and found it to be beneficial and wished they had known about it earlier (personal correspondence). Several people staying at the Ronald McDonald House (RMH), who have children in the hospital, reported not knowing about the Arb even though the Arb is located across from the hospital and next to RMH. Anecdotal reports from Professor Grese along with research showing the benefits of nature, and the fact that UMHS has a renowned natural resource next door inspired this project to bring the Arb and UMHS closer together in the minds of the hospital's visitors and the broader community.

This Study

The goal of this pilot study is to increase the use of the Arb for the benefit of hospital visitors. Visitors throughout this project are defined to be visitors of hospital patients. These individuals, often ongoing caretakers of ill family members, are often stressed and mentally fatigued and would benefit greatly from the restorative qualities of nature. This project incorporates both a program to encourage walking in the Arb and a study to evaluate the benefits of this program.

The primary objectives of this pilot study are to:

- 1) Gather data to support future efforts to increase UMHS visitor use and awareness of the Arb,
- 2) Generate materials, such as walking routes that are time and exertion sensitive, that can be used in the future by RMH residents and other hospital visitors, and
- 3) Help current RMH residents by increasing their opportunities for restoration.

Chapter 3: Methods

This chapter describes the research methods used in this pilot project including the research setting, participant recruitment, the walk materials provided to participants, procedures, survey instruments, and data analysis.

Research Setting

Participants were visitors of the University of Michigan Hospital System (UMHS) who were staying at the Ann Arbor Ronald McDonald House (RMH). The intervention site is Nichols Arboretum (Arb). A brief overview of each location is presented below.

University of Michigan Hospital System (UMHS)

UMHS is recognized as one of America's Best Hospitals and consists of three hospitals, 30 health centers and 120 outpatient clinics, the University of Michigan Medical School, the Medical School's Faculty Group practice, and the M-CARE health insurance plans (About UMHS). In 2005, UMHS had 247,236 patient days, 43,345 inpatient discharges, 3,838 deliveries, and operating expenses of \$1.2 billion (UMHS Facts and Figures, 2005).

Natural design elements, such as the use of natural lighting and conscious attention to window views, are incorporated into UMHS design. In addition, the Friends Meditation Garden, at the center of the hospital, was completed in 2002. Plans for the new Mott's Children's hospital include greater patient interaction with nature and views from patient windows will overlook the Arb.

Nichols Arboretum (Arb)

The Arb is a 123-acre botanical preserve adjacent to the UMHS hospitals. It contains plants native to Michigan and North America and has a variety of gardens and natural features including the Peony Garden, Dow prairie, the Huron River, an oak openings garden, and the Heathdale collection. It is a site for research, education, and recreation. Trails are well maintained and benches are present throughout the Arb.

Ann Arbor Ronald McDonald House (RMH)

RMH is a nonprofit organization that provides a supportive residence for families of hospitalized children who are under age 21. The Ann Arbor RMH can house up to 29 families a night and serves approximately 600 families annually, 40-50 families per month. The average length of stay is two weeks and ranges from a couple of days to over a month.

Participants

This program and study specifically targeted the subpopulation of hospital visitors that reside at RMH, a residence for families of children who are patients at UMHS. Study recruitment efforts included: an announcement on RMH's white board at the entrance to RMH, fliers in the RMH welcome packet, and a poster displayed in one of RMH's primary common areas. See appendix A, Recruitment Materials. In addition, the RMH day manager spoke of the program to guests who she thought would be particularly interested in participating.

Walk Materials

The program to encourage use of the Arb included suggested walking routes. Suggested routes ranged from 10 to 30 minutes and from flat to moderately challenging terrain. Suggested walks included guidelines to help participants engage in their surroundings and transition to a restorative state. For instance, the guidelines in the Short Get-Away 10 minute walk, "Notice how quickly you enter the haven of nature and how different it feels from the busy world moments away. Stop to look at a tree bud or vibrant flower," encourage participants to feel away from their everyday and to be fascinated by nature. Guidelines suggest other activities to aid engagement such as watching birds, people, and running water, listening to the noises of the woods, noticing different scents, learning about restoration projects in the Arb, and encouraging imagination through descriptions such as describing the Hemlocks as the trees of storybook forests (National Park Service-Olmsted National Historic Site, Arnold Arboretum of Harvard University and University of Michigan Nichols Arboretum, describing Hemlocks as such). In addition to suggested routes, participants were encouraged to explore on their own through a "Make Your

Own” route and a detailed map of trail routes of the Arb. The walks and their attributes are described in table 3.1 below. Walk materials are presented in Appendix B.

Table 3.1: Walking Route Attributes

Walk	Length (Minutes)	Terrain	Key Arboretum Features
Short Get-Away	10	Well maintained Nearly flat Multiple benches	Laurel Ridge Trail Overlook Peony Garden
Riverbank	20	Some stairs and hills	Huron River
Valley	30	Some stairs and hills Occasional benches	Main Valley
Wheelchair Accessible	20	Well maintained Nearly flat Occasional benches	School Girl's Glen Overlook Heathdale Collection
Create Your Own	Varies, but allow at least 30 minutes	Varies	Varies

Study Instruments

Two data collection instruments were used: (A) a series of surveys measuring mental fatigue, stress/anxiety and coping before and after walking in the Arb and (B) a one time only survey to learn about knowledge of and use of the Arb.

A) Survey Instrument Measuring Mental Fatigue and Stress

This series of surveys consisted of a “Before-First-Walk,” “After-Each-Walk,” and a “Final” survey. Mental fatigue and stress/anxiety were measured in all surveys. In addition, the “Before-First-Walk” and “Final” survey gathered information about the types of coping mechanisms residents used at home and at RMH. Participants were asked to complete the “Before-First-Walk” survey before walking in the Arb as part of this study, the “After-Each-Walk” survey within 24 hours of walking in the Arb, and the “Final” survey when they were ready to end participation in the study or before leaving RMH. See table 3.2: Measuring Mental Fatigue and Stress Survey Instrument Design and Appendix C: Survey Instrument Measuring Mental Fatigue and Stress.

Table 3.2: Measuring Mental Fatigue and Stress Survey Instrument Design

Item Category	Before-First-Walk	After-Each-Walk	Final
Attention Fatigue	Yes	Yes	Yes
Stress	Yes	Yes	Yes
Coping methods at home	Yes	No	No
Coping methods at RMH	No	No	Yes
Walk feedback	No	Yes	No

Attention fatigue was measured with 11 items that were adapted from previously empirically-derived factors measuring attentional well-being (Irvine 2004; Canin 1991; R. Kaplan 2001). These 11 items measuring general mental fatigue were grouped into two subcategories: those measuring alertness and those measuring ability to focus.

Changes in stress level were measured with an adaptation of the six question form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI) developed and tested by Marteau and Bekker (1992).

B) Survey Instrument Measuring Arboretum Awareness and Perception

The one-time Arboretum Awareness and Perception survey instrument consisted of six questions to obtain data on length of stay, awareness of and perception of the Arb. See appendix D.

Procedures

The program and study elements were designed to fit the participants' schedules and situations. Residents at the RMH usually have unpredictable schedules, limited time, may have siblings of the hospitalized child staying with them, may be the only family member accompanying the child or one of several. For these reasons, walks were self guided and could be done at any time by the participant alone or with others. Similarly, the survey instruments were limited to two sides of one piece of paper. In addition, because participants might leave the RMH suddenly and may not be able to complete a final survey, data was collected incrementally with a Before-First-Walk survey, an After-Each-Walk survey, and a Final Survey.

Procedure for Survey Instrument A: Measuring Mental Fatigue and Stress

Interested participants picked up an “Arboretum Walks” binder from the day manager. “Informed consent” was the first section of the binder and it contained two copies of the informed consent letter. Potential participants were instructed to read the informed consent letter and, if willing to participate, to sign and submit one copy and keep the other for their personal records. See Appendix E, Informed Consent Letter. Participants placed completed survey instruments in a drop box in the RMH day manager’s office.

Procedure for Survey Instrument B: Measuring Arboretum Awareness and Perception

The six question one-time Arboretum Awareness and Perception survey instrument did not involve a specific recruitment process. The survey, which included a brief description of the project and the researcher’s phone number in case of questions, was distributed to all residents through their RMH mailboxes and residents were free to complete or discard it. Participants placed completed survey instruments in a drop box in the RMH day manager’s office.

Analysis

Data were analyzed using SPSS 13.0 for windows. Descriptive statistics were obtained and Pearson’s correlations run to identify relationships between survey instrument items.

Chapter 4: Results

Results from the one-time survey instrument and the program booklet series are presented below.

Results from Survey Instrument B: Measuring Arboretum Awareness and Perception

The findings below are drawn from the one time survey instrument which was distributed to 29 family units through the RMH family mailboxes. 11 surveys (38%) were returned. Eighty one percent of survey respondents (9) had already stayed at RMH for two weeks.

The minimum length of stay was 1-3 nights and the maximum was over one month. The average length of stay for respondents was 3-4 weeks.

Table 4.1: Length of RMH Stay at Time of Survey Instrument Response

Length of Stay	Count	Percent	Cumulative Percent
1-3 nights	1	9.1	9.1
2-3 nights	1	9.1	18.2
1-2 weeks	0	0	18.2
3-4 weeks	4	36.4	54.5
Over 1 month	5	45.5	100
Total	11	100	

Arboretum Awareness and Usage

There was high familiarity with the Arb. Eighty percent of respondents reported knowing about the Arb at the time they filled out the survey. Four respondents (40%) first learned about the Arb themselves by noticing its location. The second largest source for learning about the Arb was this project’s walk materials with 20% of respondents (2) first learning about the Arb through this study’s materials. Others learned about the Arb from fellow RMH residents (1) and from living in Ann Arbor previously (1).¹

Table 4.2: How Respondents First Learned of the Arboretum

Information Source	Count	Percent
Saw it myself	4	40
Arboretum Walks Materials	2	20
I don't know about the Arboretum	2	20
Fellow RMH resident	1	10
Other	1	10
RMH manager	0	0
RMH website	0	0
Total	10	100

¹ One respondent knew about the Arboretum but filled out this question ambiguously by circling both “saw it myself” and “Arboretum Walks materials.”

Of the nine respondents who knew about the Arb, 89% of respondents (8) went on at least one walk in the Arb. Respondents varied on how many walks they took. Table 4.3 below contains data indicating how many times respondents walked in the Arb.

Table 4.3: Number of Walks in the Arboretum

Number of Walks in the Arboretum	Count	Percent	Cumulative Percent
None	3	27.3	27.3
1-3	5	45.5	72.7
4-6	0	0	72.7
7-9	2	18.2	90.9
over 9	1	9.1	100
Total	11	100	

Perceived Restfulness of Walking in the Arboretum

Respondents were asked to rate how relaxing (restful, restorative, stress-relieving) they found spending time in the Arb on a scale of 1-10, where 1 was not restful and 10 was extremely restful. All respondents who completed this item reported their time in the Arb to be very restful with an average rating of 8.5 and a range of scores from 6 to 10. Three respondents (the mode) perceived their experience to be extremely restful and rated it 10.

Table 4.4: Perceived Restfulness of Arboretum Experience

Perceived Relaxation/Restoration of Walk (rated on a scale of 1 -10 where 1 was not relaxing and 10 was extremely relaxing)	Count	Percent	Cumulative Percent
6	1	12.5	12.5
7	1	12.5	25
8	2	25	50
9	1	12.5	62.5
10	3	37.5	100
Total	8	100	

Correlations Among Data

Respondents who reported their Arb experience to be extremely restful also reported taking more walks in the Arb. The scores on the “restful” scale highly correlated with the

number of walks taken in the Arb ($r=.80$, $p=.018$). In addition, the data suggests that length of stay correlates with number of walks taken in the Arb ($r =.49$, $p=.124$).

The data suggests the possibility that those who learned about the Arb by seeing it themselves found their experience to be more restful than those who found out about it through other means ($t=-1.37$, $df=5$, $p=.228$). See Table 4.5, Perceived Restfulness by How Learned about the Arboretum.

Table 4.5: Perceived Restfulness by How Learned about the Arboretum

Information Source	Count	Perceived Restfulness (Mean)
Saw it myself	3	9.33
All Other Sources Together	4	7.75
Arboretum Walks Materials	2	
Fellow RMH resident	1	
Other	1	

Comments and Provision of Contact Information

Four of the 11 respondents (36%) provided additional written comments. All four of these respondents had gone on walks in the Arb. “Restful” scale scores highly correlate ($r=.88$, $p=.004$) with the provision of comments. The four respondents who provided comments were the same three who rated their experience 10 and the one who rated his/her experience 9.

In addition, 46% of respondents (5) provided contact information for follow up. No follow up has yet been undertaken. The provision of contact information does not correlate with number of walks taken or the perceived restfulness of those walks. The number of walks these five respondents went on ranged from 0 to over 9 with the majority being 1-3.

Results from Survey Instrument A: Measuring Mental Fatigue and Stress

The results presented below are drawn from the responses to the survey instruments contained in the program booklet.

Five RMH residents expressed interest in participating in the study during its implementation and picked up the program booklet from the RMH day manager. Only one of these five returned a set of completed survey instruments. Due to the single person sample size, this section is presented as a case study.

The respondent is the grandfather of a child who was hospitalized and identified himself as a secondary family member providing care to a child being treated for an ongoing health issue. He reported staying at RMH previously and enjoying walks in the Arboretum on these previous visits to RMH. At the time the grandfather completed the “Before-First-Walk Survey” he had been at RMH for 4-7 days and rated the pressure and demands in his life as very strong, (8 on a scale of 1 to 10 where 1 was no pressure/demand and 10 was extreme pressure/demand). As a participant in this study, the grandfather completed the “Before-First-Walk” survey and two “After-Each-Walk” surveys. Over the course of completing these three surveys, the respondent’s pressures and demands increased slightly from his rating of 8 and then decreased slightly.

The grandfather also reported using a variety of coping mechanisms while at home with an emphasis on walking outside and attending or participating in religious/spiritual activities. Prior to going on walks as part of this program he valued walking as a “time to relax, be quiet, think, observe nature and people, (and) be energized by exercise.”

Directed Attention Fatigue and Stress

The “Before-First-Walk” and “After-Each-Walk” survey instruments included questions to assess directed attention fatigue and stress. The grandfather’s responses indicate strong attentional wellbeing at all times, with improvement after walks. With the measurement tools used, completely restored attention capacity had a value of one and extremely low (very fatigued) attention capacity had a value of five. At his most fatigued point, reflected in his responses to the “Before-First-Walk” survey instrument, the grandfather’s general attention fatigue score was 1.6. After both walks, his attentional fatigue scores were

lower (1.3), indicating greater restoration. See table XX. The general attention fatigue survey instrument items can be grouped into two categories: alertness and focus. The grandfather’s responses indicate that his alertness either remained the same or increased post walk and that his ability to focus increased after both walks. See Table XX.

Table 4.6 Attention Fatigue

Category Names and Items Included	Before First Walk (Mean)	After Walk 1 (Mean)	After Walk 2 (Mean)
General Attention Fatigue	1.6	1.3	1.3
Alertness	1.5	1.5	1.3
I feel worn out mentally			
I feel energized (r)			
My mind nearly always feel alert/awake (r)			
There seems to be too much going on in my life			
Focus	1.7	1.2	1.3
It's hard to concentrate on details			
Making decisions is difficult			
I am losing or misplacing things			
I can keep track of what I am saying or doing (r)			
I am able to get really absorbed in a task (r)			

Note: Respondents were asked to indicate how they felt by circling a number on a 5-point scale from 1 (not at all) to 5 (extremely well) for each item. The scale for items marked “(r)” were reversed before analysis.

The grandfather’s responses to the stress items in the “Before-First-Walk” survey instrument and both “After-Each-Walk” surveys indicate reduced stress after each walk. With the measurement tools used, no stress had a value of one and high stress had a value of five. The grandfather reported greatest stress in his responses to the “Before-First-Walk” survey instrument with a score of 1.7 and lower stress in his responses to both “After-Each-Walk” survey instruments (1, 1.5). See Table 4.7, Stress.

Table 4.7: Stress

Category Name and Items Included	Before First Walk (Mean)	After Walk 1 (Mean)	After Walk 2 (Mean)
Stress	1.7	1.0	1.5
I feel calm (r)			
I feel tense			
I feel upset			
I feel relaxed (r)			
I feel content (r)			
I feel worried			

Note: Respondents were asked to indicate how they felt by circling a number on a 5-point scale from 1 (not at all) to 5 (extremely well) for each item. The scale for items marked (r) were reversed before analysis.

Looking at the results of multiple survey instrument items concurrently reveals that the grandfather found walking in the Arb to reduce general fatigue and anxiety even when he perceived his pressures/demands to have increased, later in the day when he was likely to be more worn out, and both when he was alone and with children. See table 4.8, Summary Statistics.

Table 4.8: Summary Statistics

	Before First Walk	After Walk 1	After Walk 2
General Fatigue	1.6	1.3	1.3
Fatigued Focus	1.5	1.5	1.3
Fatigued Alertness	1.7	1.2	1.3
Anxiety	1.7	1.0	1.5
Pressures/Demands	Very High (8)	Slightly higher (9)	Slightly lower (8)
Time of day ²	Day	Day	Evening
# Children on walk	N/A	1-2	0

Walk Materials

The results presented below are drawn from the responses to the walk material items in the After-Each-Walk survey instrument.

Although the grandfather indicated that he would have walked in the Arb even if he did not participate in this study, he reported finding the walk materials helpful. Specifically,

² The respondent voluntarily, without prompting, indicated that he took his second walk in the evening. It is assumed that since he made no mention regarding time of day in his first “After-Each-Walk” survey and “Before-First-Walk” survey that he took his first walk and responded to the surveys during the day.

he went on the two shortest walks which were also the first two walks in the walk materials binder, Short Get-Away and Riverbank. The grandfather reported appreciating having a route to follow, guidelines of things to pay attention to, and the Arb map. He also reported feeling free to go his own way and vary from the suggested route.

Chapter 5: Discussion

Taken together, the results indicate that walking in the Arboretum (Arb) is restful and relaxing for hospital visitors and that specifically, walking in the Arb helps hospital visitors alleviate stress and restore their ability to direct attention. This has important implications for enhancing the wellbeing and quality of life for hospital visitors, a group of people who are likely to be stressed and mentally fatigued. The University of Michigan Hospital System (UMHS) has 43,345 inpatient discharges annually (UMHS Fact and Figures, 2005). Assuming that each inpatient has one visitor, possibly a low estimate, over 40,000 people could potentially benefit by greater access to nature at UMHS.

The findings and trends that emerge from this study are discussed below. Specific implications and recommendations are presented in Chapter 6, Recommendations.

A Walk in an Arboretum is Restorative and Stress Reducing

All respondents of the one time survey who walked in the Arb indicated that they found their experience in the Arb moderately to extremely relaxing. Residents of Ronald McDonald House (RMH) are family members of hospitalized children and because RMH gives preference to families with severely ill children, respondents' ability to benefit from contact with nature indicates that people in extremely difficult circumstances can benefit from time spent in a natural environment. The more in depth case study data show that walking in the Arb can restore the capacity to direct attention and reduce stress for people in caretaking roles.

A Diverse Population of Hospital Visitors Benefits from Nearby Nature

Although the survey instruments used in this study did not elicit detailed demographic data, it can be assumed that the diversity of the respondent group reflects the diversity of the RMH resident population. About 75% of those who stay at RMH are from Michigan, about 15% from Ohio, and the remainder are from elsewhere in the world. Recent

international residents have been from Iraq, Uganda, and China. RMH serves all income and ethnic groups.

The assumed diversity of respondents is supported by the fact that two Iraqi women were interested in completing the lengthier series of surveys that were part of the program booklet, but were not able to do so due to translation difficulty. One can speculate that walking in the Arb benefits people of all nationalities and ethnicities. This conclusion is consistent with current research on the psychological effects of time spent in nature.

It is Necessary to Better Inform Hospital Visitors About Nearby Nature

Given that 40% of respondents either did not know about the Arb or first learned of it from this study's materials, there is a need for greater Arb publicity at UMHS. Although 40% of respondents learned about the Arb by seeing it on their own, this may be due to the fact that RMH is uniquely close to one of the Arb entrances. One might speculate that visitors who do not stay at RMH would be considerably less likely to learn about the Arb on their own since most would not easily see it in their daily routine.

Several Trends

The data collected in this study provide insight into the hospital visitor population.

Longer Stay Visitors May Take More Walks in the Nearby Nature

Longer term hospital visitors were more likely to report taking more walks in the Arb. There are several possible explanations for this trend: a greater need to relax and restore attention may have developed over time, the medical condition of the patient being visited may have stabilized with time, and lastly, longer term visitors may have accommodated to the hospital and health concern at hand and as a result are more able to devote efforts to caring for their own needs. This trend is supported by the one time survey data that indicate the average length of stay for respondents was between 3 and 4 weeks, notably longer than the average RMH stay of 2 weeks. Further, the data suggest that length of stay correlates with number of walks taken in the Arb ($r = .49, p = .124$).

People Proficient at Reaping Nature’s Restorative Benefits are More Likely to Seek Natural Places

The case study of the grandfather staying at RMH indicates that he walked to relax at home and that he sought out the Arb on his own. Analysis of data from the one time survey shows that Arb walkers who found the Arb on their own rated their experience, on average, as more restful than those who found the Arb by other means. It is possible that those who found the Arb on their own were, consciously or subconsciously, searching for and noting places to walk and relax. This suggests that those who walk regularly in nature to relax and cope are more receptive of its benefits and seek out those benefits.

Walks and Other Activities May be Particularly Useful for Caretakers and Children

During an early planning meeting at RMH, the RMH executive director and day manager suggested that walks might be a particularly useful activity for kids and either their parents or grandparents. Siblings of the hospitalized child often stay at RMH, especially when school is not in session, and often a grandparent will be present as a caretaker. The case study supported this notion as the respondent identified himself as the grandfather of the patient and he walked both by himself and with children. The case study results indicate that walking in the Arb has restorative benefits for the adult even when accompanied by children. Note however, that this study did not address the benefits of walking in the Arb for children.

Shorter Walks and Walk Guidelines may be Particularly Useful

The grandfather who completed two “After-Each-Walk” survey instruments indicated that he went on the two shortest walks, the “Short Get-Away” which was approximately ten minutes in length, and the “Riverbank” which was approximately 20 minutes in length. UMHS visitors may feel most comfortable taking short personal breaks. Professor Bob Grese recalls a staff member at the Mott Children’s hospital explaining that parents are sometimes afraid to leave their child’s side for any length of time (personal correspondence). However there may be short periods of time, such as when the patient has additional visitors or is napping, that it would be comfortable and beneficial for the visitor to leave the hospital.

The grandfather also indicated that he appreciated having the Arb map, a specific route to follow and the guidelines of things to pay attention to while walking. The map, like the one that was provided as part of this study that indicated both the location of RMH and UMHS and contained a key indicating whether the trails were nearly flat, sloping, or were steep or had stairs, helps inform the visitor that the Arb is close by and navigable. Specific routes with information such as an estimate of the amount of time needed to complete the route and level of difficulty, help visitors realize that they can take a walk in the Arb for a short duration and follow a path that is suitable to their needs. The guidelines of details to attend to while walking in the Arb were included to assist the walker to become engaged with nature and to facilitate restoration. These guidelines may be particularly helpful for those taking quick walks from the hospital.

Chapter 6: Recommendations

Recommendations emerging from this study are in response to the findings and trends discussed earlier. The recommendations are grouped into two categories: considerations for informing hospital visitors about nearby nature and guidelines for walk materials. Table 6.1 details specific recommendations for UMHS and the Arb.

Informing Hospital Visitors about Nearby Nature

The results of this study show that nearby nature is a beneficial resource to hospital visitors but that a large percentage of visitors may not know about local natural resources and therefore can not avail themselves of their restful, restorative, and stress reducing benefits. Efforts should be undertaken to inform hospital visitors about the nearby nature and special efforts should be taken to inform longer term visitors, who are more likely to make use of resources.

To target longer-term patient visitors:

- Work with the hospital units that have longer-term patients and therefore longer term visitors first to share information about accessing the nearby nature and walking routes. Perhaps put a poster about walks in nearby nature in the elevator banks of inpatient units.
- Share information about accessing nearby nature and walking routes with the overnight stay accommodations that work specifically with patient families.

To provide information to the general hospital visitor population:

- Include information on nearby nature as part of a visitor guide. This information should be specific to hospital visitors and include information on how to access the natural resource from the hospital and, if applicable, indicate that short and long walks are possible. See the guidelines for walk materials below.
- Distribute a brochure in high traffic places for visitors such as elevator banks and waiting rooms.
- Provide information about nearby nature at information desks throughout the hospital. The materials provided should, where possible, be specific to the

hospital visitor and include information about accessing the natural area from the hospital. See the guidelines for walk materials below.

- It may be helpful to inform nurses and other staff about nearby natural resources, perhaps by providing guided tours for staff, so that they can provide personal suggestions to visitors and patients.

Guidelines for Walk Materials

The walk materials can influence how many hospital visitors choose to take advantage of nearby nature and perhaps influence how restful and restorative they find their experience.

In order to help visitors recognize the accessibility of nearby nature, the information provided at hospitals about accessing local natural resources should:

- Emphasize the proximity in writing and pictorially with a map that indicates the location of both the hospital and the natural area.
- Advertise specific routes that one can complete in 10, 20, and 30 minutes.
- It may be useful to include pictures of the nearby natural resource and/ or quotes of people's experiences their in order to help visitors realize the extent of the natural resource right next door.

Walking routes should be designed with adults and children in mind. Routes should indicate difficulty level and whether they are stroller and wheelchair accessible.

Activities for children could be developed and could range from suggested ideas that require no materials, such as imagining the landscape at a different time of year, to those that have materials for checkout such as drawing supplies and a "landscape viewer," a paper frame used in the Landscape Explorers Program at Nichols Arboretum, that encourages the user to visualize taking photographs. These materials could be developed in conjunction with local organizations that specialize in environmental programs for children.

To enhance the restorative potential of the visitors' experience in nearby nature, materials should include guidelines to help visitors become fascinated by their surroundings. "Even in a carefully designed setting, interaction with the environment can be diminished, for example, by being mentally consumed by a highly fascinating internal distraction . . . Intensity and usefulness of an outdoor experience is enhanced to the extent that one brings into mind what is present in that environment" (De Young, 2005).

These guidelines should include things to pay attention to, things to do and learn. They could include ways to take note of the environment such as listening to various sounds and noticing areas of sun and shade, introductory meditation techniques, guidelines to identifying birds by sight and sound, and descriptions of plants, trees and shrubs by season. These guidelines should be targeted to the novice restorative walker since those who routinely walk in nature to restore and refresh will be more likely to find and utilize the natural resource on their own. These guidelines also have the potential to influence the visitors' long term coping techniques.

In order to help hospital visitors feel comfortable leaving the hospital to relax and restore in nearby nature, it may be helpful to have a process by which the visitor can be reached by either the patient or the hospital if a need arises. This process could involve the visitor leaving their phone number with the nurse or checking out a beeper or phone. It is important to research and assure visitors that cell phones and beeper work in the natural environment.

Beyond facilitating hospital visitors' use of existing nature, environments designed with the hospital visitor in mind may provide even greater restorative and stress reducing benefit. Natural environments near healthcare facilities should be designed to be both restorative from a distance and inviting to enter. Special care should be taken to craft views from hospital windows and entrances that have fascinating features and that encourage exploration. In addition, several routes should be designed that would allow a quick return to the hospital. These efforts have potential to increase visitor's awareness and exploration of nearby nature and to increase the restorative potential of distant contact with the natural resource.

Table 6.1: Informing UMHS Visitors about Nichols Arboretum

To target longer-term UMHS visitors	
Guideline	Specific Suggestions
Share information about accessing and walking in the Arb in hospital units with longer-term patients	Display a poster about walks in nearby nature in the elevator banks of inpatient units.
Share information about accessing nearby nature and walking routes with the overnight stay accommodations that specifically serve patient families	These accommodations may include: Ronald McDonald House (RMH), Med Inn, Michigan Transplant House, and Wilmot House.
To target the general UMHS Population	
Expand information available from Patient & Visitor Guide	Currently there is a direct link to the Matthaei Botanical Gardens & Nichols Arboretum website from the Patient and Visitor Amenities listed on the UMHS website. Ideally an intermediary page would highlight the Arb’s proximity to the hospital, the availability of shorter and longer length trails, range of difficulty of terrain, include suggested routes, and information on the benefits to be gained by walking in the Arb.
Expand upon the “Friends Meditation Garden” brochure to create a “Friends Meditation Garden & Nichols Arboretum – Restorative Opportunities at UMHS” that also introduce the Arb	Distribution of this brochure should continue at elevator banks and waiting rooms.
Expand and maintain information available at hospital information desks	Currently, the hospital occasionally carries a map of the Arb. This map should be customized for the hospital visitors to clearly show the proximity between UMHS and the Arb. In addition, walk materials, such as suggested routes, should be provided at the information desk. See the guidelines for walk materials below. A process should be created for restocking these materials on a regular basis.
Educate nurses and other staff so that they can suggest the Arb to visitors	Organize tours of the Arb for hospital staff.
Design areas of the Arb to have fascinating features visible from the hospital windows and entrances and to encourage exploration	Create elements of fascination (for example: bright colors and moving features such as running water or plants that attract birds and butterflies) that are visible from the hospital windows and entrances. Create entrances to the Arb that are visible from the

	hospital and that encourage exploration. This may involve redesigning the current Arb entrance or landscaping areas that are not currently part of the Arb.
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Table 6.2: Guidelines for Arboretum Materials for UMHS Visitors

Guideline	Specific Suggestions
Customize Arb map	<ul style="list-style-type: none"> • Clearly show both UMHS and the Arb on the same map. Consider showing hospital entrances and parking lots. • Indicate whether trails are wheelchair and stroller appropriate, and the difficulty level of the trails.
Advertise routes that can be completed in 10, 20, 30 minutes and indicate stroller and wheelchair accessibility	<ul style="list-style-type: none"> • Posters and other summary materials should inform visitors that 10 minute walks, as well as longer walks, are possible. • Provide maps of the routes.
Suggest activities for children	<ul style="list-style-type: none"> • Provide suggestions that do not require materials, such as trying to identify all the colors one sees or guessing what the Arb looked like during a different season or years ago. • Provide materials for checkout at the Reader Center such as drawing supplies and the “landscape viewer” that encourages the user to imagine taking pictures. • Develop additional activities in conjunction with the Arb’s education department.
Provide guidelines for becoming mentally engaged in one’s surroundings and the present moment	<ul style="list-style-type: none"> • Suggest things to pay attention to such as patterns of light and the sound of the river. • Suggest that visitors look for Arb notices about current restoration projects. • Include information on introductory meditation techniques.
Develop procedures for communicating with the visitor while he/she is in the Arb	<ul style="list-style-type: none"> • Identify which cell phone networks work in the Arb. • Have cell phones for checkout. • Have buzzers for checkout.

Conclusion

Contact with nature has great potential to help hospital visitors reduce mental fatigue and stress. The restorative and stress reducing benefits of nature are remarkably valuable for use in public settings because they are received by all people, regardless of cultural background, and although one may be able to heighten their benefit, some benefit is obtained easily without training. In addition, nature is often already located nearby to healthcare facilities and as a result a great deal of good can be done by encouraging greater contact with existing nature. As a result, it should be relatively easy to utilize nature to increase the well-being of hospital visitors. Furthermore, from an implementation standpoint, nature is a broadly beneficial and relatively inexpensive.

This study encouraged University of Michigan Hospital System visitors staying at the Ann Arbor Ronald McDonald House (RMH) to walk in the Arboretum (Arb). In particular, this study publicized the Arb at RMH, suggested routes ranging in length of time from 10 to 30 minutes and from flat to moderately challenging terrain, provided guidelines for becoming more engaged in the natural environment and the present moment, and provided a customized map of the Arb for hospital visitors. The benefits obtained from existing nearby nature may be enhanced by encouraging additional contact with this nature and increasing the quality of that contact through mindfulness based strategies. Furthermore, it is likely that even greater benefit can be obtained by designing natural areas close to healthcare facilities with the healthcare visitor's experience in mind. This may include designing easy access, enticing views, communications areas, and a variety of walks, overlooks, and private nooks all just a few minutes from the hospital entrances. Carefully designed natural environments may both attract people to the nature and help enhance their restorative experience once they are there.

Although overwhelmingly positive, the results of this study are based on a small sample size. Additional pilot studies should be undertaken to further inform programs for hospital visitors. Different visitors may benefit from different materials and programs and a series of pilots may uncover a variety of beneficial program models. Research that

focuses on how to enhance the visitor's restorative experience would be particularly valuable. In addition, it would also be beneficial to conduct a full scale study to provide greater statistical evidence.

Appendices

Appendix A: Recruitment Materials

Arboretum Walks

A PROGRAM FOR INCREASING WELLNESS
AND REDUCING STRESS

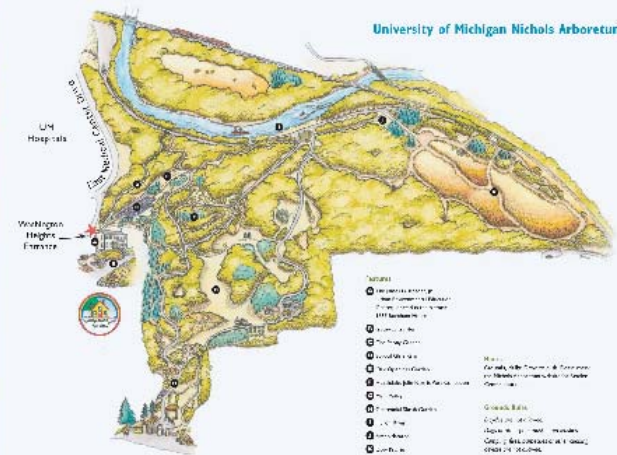
*Have 10 minutes?
Did you know the Arboretum
was right next door?*

*Enjoy a walk in the Arboretum
Learn more at the front desk!*

123 acres of trails
Woods, valley, prairie and
riverbank

Suggested walks:
- 10, 20, 30 minutes
Create your own route

Explore by yourself or
with others



Arboretum Walks

Enjoy a Walk in Nature
Relax, Refresh, and Reduce
Stress

- Walk in the Arboretum whenever it's convenient for you, by yourself or with others.
- Fill out surveys and your participation will inform future stress reduction and wellness programs for caretakers and, as a result, may help others as well.

Pick up an information packet at the
Ronald McDonald House front desk!

Appendix B: Walk Materials

WALKS

This section includes:

- 1) Walking Routes
 - Short Get-Away
 - Riverbank
 - Valley
 - Wheelchair Accessible
 - Create Your Own

- 2) Arboretum Map which shows key features of the Arboretum, trail routes, and whether the trails are nearly flat, sloping or steep.

Enjoy one walking route several times or try different routes each time you explore the Arboretum. Feel free to vary from the route you choose and to explore on your own. Enjoy walking by yourself or with friends and family. Consider bringing a blanket, Frisbee or book with you as there are open fields as well as benches on which to relax.



Short Get-Away

Length	10 minutes
Difficulty	Low <ul style="list-style-type: none">• The path is well maintained and nearly flat.• There are benches along the trail.
When to do this walk	Consider doing this walk as a: <ul style="list-style-type: none">• quick outing all by itself,• part of another walk, or• on the way to another destination such as the hospital, Ronald McDonald House, or even your car.

Suggested Guidelines

Take your time walking this beautiful route. Notice how quickly you enter the haven of nature and how different it feels from the busy world moments away. Stop to look at a tree bud or vibrant flower. Rest on a bench overlooking the peony garden. Hear the wind in the branches. Listen for birds. Watch others explore the Arboretum. Explore this winding path at your leisure.

Walking Route

- Enter the Arboretum at the gate nearest the Ronald McDonald House, off of Washington Heights. The Reader Center, a white building, will be on your right.
- Walk on the main path a short distance.
- When the path changes from gravel to dirt, look towards the right for a narrow path between the trees.
- Take this narrow path though the trees on the right. A rock with the trail name, "Laurel Ridge Trail" carved into its surface, marks the start of this narrow path. You will overlook the peony garden and will pass several benches on the left.
- Bear left to remain on this path when you reach a fork in the path.
- The path will slope downwards before it intersects the main path connecting to the entrance of the Arboretum.
- Turn left onto this main path. The entrance to Arboretum will be in view.
- Walk back to the Arboretum entrance.

Short Get-Away



Riverbank Walk

Length	20 minutes
Difficulty	Medium <ul style="list-style-type: none">• The path has some stairs and hills.
When to do this walk	Consider doing this walk as: <ul style="list-style-type: none">• an outing all by itself or• part of another walk.

Suggested Guidelines

- Enjoy the progression from planned garden, to forest path, to the river bank. Notice how the path moves through sun and shade.
- Watch ducks, geese and other birds from the benches along the riverbank.
- Watch the water flow down the river and over the rock sculpture in the river.
- Learn about projects going on in the Arboretum such as "Riverbank Rescue."
- Relax in the shade of the over 80-year-old Hemlocks, "the trees of storybook forests," in the Heathdale collection on your return from the Riverbank.
- Look for flowering bushes, trees and low plants as you return to the Arboretum entrance.

Walking Route

To the Riverbank:

- Enter the Arboretum at the gate nearest the Ronald McDonald House, off of Washington Heights. The Reader Center, a white building, will be on your right.
- Walk on the main path as it turns from gravel to dirt and continue straight through the peony garden.
- Continue straight when the path intersects others. The path will become lined with logs and will be surrounded by tall trees.
- Continue down the steps to the riverbank.

Return to the entrance of the Arboretum:

(If you are in a hurry, return up the stairs the way you came. If you have more time, take the slightly longer route described below.)

- Turn back towards the stairs that you came down.
- Take the wide gravel path just to the left of the stairs. You will pass a call box on your left.
- Continue as the path slopes upwards.
- Take a right between two low fences marking the entrance to the "Heathdale Julie Norris Post Collection." A rock with "Heathdale Julie Norris Post Collection" carved into its surface marks the entrance.
- Follow the main path through the Heathdale collection. You will pass an information plaque on your left and a circle of stone benches on your right.
- Take a left at the fork in the path to begin upwards.
- Take a right onto a wide gravel path at the fence marking the Heathdale collection exit.
- Continue around the bend and past the bench on your right. This path will slope gently upwards.
- Look to your left to find a short staircase.
- Go up these steps and turn left onto the main path. This is the path on which you entered the Arboretum. The Arboretum entrance will be in view.
- Walk back to the Arboretum entrance.

Riverbank Walk



Valley Walk

Length	30 minutes
Difficulty	Medium <ul style="list-style-type: none">• The path slopes and there are some stairs.• There are benches along the trail.
When to do this walk	Consider doing this walk as an outdoor activity.

Suggested Guidelines

Enjoy the cool, moist scent of the woods. Look up to see the canopy of branches swaying in the breeze. Be pulled into the valley by its openness and light. Wonder at the contrast to the dense shade of the woods. Watch the water rushing over the rocks in the river before returning to the Arboretum entrance.

Walking Route

To the Valley and Riverbank:

- Enter the Arboretum at the gate nearest the Ronald McDonald House, off of Washington Heights. The Reader Center, a white building, will be on your right.
- Walk straight on the center path through the peony garden.
- Look to your right for a short staircase, just after you pass a low concrete bench on your right.
- Go down the stairs and make a right onto the wide gravel path.
- Follow the winding gravel path past the wooden bench on your left. The path will slope downwards.
- At the intersection with another path, make a left and then a quick right down a short staircase leading into the grassy valley.
- Cross the grass towards the yellow call box.
- Make a left onto the dirt path alongside the trees which will be on your right.
- Follow this dirt path until it intersects with a wide gravel path.
- Make a left onto this gravel path and head towards the river.

Return to the entrance of the Arboretum:

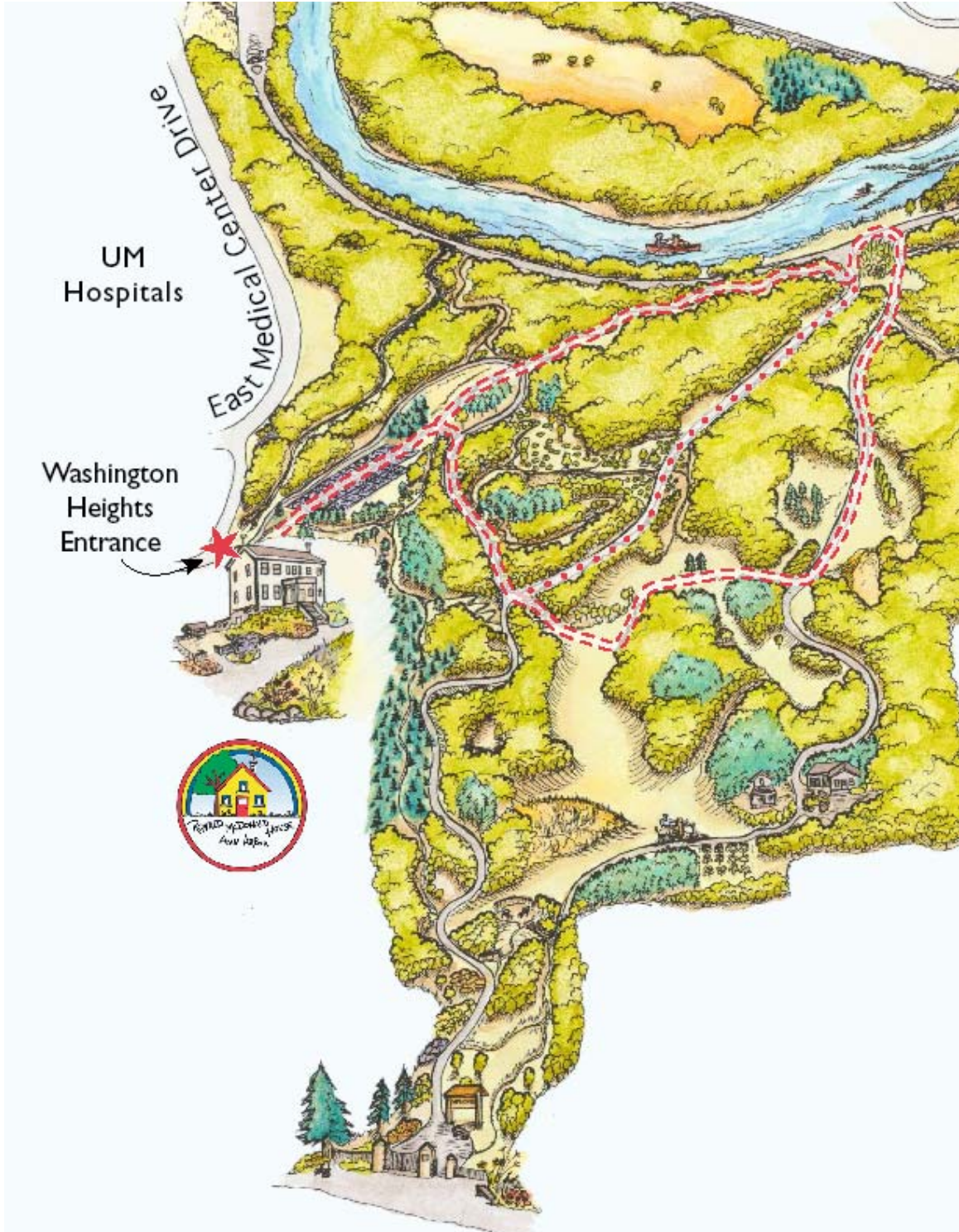
- Head up the stairs from the riverbank. (See alternate route below to avoid steep stairs.)
- Continue on this path as it changes from stairs to a slope, and then becomes flat.
- Continue straight through the intersection with other paths. At this point, the peony garden and Arboretum entrance will be in view.
- Walk back to the Arboretum entrance.

Alternate return to the entrance of the Arboretum (shown with dotted line on accompanying map):

To avoid the steep stairs:

- Take the wide gravel path just to the left of the stairs. You will pass a call box on your left.
- Continue as the path slopes upwards.
- Take a right when the path forks and continue around the bend. This path will slope upwards.
- Pass the wooden bench to your right.
- Look to your left and climb the short staircase you went down earlier.
- Turn left onto the main path. The Arboretum entrance will be in view.
- Walk back to the Arboretum entrance.

Valley Walk



Wheelchair Accessible Walk

Length	20 minutes
Difficulty	Low <ul style="list-style-type: none"> • The path is well maintained and nearly flat. • There are benches along the trail.
When to do this walk	Consider doing this walk: <ul style="list-style-type: none"> • as an outing all by itself, • on the way to another destination such as the hospital, Ronald McDonald House, or even your car.

Suggested Guidelines

- Note the deep valley to the left and learn about how the valley, "School Girl's Glen," has changed over the years at the kiosk at the entrance to the Arboretum.
- Enjoy the shade of the trees arching over the path.
- Listen for birds and the rustle of leaves.
- View the intriguing Heathdale collection from the overlook at the end of this trail; admire the flowering bushes and tall trees.
- Linger in the peony garden on your return to the Arboretum entrance.

Walking Route

To the Heathdale Lookout Bench:

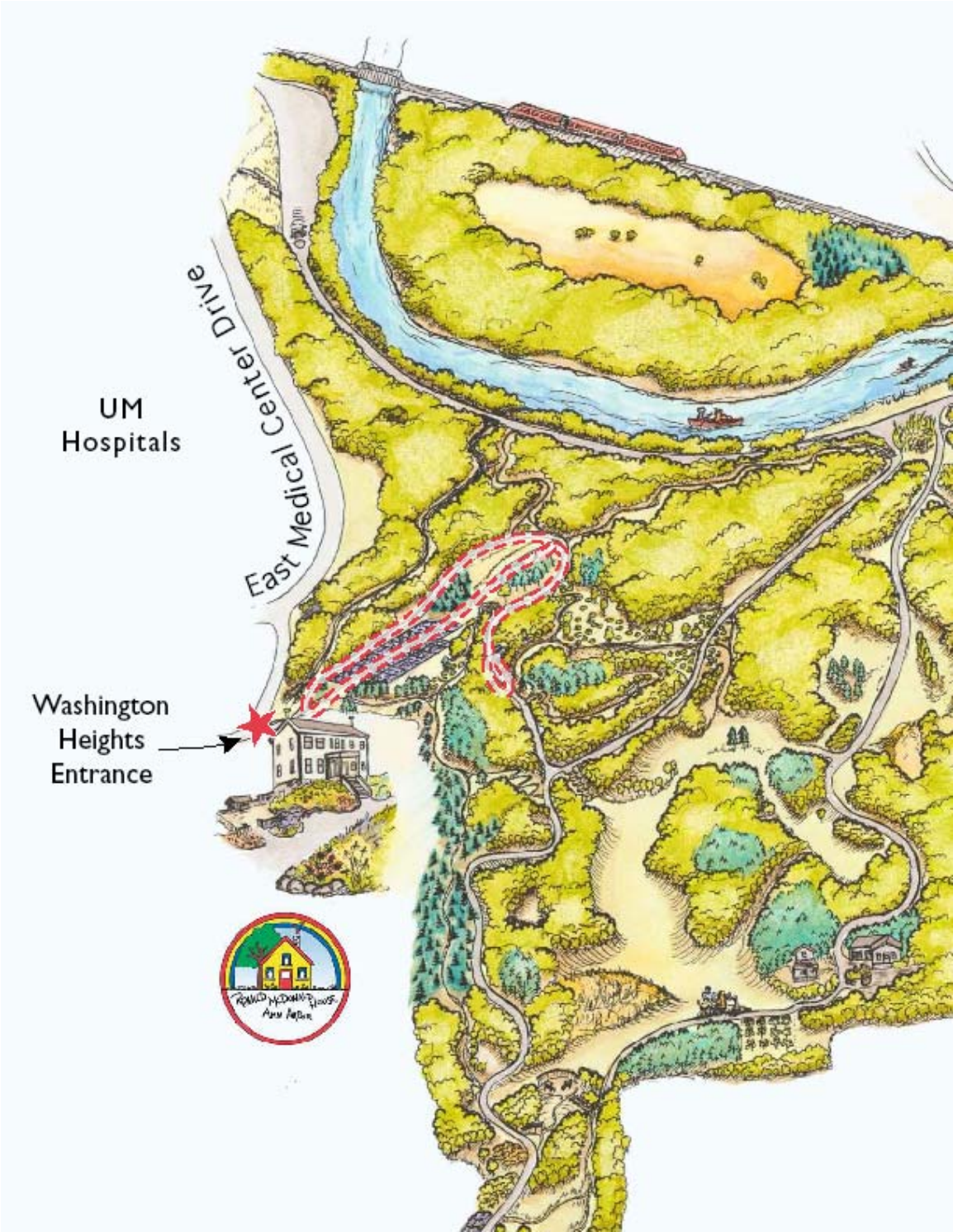
- Enter the Arboretum at the gate nearest the Ronald McDonald House, off of Washington Heights. The Reader Center, a white building, will be on your right.
- When the path splits, soon after you pass the kiosk, take the wide gravel path to the left. This path will slope gently downwards and the peony garden will be slightly above you to the right.
- Continue on this path around the bend and through the intersection with the straight path on which you entered the Arboretum.
- You will pass the entrance to the "Heathdale Julie Norris Post Collection" on your left.
- Continue to the bench, on the left, that overlooks the Heathdale collection.

Return to the Entrance of the Arboretum:

- Retrace your steps.
- At the intersection make a left onto the path on which you entered the Arboretum. The Arboretum entrance will be in view.
- Continue straight through the Peony Garden to the Arboretum entrance.

Additional wheelchair accessible routes can be accessed from the River Entry (Lower Entry) to the Arboretum off of East Medical Center Drive. See the Arboretum Map at the end of the Walks section of the "Arboretum Walks" binder. Although not labeled on this map, there is a parking lot at the upper left section of the map, at the start of the blue trail that follows the course of the river. From here you can access the wide flat path along the river and Dow Prairie.

Wheelchair Accessible Walk



Make Your Own Route

Length	Up to you, but you should allow at least 30 minutes
Difficulty	Up to you
When to do this walk	When you have time to explore

Suggested Guidelines

Many people enjoy exploring the Arboretum without a specific goal, just seeing where they end up. Others like walking to a particular destination or looking for particular plants and birds. Here are some resources, if you'd like to plan a walk:

The kiosk at the entrance to the Arboretum contains information on:

- plants in bloom,
- projects going on in the Arboretum,
- special events,
- a "Welcome" brochure which contains a self guided tour of Michigan and North American tree collections, and
- a detailed map of the Arboretum which indicates the location of specific overlooks.

Trail Difficulty

If you have concerns about the difficulty of a trail, see the Arboretum map at the end of the Walks section of your "Arboretum Walks" binder. This map indicates whether trails are nearly flat, sloping or are steep/have stairs.

Other Tips

- You may want to bring a water bottle, blanket, book or Frisbee.
- Picnics are allowed in the Arboretum, but fires, barbecues and other cooking devices are **not** permitted. And, of course, place all litter in garbage containers or take it with you. Fellow Arboretum visitors will appreciate your thoughtfulness.
- Restrooms are available M-F from 8:30am – 4:30pm at the Reader Center at the Washington Heights entrance to the Arboretum. (This is the entrance closest to Ronald McDonald House).

University of Michigan Nichols Arboretum



Appendix C: Survey Instrument Measuring Mental Fatigue and Stress

Before-First-Walk Survey

Please complete this survey before continuing to the Walks section of this packet.

Today's Date: _____

Last 4 digits of your home phone number: _____

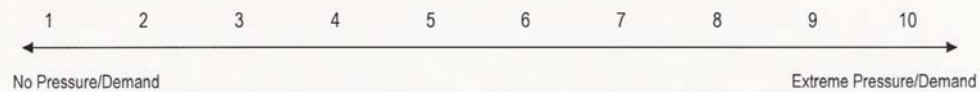
Circle the most appropriate number to indicate how you have been feeling the past couple of days?

	Not at all	A little	Somewhat	Very well	Extremely well
It's hard to concentrate on details	1	2	3	4	5
Making decisions is difficult	1	2	3	4	5
I am losing or misplacing things	1	2	3	4	5
I can keep track of what I am saying or doing	1	2	3	4	5
I am able to get really absorbed in a task	1	2	3	4	5
I have patience with others	1	2	3	4	5
There seems to be too much going on in my life	1	2	3	4	5
I feel worn out mentally	1	2	3	4	5
I feel energized	1	2	3	4	5
My mind nearly always feel alert/awake	1	2	3	4	5
It's difficult to finish things I have started	1	2	3	4	5

Circle the most appropriate number to the right of the statement to indicate how you feel right now.

	Not at all	A little	Somewhat	Very much	Extremely
I feel calm	1	2	3	4	5
I feel tense	1	2	3	4	5
I feel upset	1	2	3	4	5
I feel relaxed	1	2	3	4	5
I feel content	1	2	3	4	5
I feel worried	1	2	3	4	5

Please use the scale below to rate how light or heavy you feel the pressures and demands are in your life.



(Please turn over to continue)

Before-First-Walk Survey

Indicate how often you do the following activities while at home. Please circle the best answer.

	Never	Occasionally	Sometimes	Often	Very often
Walk outside	1	2	3	4	5
Take time to do an activity you enjoy such as reading a fiction book, doing an arts and crafts project, working on a puzzle, cooking or baking for pleasure.	1	2	3	4	5
Take time to reflect on life	1	2	3	4	5
Spend time looking out windows	1	2	3	4	5
Practice yoga, tai-chi, or meditation	1	2	3	4	5
Visit quietly with friends/family	1	2	3	4	5
Attend/participate in religious/spiritual activities	1	2	3	4	5
Watch television / movies	1	2	3	4	5
Work or study	1	2	3	4	5

Circle the best answer to each question regarding your experiences at Ronald McDonald House (RMH).

Have you stayed at the RMH before this visit?	Yes	No			
How many days have you stayed at RMH during this visit?	1-3 days	4-7 days	1-2 weeks	2-4 weeks	Over 1 month

Please circle the best answer to each question.

Do you know where the Nichols Arboretum (Ann Arbor Arboretum) is located?	Yes	No	Unsure
Have you walked in Nichols Arboretum before?	Yes	No	Unsure
If you have walked in Nichols Arboretum before, did you enjoy it?	Yes	No	Unsure

Please provide information about your role as a caregiver. Please circle the word that best completes each sentence.

- The child I am caring for is being treated for: An ongoing health issue A one time emergency stay I don't know
- I am the patient's: Mother Father Grandmother Grandfather Sibling Other
- I am the primary / secondary / other family member providing care to the patient at UMHS. (Please circle: Primary, Secondary, Other)

Please write in the box below what you find most beneficial about walking outside.

Please place the completed survey in the **Arboretum Walks** Drop Box at the Ronald McDonald House front desk.
Thank you!

After-Each-Walk Survey

Please complete this survey within 24 hours of your walk.

Today's Date: _____

Last 4 digits of your home phone number: _____

Please circle the most appropriate number to the right of the statement to indicate how you have been feeling today.

	Not at all	A little	Somewhat	Very well	Extremely well
It's hard to concentrate on details	1	2	3	4	5
Making decisions is difficult	1	2	3	4	5
I am losing or misplacing things	1	2	3	4	5
I can keep track of what I am saying or doing	1	2	3	4	5
I am able to get really absorbed in a task	1	2	3	4	5
I have patience with others	1	2	3	4	5
There seems to be too much going on in my life	1	2	3	4	5
I feel worn out mentally	1	2	3	4	5
I feel energized	1	2	3	4	5
My mind nearly always feel alert/awake	1	2	3	4	5
It's difficult to finish things I have started	1	2	3	4	5

Circle the most appropriate number to the right of the statement to indicate how you feel right now.

	Not at all	A little	Somewhat	Very much	Extremely
I feel calm	1	2	3	4	5
I feel tense	1	2	3	4	5
I feel upset	1	2	3	4	5
I feel relaxed	1	2	3	4	5
I feel content	1	2	3	4	5
I feel worried	1	2	3	4	5

How have the pressures/demands in your life changed since the previous survey you filled out for this study?

Lessened a lot Lessened a little Stayed the same Increased a little Increased a lot

Please indicate how much you agree with each of the following statements about the walk materials and experience.

	Not at all	A little	Somewhat	Very well	Extremely well
I am glad I went on the walk	1	2	3	4	5
I liked having a route to follow	1	2	3	4	5
I felt free to go my own way	1	2	3	4	5
I liked the suggested guidelines of things to pay attention to on my walk	1	2	3	4	5
I found the Arboretum map helpful	1	2	3	4	5
I found the walk instructions clear	1	2	3	4	5
I would have walked in the Arboretum even if I did not participate in this study.	1	2	3	4	5

Please circle which walk you went on:

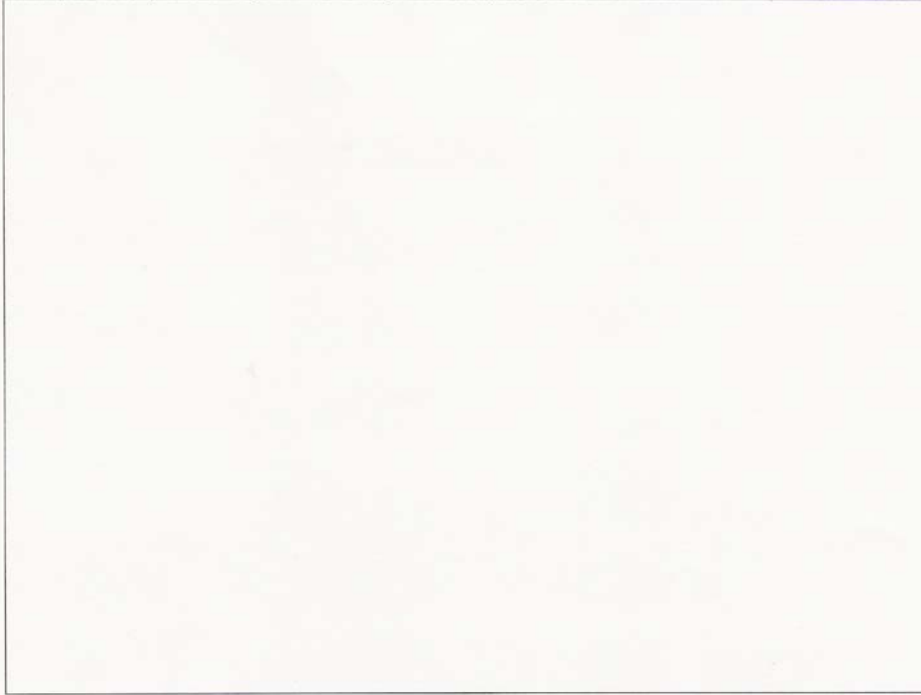
Short Get-Away Riverbank Valley Wheelchair Access Make Your Own

How many other adults did you walk with?	0	1-2	3-5	6-8	9 or more
How many children did you walk with?	0	1-2	3-5	6-8	9 or more

Please provide any comments you'd like about your walk experience or about the walk materials on the back of this page.

After-Each-Walk Survey

Please provide any comments you'd like about your walk experience or about the walk materials in the box below.

A large, empty rectangular box with a thin black border, intended for handwritten or typed comments about the walk experience or materials.

Please place the completed survey in the **Arboretum Walks** Drop Box at the Ronald McDonald House front desk.
Thank you!

Final Survey

Please complete this survey after you are finished participating in this study and before you leave the Ann Arbor Ronald McDonald House. We will find your responses valuable regardless of how many walks you took.

Today's Date: _____

Last 4 digits of your home phone number: _____

Circle the most appropriate number to indicate how you have been feeling the past couple of days.

	Not at all	A little	Somewhat	Very well	Extremely well
It's hard to concentrate on details	1	2	3	4	5
Making decisions is difficult	1	2	3	4	5
I am losing or misplacing things	1	2	3	4	5
I can keep track of what I am saying or doing	1	2	3	4	5
I am able to get really absorbed in a task	1	2	3	4	5
I have patience with others	1	2	3	4	5
There seems to be too much going on in my life	1	2	3	4	5
I feel worn out mentally	1	2	3	4	5
I feel energized	1	2	3	4	5
My mind nearly always feel alert/awake	1	2	3	4	5
It's difficult to finish things I have started	1	2	3	4	5

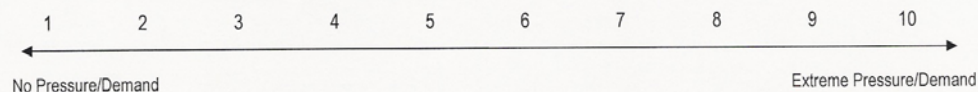
Circle the most appropriate number to the right of the statement to indicate how you feel right now.

	Not at all	A little	Somewhat	Very much	Extremely
I feel calm	1	2	3	4	5
I feel tense	1	2	3	4	5
I feel upset	1	2	3	4	5
I feel relaxed	1	2	3	4	5
I feel content	1	2	3	4	5
I feel worried	1	2	3	4	5

How have the pressures/demands in your life changed since the previous survey you filled out for this study?

Lessened a lot Lessened a little Stayed the same Increased a little Increased a lot

Please use the scale below to rate how light or heavy you feel the pressures and demands are in your life.



(Please turn over to continue)

Final Survey

Indicate how often you did the following activities while at Ronald McDonald House (RMH).

	Never	Occasionally	Sometimes	Often	Very often
Walk outside	1	2	3	4	5
Take time to do an activity you enjoy such as reading a fiction book, doing an arts and crafts project, working on a puzzle, cooking or baking for pleasure.	1	2	3	4	5
Take time to reflect on life	1	2	3	4	5
Spend time looking out windows	1	2	3	4	5
Practice yoga, tai-chi, or meditation	1	2	3	4	5
Visit quietly with friends/family	1	2	3	4	5
Attend/participate in religious/spiritual activities	1	2	3	4	5
Watch television / movies	1	2	3	4	5
Work or study	1	2	3	4	5

Circle the best answer to each question regarding your experiences at Ronald McDonald House (RMH).

If you were to stay at the Ann Arbor RMH again, would you consider walking in the Arboretum?	Yes	Maybe	No
Having taken walks in the Arboretum while staying at the RMH, are you likely to walk outdoors more when you return home?	Yes	Maybe	No

How many days have you stayed at RMH during this visit?	1-3 days	4-7 days	1-2 weeks	2-4 weeks	Over 1 month
Approximately how many times did you walk in the Arboretum or outside for leisure?	0	1-3	4-6	7-9	Over 9

Did you enjoy participating in the Arboretum Walks Project? Yes No

Please write in the box below what you find most beneficial about walking outside.

Please share any comments you would like about your experiences participating in this study.

Please place the completed survey in the **Arboretum Walks** Drop Box at the Ronald McDonald House front desk.
Thank you for participating in this study!

Appendix E: Informed Consent Letter

Walking for Caretaker Coping and Wellness

Consent to Participate in Research

Researcher: Katy Levine (MBA/MS 2006)

Description of research project:

This study is part of a project to increase the use of Nichols Arboretum by visitors of the University of Michigan Hospital System for stress reduction, wellness, and physical health maintenance. Caretakers of ill family members are under significant stress and sometimes become ill themselves. Spending time in natural environments has been shown to help people reduce stress, refresh their minds, reflect, and cope. Walking has been shown to be beneficial for physical health as well as stress reduction. The goals of this study are to assess the benefits of walking in nature for caretakers of family members who are hospitalized and to learn about how to create wellness programs that have optimal benefit for this population.

Participating in this study involves:

1. Signing the consent form.
2. Completing an initial survey.
3. Selecting one or more walking routes from the enclosed materials.
4. Walking the route(s).
5. Completing post-walk survey(s).
6. Completing a final survey about your experience.

Surveys vary in length. The initial survey is a two-sided 1 page survey and will take 5-10 minutes to complete. The post-walk surveys are shorter and will take approximately 5 minutes to complete. The final survey about your experience will take 5-10 minutes to complete.

Walking routes vary in length from approximately 15 minutes to 45 minutes and in difficulty from gently sloping to steep. This information is included in the walk description so that you can select walks that best meet your needs and interests. You may complete these walks alone, with other adults, or children. The walks should be enjoyable!

Your participation in this project is on your own schedule. You are invited to participate for as long as you are visiting at the University of Michigan Hospital System and to go on as many walks as you like during this time.

If significant new knowledge is obtained during the course of this research which may relate to your willingness to continue participation, you will be informed of this knowledge.

Benefits of this study:

Although not guaranteed, as a participant in this study you are likely to receive direct benefits of walking in nature including stress reduction, cardiovascular health maintenance, and pleasure. The information gained through this study will inform future stress reduction and wellness programs for caretakers and as a result others may ultimately benefit from the knowledge obtained in this study.

Risks of participating in this study:

Risks of participating in this study are minimal. However, they include all of the usual risks of walking in a rugged natural environment. While walking you may encounter a variety of natural conditions including slick, slippery surfaces, hills, depressions, water, and dry leaves. You may also encounter a variety of life forms including animals

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