Lorna Troost

Health and Wellness Assignment 4

**Statement of Need**

Stress urinary incontinence is a common, expensive, and undertreated condition with significant consequences for quality of life and self-efficacy. Urinary incontinence (UI) is a broad term covering several etiologies that refers to the involuntary loss of urine. It is perhaps one of the most prevalent but one of the least discussed conditions in adulthood, with an estimated 75% of older women experiencing UI at some point in their lifetime.14 Though men also experience UI, and perhaps in equal rates after 80, this program will focus on the treatment of stress UI (SUI) in older adult women, as they experience SUI at greater prevalence overall, which also increases with age. SUI is caused by sphincter incompetence during periods of increased intra-abdominal pressure, such as sneezing, coughing, jumping, or exercising, while urgency UI is caused by inappropriate detrusor muscle contractions.13

SUI is associated with impairments to quality of life and increased social isolation1 and increased burden on caretakers.15 In addition to the personal and social costs, the annual direct cost of UI in 2000 was $19.5 billion.7 The cost to individuals is high as well. Women spent an average of $250 per year out of pocket on UI related expenses, including absorbency products and laundry.6 The cumulative individual costs may be even higher since UI is underdiagnosed and undertreated, resulting in the burden falling on individuals instead of insurance companies or healthcare providers.9 The total annual costs of UI are likely to rise as the population in the US ages, as prevalence of UI increases with age.

Estimating prevalence of UI in general is difficult in light of how sensitive the topic can be, and how rarely health care professionals screen for it. Part of the difficulty in defining prevalence may be that UI is a highly personal and potentially embarrassing topic for many individuals resulting in intrapersonal barriers to individuals seeking treatment. It is also generally underscreened by primary care providers,9 causing organizational barriers to diagnosis and treatment. Primary care providers may also experience the same embarrassment that their patients do regarding UI, creating intrapersonal barriers to asking the patient about continence issues.9 Estimates vary significantly between studies, thus estimates will be presented as ranges when appropriate. By age, an estimated 36% of women between 40-45, and 40% of women 70-74 experience UI.8

Prevalence of UI varies between residence setting. Among nursing home residents, between 44.6 and 58.6% of older adult women experience UI (stress, urge, or mixed type).2,4 Estimates for community-dwelling older adult women vary more widely, from 16% to 38%.11,17 Estimating the proportion of SUI cases is made more difficult by poor documentation by primary care providers.16 The overall incidence of UI is reported to not have changed much in the previous decade, though the complexity and number of comorbidities in individuals with SUI are increasing, along with an increasing number of prior pelvic surgeries and greater likelihood of concomitant prolapse.5

Urinary incontinence is more than just a minor hassle. The costs of SUI affect both individuals and communities, through early retirement of skilled employees and loss of social support for family members. Around 60% of women who suffer from SUI decrease their activity levels out of fear of incidents.23 Inactivity secondary to fears about SUI leads or contributes to all the same health issues that a sedentary individual often suffers from, including obesity, cardiovascular concerns, and bone density loss. The strongest risk factors for developing UI are the decline of physical function21 and the loss of independent mobility.22 Since physical activity is protective against the loss of physical function and independent mobility, many women who fear SUI and thus decrease their activity levels may conversely make their problem worse. Additionally, older adults may not drink sufficient water throughout the day due to fears about unplanned voiding, leading to dehydration and other complications such as kidney dysfunction. Thus, it is important to intervene early to prevent the development of this cycle.

SUI presents significant challenges to the self-efficacy and emotional health of those who suffer from it, as well. Urinary continence plays a great societal role in the perception of adulthood, and thus the loss of continence can play a detrimental role in how individuals view themselves, reducing their sense of independence and self-respect. Given that incontinence in adults is highly stigmatized, individuals who need assistance may not seek it due to shame, leading to further social isolation. Incontinence can have negative impacts on relationships with spouses or partners as well. Around 64% of older adult women with SUI report sexual dysfunction related to fears about SUI.23 SUI is also linked to the loss of independence and greater risk of entering an assisted living facility,18 as well as a lower likelihood of regaining independence after entering a temporary assisted living facility such as a skilled nursing or inpatient rehabilitation.19

SUI is common, expensive, and socially isolating, but there is much that can be done to prevent and treat it. However, given the social stigma (intrapersonal, interpersonal, and community barriers) connected to it, reaching individuals experiencing SUI can be difficult. In order to reach this population, a community-based program aimed at older adult women and focused on improving mobility and physical function has been designed. The program itself consists of a behavioral and mobility training course, focusing on promoting general mobility, strength, endurance, and independence, which has been shown to improve urinary continence.12 This type of program has been taught and shown to be effective at reducing SUI in older adult women when performed in a variety of settings, including community centers, assisted living facilities, churches, or any location older adult women live or meet.12 These training courses are less embarrassing and more accessible than many other types of SUI prevention or treatment programs in that they do not expressly state they are about SUI, thus any intrapersonal barriers to seeking care due to embarrassment over SUI are lessened. This portion of the program is geared towards improving continence and building self-efficacy in a safe, nonthreatening environment which reduces intrapersonal barriers to seeking care. These classes will also contain information regarding SUI, including information such as prevalence and treatment options, which will help to reduce intrapersonal barriers by destigmatizing SUI and reducing the individual’s sense of isolation. By changing the individual’s intrapersonal views on SUI, it is possible to increase their willingness to actively participate in activity and seek care.

A prime location for these classes is the Galloway Ridge Retirement Community, a continuing care retirement community (CCRC), which provides a variety of levels of residences to older adults, including independent living, assisted living, skilled nursing, and memory care. All residents at Galloway Ridge are older adults, and the majority are women. They provide a number of wellness services and classes on site, which are well attended and thought of by residents. Galloway Ridge already offers many specialized exercise classes geared for older adults, and has the resources to help adults with mobility assistance needs get to the classroom safely. They have ample room for classes and staff for assisting residents who are not independently mobile to exercise rooms. Since specialized classes already take place on a daily basis there, this class would fit in easily with the current model and would not feel out of place to residents or staff. Thus, individuals referred to or voluntarily participating in this class would not experience the embarrassment or shame that served as an intrapersonal barrier to seeking care. Given that many older adults, whether community-dwelling or requiring assistance in a nursing facility, will have multiple comorbidities, a physical therapist (PT) who is trained in the treatment and care of older adults is a necessity both for activity modification, general safety, and the education of participants. A licensed PT has the knowledge both of comorbidities and their associated precautions, which individuals and professionals in other disciplines, such as recreational therapy or exercise and sports science, are unlikely to have. Without appropriate education and training, the instructor might not know when a participant needs assistance, is at falls risk, or is presenting with signs of cardiovascular distress or other warning signs. Additionally, only a PT is going to have the education and knowledge to design an evidenced based exercise protocol and education plan. Individual goal setting will also require a PT, to know how to set individualized SMART (specific, measurable, attainable, relevant, and time bound) goals, based on the individual’s current level of function, personal goals, comorbidities, and the therapist’s knowledge of the evidence. Since PTs have this level of training, the course should be designed, instructed, and overseen by a licensed PT.

SUI is common and there are a variety of means of treating it, but our societal-level embarrassment about the topic leads to patients being unwilling to talk and their doctors unwilling to ask. This health promotion and wellness program is geared to improve or prevent SUI through evidence-based treatment protocols in a non-threatening, familiar environment, and provide both education and reduce isolation related to SUI, to help promote the self-efficacy, independence, and wellness of older adult women experiencing SUI.

**Background**

Exercise programs to improve the physical function and urinary continence of older adult women have been well explored in the literature in recent years, providing evidence that targeted group exercise programs, led by PTs, can reduce or prevent urinary incontinence. Exercise and mobility training classes for the treatment and prevention of SUI have been conducted in a variety of settings, including assisted living faculties, care homes, and retirement communities, with excellent results.12 The program at Galloway Ridge can be designed to allow participation of residents at a variety of functional levels, though participants with lower functional levels will require program modification by the PT. As the treatment protocol involves individual goal setting and activity modification, individuals at a variety of functional levels will be able to participate and receive benefits. These programs have been shown to be effective at reducing SUI severity and incident rates among older adults with cognitive impairment as well, so individuals residing in Galloway Ridge’s memory unit or those residing in other levels of care with cognitive impairment can also benefit.

Mobility training and behavioral interventions are effective means of reducing the incidence and severity of SUI. These interventions work well in many populations, including those with dementia or other cognitive impairments.12 These interventions include prompted voiding, mobility training, as well as balance, strength, and endurance training. A study by Sackley et al. showed that interventions supervised and designed by a licensed PT in group care homes reduced incidents of SUI by roughly 50% at 6-week follow up.12 These sessions met for 1 hour, twice weekly, for four weeks, and consisted of activities of daily living (ADL) functional training, strength, balance, flexibility, and cardiovascular endurance training, as well as bladder training. Students assistants were trained by a licensed PT in a PT-designed exercise protocol. Bladder training was also incorporated into the intervention. Participants were prompted to void pre- and post-training as well as drink water to promote hydration. At the end of the 6-week intervention, participants with SUI symptoms decreased from 70.6% of participants to 41.4%. In addition to significant improvements in continence, many residents reported psychosocial benefits as well, including decreased isolation.

The exercise interventions used in the Sackley et al. trial promote general mobility, strength, endurance, and independence at the same time, which may be easier to promote in assisted living facilities than programs which are more overtly UI related which may be seen as embarrassing by participants. In addition to assisting with the treatment of UI in individuals with preexisting mobility impairment, there are also preventative benefits to physical activity, as it may prevent or at least delay onset of UI.3

Functional training with prompted voiding (PV) has been shown to be effective at reducing incidents of incontinence even in older adult women with significant mobility impairments. Functional Incidental Training (FIT) combines PV with functionally oriented, low-intensity endurance and strength exercises and was specifically designed for frail older adults in assisted living settings. Previous trials using FIT care with endurance and strength training, as well as PV and hydration education have shown remarkable success for reducing incontinence in nursing home residents.20 At the end of an 8-week intervention, participants experienced a roughly 29% decrease in SUI incidents. This and other similar trials demonstrate the benefit of PT-led functional strength and mobility training with UI-related education. These trials also have high participation and adherence, and provide cardiovascular and other health benefits as well, increasing the variety of benefits the participants can receive. Given that maintaining gross strength and mobility is preventative of UI development, PT-led programs like FIT with PV can not only treat but prevent the development of SUI, leading to decreased social isolation, increased function, improved self-efficacy, and increased independence.

Urinary incontinence becomes significantly more prevalent over time, and may be considered a part of normal aging,18 though other factors, such as the need for assistance on at least one ADL, can be significant risk factors for the development of SUI as well.18 ADL training for individuals needing assistance is able to help reduce the incidence and severity of SUI. PT-directed training programs which are individually tailored, even if performed in group settings, can decrease SUI symptoms in those who already suffer from it, and can prevent the development of SUI in those who do not. Over time without treatment, more older adults will develop SUI or will have current SUI symptoms worsen, but with training programs consisting of ADLs, transfers, walking, balance, strengthening, and endurance exercises, that progression can be slowed or reversed. Without treatment, the control groups in many studies demonstrate that SUI increases over time,12,18,20  but with treatment can be effectively and safely managed.

 Studies highlight the importance of overall physical functioning in the prevention of worsening urinary incontinence.18 While the program itself will be presented as a general fitness class, it will also include an educational component. The instructors will present information regarding SUI to participants with the goal of encouraging questions from participants. Part of the goal of the educational component will be to convey the message that individuals experiencing SUI are not alone. That is, to encourage older adults to be willing to start conversations with their family, friends, and healthcare providers. Knowing how common it is, they may realize that there is a high statistical likelihood that their friends also experience SUI, decreasing their sense of isolation and embarrassment and reducing intrapersonal and interpersonal barriers to seeking and receiving care.

Currently, there is little literature available on how to encourage individuals with SUI to seek care, but given that a common reason sited for not seeking care is shame and sense of isolation, hopefully education to reduce isolation and shame will help older adult women to be more willing to discuss UI with their health care providers. Some of the consequences of the intrapersonal and interpersonal views regarding UI are misinformation about the condition itself, its consequences, and prevalence. Individuals may feel shame or embarrassment and as a result be unwilling to bring up incontinence to a medical provider. Consequently, they may also lack evidence-based information on it or what to do about it, and may not know what health-related behavior changes to make. The Health Belief Model25 discusses how various factors can impact the individual’s willingness to change health-related behaviors. These factors, such as the individual’s perception of their susceptibility to a condition, its seriousness or the consequences of the condition, the benefits of acting or changing behaviors, cues to action, and self-efficacy, can be addressed via education and appropriate health initiatives. An educational program can inform participants about their true susceptibility, including the prevalence at the participant’s current age group, risk factors, and how the prevalence and severity of UI increases with age.18  Many individuals may not think deeply about the consequences of SUI on their self-efficacy or how unhealthy behavior changes they make as a result of SUI may negatively influence their general health. These individuals may need education regarding topics such as avoidance of drinking water. Many older adults with SUI may avoid drinking water during the day out of fear of SUI incidents, without realizing both the health risks and how counter-productive that behavior may be. Older adults who avoid drinking water out of fear of SUI incidents not only increase the likelihood of SUI incidents via bladder irritation, but also can create a variety of other health concerns resulting from chronic dehydration. Yet, without education on the subject, these individuals will not be able to make healthy behavior changes. In this way, participants can be educated on their susceptibility to SUI, the benefits of action, and more. They may also not realize the negative impact SUI may have on their self-efficacy, ability to interact with others, and willingness to exercise. Though participants will already be residing in a CCRC, they may be unaware that one of the greatest risk factors for loss of independence and admission into an assisted living facility is SUI. Those living in the independent living area of Galloway Ridge will likely wish to keep their independent status as long as possible, so may be even more motivated to improve continence to prevent the loss of further independence.

**Program Description**

**Program Objectives**

1. Cognitively intact participants will be compliant with daily bladder diary record keeping to assist in pattern recognition for the participant and incontinence record keeping, in 1 month.
	1. This will be measured during the weekly 10 minute conferences with the participant to discuss how record keeping is progressing for the individual. Individuals with mild-moderate cognitive impairment will have assistance from staff on duty.
2. At least 50% of participants will experience at least a 20% decrease in SUI frequency, as measured by self-report in bladder diaries, in 3 months.
	1. Previous studies have demonstrated between 20-30% decreases in SUI incident frequency,12,20 while others studies have reported at least a 50% decrease in frequency.12
3. At least 50% of participants will demonstrate at least a 20% decrease in volume of urine loss as reported by bladder diaries to demonstrate a decrease in severity of UI, in 3 months.
	1. 20% reduction over a 3 month intervention has been demonstrated in Vinsnes et al.18 At this time, minimal clinically important difference (MCID) and minimum detectable change (MDC) information for changes in urine loss is unavailable.
4. Participants will demonstrate at least a 15% decrease in score on International Consultation on Incontinence Questionnaire - Short Form (ICIQ-SF) to demonstrate a decrease on the negative impact of SUI on quality of life, in 3 months.
	1. MCID has not been established with the ICIQ-SF. However, 15% decreases in ICIQ-SF score have been previously reported using conservative management.27
5. Participants will demonstrate decreased sense of burden from UI and increased quality of life, demonstrated by at least a 13 point decrease in Incontinence Impact Questionnaire (IIQ) score, in 3 months.
	1. MCID has not been established for the IIQ. A 13 point decrease is consistent with a Dumoulin et al. study for decreasing SUI through conservative management.26
6. At least 50% of participants will demonstrate an improvement of at least 4.85 seconds on the Timed Up and Go (TUG) test by the end of 3 months, to demonstrate improved functional mobility in being able to access the bathroom with safety and timeliness, in 3 months.
	1. MCID has not been established for the TUG. 4.85 seconds is the established MDC for older adults.28
7. Participants with no cognitive impairment or only mild cognitive impairment will participate in at least 80% of weekly bladder diary checks and personal goal update meetings with the physical therapist, to maintain participant engagement and provide cues to action for health-behavior changes, during the 3 month intervention.

**Program Methods**

* Location: Galloway Ridge Retirement Community, within one of the on site exercise rooms. Some classes may involve the community gym, adjacent to the exercise rooms. Weekly meetings to take place in a space of the participant’s choice, such as a private meeting room in the main building or the participant’s living space.
* Equipment needed: Galloway Ridge already possesses a gym complete with a variety of free weights and exercise machines, including cardio and strength training machines. Exercise rooms contain yoga mats and chairs. The wellness center and outpatient therapy clinics on site have necessary medical equipment, including automatic blood pressure monitors and pulse oximeters, and keep at least one unit in all exercise spaces. No new equipment will need to be purchased by the facility. Participants will be given bladder diary print outs at the beginning of each week. Printer, ink, and paper to be provided by Galloway Ridge.
* Participants: up to 20 women residents at Galloway Ridge. Participants can elect to join the class or be recommended by a medical provider. Participants will be informed of the new class through fliers posted in public places around Galloway Ridge and through medical providers and appropriate Galloway Ridge staff. Participants will be placed into groups of no more than ten participants, with a maximum of two groups at any time. Participants must be cognitively intact or have no more than moderate cognitive impairment.
* The intervention
	+ Duration: as per the Vinsnes et al.18 trial, the intervention will be held for 3 months.
	+ Exercise component
		- The exercise component will consist of 90 minute, twice weekly group exercise sessions. The class will be led by one PT and will have 3 physical therapy student (sPT) volunteers to assist with guarding, safety, and cueing for appropriate form.
		- Prior to the beginning of class, participants will be prompted to void and drink water, as part of the prompted voiding (PV) protocol.12,20
		- Functional Incidental Training (FIT)20: exercises are grouped into three types, endurance/cardiovascular, strengthening, and flexibility. All types will include functional and ADL training. Specific exercises, intensities, and durations will be set prior to the first group exercise class and after baseline status has been established. Exercise protocols for individuals will be collaboratively created by the PT and the participant, based on participant impairments and goals. After protocol has been set, the participant will be educated on safely progressing their exercise routine, including how to judge rate of perceived exertion, and when to change resistance, duration, repetitions, or intensity. Participants will also be educated in self-monitoring of heart rate, O2 saturation, and blood pressure using pulse oximeters and automatic blood pressure cuffs. Participants will be encouraged to bring questions to the PT or sPTs regarding exercise progression. By teaching participants how to self-progress safely, this should help to increase their independence following the intervention to promote continued exercise.
			* Cardiovascular endurance exercise will consist of activities such as walking on level ground or treadmill, recumbent or upright bicycling, or other cardio machines. Duration will be set based on the individual’s functional level and goals. Intensity will be set to moderate (4-6 METs on the Borg scale) for cardiovascular endurance.
			* Strengthening exercise can consist of free weights, body weight exercise, sit-to-stand and other transfers practice, or use of resistance equipment. Body regions to be strengthened include upper and lower extremities, back, and abdominal muscles. Exercises to be performed include biceps curls, straight-arm raises, knee extension, and hip abduction and flexion, though specific exercises will vary based on participant’s functional level. Preference will be placed on functional and closed-chain strengthening exercises, such as squats or sit to stand practice, over lower extremity machine-based exercises. Intensity will be geared towards muscular strengthening over endurance, thus will have relatively high resistance and fewer repetitions.
			* Balance training will be incorporated for those who have been assessed by the facility to be at risk for falls or who have set goals related to balance. Galloway Ridge screens all residents for falls risk annually using evidence-based tests such as the Berg Balance Test. Balance training can include exercises such as narrow base of support, tandem stance, single leg stance, or standing and reaching for objects.
			* Flexibility will include stretching of large muscle groups including hamstrings, quadriceps, iliopsoas, gastrosoleus, abdominals, pectoralis major, and others, based on participant functional level and goals.
		- Research supports the use of cardiovascular endurance, strengthening, balance, flexibility, and ADL/functional training to reduce incidence and severity of SUI.12,18,20
		- Baseline status will be determined prior to the first exercise class by the PT, and will be based on paper outcome measures, facility falls risk assessment, the Timed Up and Go test, and a 1 hour evaluation/examination in the gym to establish impairments, baseline status, and exercise protocol.
	+ Educational component
		- The educational component will be conducted during twice weekly exercise classes and one-on-one weekly meetings. This will be a chance to answer questions in a group and individual setting, explain the program, give prevalence and risk factor information regarding SUI, and talk to participants about their concerns and fears. Those who feel uncomfortable talking in the group setting will have additional chances to talk to the PT individually during the weekly meeting. The education component aims to improve the participant’s understanding of SUI, including their relative susceptibility, consequences of SUI and the benefits of healthy behavior changes.
	+ Bladder diary component
		- Participants will be given bladder diaries to complete during the first week of every month, and will turn them in to the PT during the weekly meetings (described below). The bladder diary will contain information on:
			* Liquid consumed (including beverages and soups), time of consumption, and estimated quantity
			* Trips to the bathroom, including time and estimated volume of void
			* UI incidents, including time, estimated involuntary loss of urine, and details surrounding the event (such as during a sneeze or walk)
		- Bladder diaries have been validated by several studies25 as valuable means of keeping record of liquid intake as well as voluntary and involuntary loss of urine. They can also be used during one-on-one meetings to discuss patterns in UI incidents with the participant and problem-solve.
		- Bladder diaries will be kept weekly throughout the program. These will be used to help train participants how to monitor their fluid intake and find patterns in SUI incidents. Participants will be referred to a nutritionist on staff if there are continuing concerns about dehydration. Data will be recorded for 4 consecutive days, preferably including at least one weekend day, and including at least one exercise class.
		- Bladder diary format will be based off the recently developed and validated International Consultation on Incontinence Questionnaire Bladder Diary.25 This bladder diary has been shown to be valid, reliable, and responsive to change, even when given as frequently as every 2-3 weeks.25
	+ Weekly meeting component
		- Weekly, individual meetings will be held between the PT and the participant for around 10 minutes. During this time, the participants will discuss their bladder diaries, personal goals and changing habits, setbacks, concerns, and more. During the early meetings, participants will be reminded how to use the bladder diary to keep track of their liquid intake, how to estimate expelled urine, and how to estimate involuntary loss of urine. The PT can also use this time for individualized education, to answer questions, adjust goals, and adjust exercise protocol as needed. This time can be used for education about personal subjects or to address issues the PT is aware of in the participant.
	+ Outcome measures and timing of outcome measures
		- All outcome measures will be taken at baseline and at the end of the 3-month intervention. Participants will be encouraged to participate in paper outcome measure follow-up at 3-month follow-up.

**Program Evaluation**

One of the most important evaluation tools in this program’s evaluation will be whether individual participants fulfilled the goals stated in under Program Objectives, as this will give quantifiable information on whether participants experienced improvements in continence, function, and quality of life. Bladder diaries and the two paper outcome measures, the International Consultation on Incontinence and the Incontinence Impact Questionnaire, will be invaluable tools for assessing the change in UI frequency, as well as the impact on quality of life and burden. These tools have been validated and used in similar programs for determining UI severity and impact. In addition to assessing severity and frequency of UI, adherence to bladder diary notation will assist with the independent management of UI by the participant after program cessation. This program will not involve a control group, so assessing the effectiveness of the program compared to non-participants is not feasible, though participants can and will be compared to their baseline status. However, given that similar programs have been implemented in randomized controlled trials previously12,20,25 these data would be redundant. Participant satisfaction, adverse events, and cost-effectiveness will also be assessed, as these will have a significant impact on assessing the merit, worth, and significance29 of the program and determining changes to be made in potential future implementations of the program.

Cost-effectiveness is an important aspect of program evaluation, as it is important to assess if the program is providing sufficient benefit to justify the costs. In general, this program is designed to be relatively inexpensive. Information to be examined will be personnel costs, material and facility costs, savings in incontinence supplies such as pads, and savings in other healthcare costs. Individual cost-savings and facility cost-savings will be examined.

 Assessing the effectiveness of this program should not just take place at the end of the

3 month intervention, but should be ongoing throughout the program. Participants may give informal feedback about their progress to the PT or sPTs which should be systematically documented. Participant progress should be documented by the PT or sPTs. Weekly one-on-one meetings with the participants can be used to informally or formally assess participant progress and satisfaction with the program. Other medical staff at Galloway Ridge can and should be contacted regarding participant health status, adverse outcomes, or health improvements.

Assessing adverse events is an important aspect of determining program safety and efficacy, and can be conducted formally and informally. First, participants can report on adverse events during weekly meetings or during exercise classes. Participants may report adverse events to other medical staff at Galloway Ridge, or other medical or professional staff may notice adverse events. Participants can also report on adverse events at the end of the program in anonymous surveys, described below. No adverse events are expected as in other trials few have been reported and none have been serious.12 The most commonly reported adverse events are tiredness or muscular discomfort,12 both of which are typical of any exercise intervention.

It will also be important to assess participant satisfaction with the program. A program with low participant satisfaction is at risk for having low adherence and thus lower impact. Additionally, participants may be able to identify aspects of the program that they did or did not like, and give advice on how to change the program in the future. These surveys should help to identify components to continue, to alter, or to add to future implementations. Participant satisfaction information will be gathered in two main ways. During the last group meeting, participants will be given a chance to talk as a group about things they liked or didn’t like about the program, and give feedback and advice to the PT about the program, activities, and structure. Some participants may not respond well to giving feedback in an open setting, so in addition, within one week of program completion, the participants will be given anonymous paper surveys to fill out, containing ratings and prompts for feedback. Included in the surveys will be sealable envelopes so that the participants can have a sense of anonymity when returning the forms.

 Participant data will be assessed after the end of the program to determine individual and group changes in outcome measures. Outcome measures will be given prior to the beginning of the intervention and after 3 months. Statistical methods will be used to help classify participants into “responder” and “non-responder” status with respect to improved UI. Then, statistical analysis will be used to assess what baseline characteristics are associated with responders compared to non-responders. A responder will be defined as an individual who experiences at least a 20% reduction in frequency or severity of UI incidents. If a clear delineation is found between responders and non-responders, this can help to inform future implementations.

 As with any program, this program will have some limitations. This program will reach a relatively small number of residents compared to the number of residents at Galloway Ridge, and thus the financial impact may be limited. This program will use evidence-based means of improving UI, but does not address all of the physical impairments, such as pelvic floor or bladder dysfunction, which can cause UI. While functional and mobility training has been shown in the literature to help manage and reduce severity of UI in older adult women, few studies have been conducted on the long-term efficacy of such programs. Thus, it is unknown how long the benefits participants receive from this program will last if independent maintenance of exercise is not continued. Three month follow-up data can be analyzed for changes following the end of the program. Future implementations may include longer follow-up data collection.

The need for change in the program will be regularly assessed, both for individual exercise protocols and for program structure. Changes for individuals will be made with the collaboration of the participant, the PT, and the participant’s other health care providers. Program changes will be made based on PT, sPT, and other Galloway Ridge staff observations and clinical judgment, participant suggestions, and future location.

Galloway Ridge is a retirement community that serves predominantly upper middle class, college educated white Americans, a relatively small subset of the population of central North Carolina. This intervention specifically targets older adults, but could easily be altered to be conducted at a different assisted living facility. However, many other types of facilities have higher turnover rates, as patients will only stay for a few months, or are at lower functional levels with more medical complications. Implementations in these settings may require more direct supervision and less independence. However, many of the skills learned, such as the bladder diary training, can help individuals identify patterns in UI episodes and adjust their behavior. Any participants should receive the approval of their doctor prior to participating in an exercise intervention, which should help to decrease the risk of adverse events. Higher risk participants, such as those at high falls risk, may need one-on-one care during exercise interventions.

**Reference List**

1. Abrams P, Cardozo L, Fall M. The standardisation of terminology of lower

urinary tract function: Report from the standardisation sub-committee of the International Continence Society. *Neurourol Urodyn.* 2002;21:167–178.

1. Anger JT, Saigal CS, Pace J, et al. True prevalence of urinary incontinence among

female nursing home residents. *Urology*. 2006;67:281–287.

1. Coll-Planas L, Denkinger MD, Nikolas T. Relationship of urinary incontinence

and late-life disability: Implications for clinical work and research in geriatrics. *Z Gerontol Geriatr*. 2008;4, 283–290.

1. De Gagne JC, So A, Oh J, Park S. Sociodemographic and Health Indicators of

Older Women with Urinary Incontinence: 2010 National Survey of Residential

Care Facilities. *JAGS*. 2013;61:981–986.

1. Dmochowski RR, Blaivas JM, Gormley EA, et al. Update of AUA guideline on

the surgical management of female stress urinary incontinence. *J Urol*. 2010;183, 1906-1914.

1. Erin CH, Aqsa AK, Jennifer TA. The financial burden of stress urinary

incontinence among women in the United States. *Curr Urol Rep*. 2011;12: 358–

362.

1. Hu TW, Wagner TH, Bentkover JD, et al. Costs of urinary incontinence and

overactive bladder in the United States: A comparative study. *Urology*. 2004;63: 461–465.

1. Hunskaar S, Lose G, Sykes D. The prevalence of urinary incontinence in women

in four European countries. *BJU Int.* 2004;93: 324-330.

1. Norton P, Brubaker L. Urinary incontinence in women. *Lancet*. 2006;67:57–67.
2. Rogo-Gupta L, Litwin MS, Saigal CS, Anger JT, et al. Trends in the Surgical

Management of Stress Urinary Incontinence Among Female Medicare Beneficiaries, 2002-2007. *Urology*. 2012;82(1), 38-42.

1. Rortveit G, Hannestad YS, Daltveit AK et al. Age- and type-dependent effects of

parity on urinary incontinence: the Norwegian EPINCONT Study. *Obstet Gynecol*. 2001;98:1004–1010.

1. Sackley CM, Rodriguez NA, Berg M et al. A phase II exploratory cluster

randomized controlled trial of a group mobility training and staff education intervention to promote urinary continence in UK care homes. *Clin Rehabil.* 2008;22:714–721.

1. Seehusen DA. Treatments for Urinary Incontinence in Women. *American Family*

*Physician.* 2013;87(10): 726-728.

1. Shamilyan T, et al. Nonsurgical treatments for urinary incontinence in adult

women: diagnosis and comparative effectiveness. *Agency for Healthcare Research and Quality.* 2012*.* Retrieved from http://www. effectivehealthcare.ahrq .gov/ui.cfm.

1. Sims J, Browning C, Lundgren-Lindquist B, et al. Urinary incontinence in a

community sample of older adults: Prevalence and impact on quality of life.

*Disabil Rehabil*. 2011;33: 1389–1398.

1. Starr JA, Drobnis EZ, Lenger S, Parrot J. Outcomes of a Comprehensive

Nonsurgical Approach to Pelvic Floor Rehabilitation for Urinary Symptoms, Defecatory Dysfunction, and Pelvic Pain. *Female Pelvic Med Reconstr Surg*. 2013;95: 260-265.

1. Tennstedt SL, Link CL, Steers WD et al. Prevalence of and risk factors for urine

leakage in a racially and ethnically diverse population of adults. *Am J Epidemiol*. 2008;167: 390–399.

1. Vinsnes AG, Helbostad JL, Nyrønning S, Harkless GE, Granbo R, Seim A. Effect of

physical training on urinary incontinence: a randomized parallel group trial in nursing homes. *Clin Interv Aging*. 2012;7:45-50.

1. Martel L, Bélanger A, Berthelot JM. Health Rep. Loss and recovery of independence

among seniors. 2002 Jul;13(4):35-48.

1. Ouslander JG, Griffiths PC, McConnell E, Riolo L, Kutner M, Schnelle J. Functional

incidental training: a randomized, controlled, crossover trial in Veterans Affairs nursing homes. J Am Geriatr Soc. 2005 Jul;53(7):1091-100.

1. Huang AJ, Brown JS, Thom DH et al (2007). Urinary incontinence in older community-

dwelling women: the role of cognitive and physical function decline. *Obstet Gynecol*, 109: 909–916.

1. Jirovec MM, Wells TJ (1990). Urinary incontinence in nursing home residents with

dementia: the mobility-cognitive paradigm. *Appl Nurs Res*, 3: 112–117.

1. Sims J, Browning C, Lundgren-Lindquist B, et al (2011). Urinary incontinence in a

community sample of older adults: Prevalence and impact on quality of life.

*Disabil Rehabil*, 33: 1389–1398.

1. Salvatore S, Leone Roberti Maggiore U. Incontinence: a novel, psychometrically

validated bladder diary for LUTS. Nat Rev Urol. 2014 Jun;11(6):314-5.

1. Champion VL, Skinner CS. The health belief model. In: Glanz K, Rimer BK &

Viswanath K, eds. *Health behavior and health education: Theory, research, and practice*. 4th ed. San Francisco, CA: Jossey-Bass; 2008:45-66.

1. Dumoulin C, Martin C, Elliott V, Bourbonnais D, Morin M, Lemieux MC, Gauthier R.

Randomized controlled trial of physiotherapy for postpartum stress incontinence: 7-year follow-up. Neurourol Urodyn. 2013 Jun;32(5):449-54.

1. Avery K, Donovan J, Peters TJ, et al. ICIQ: A brief and robust measure for evaluating

the symptoms and impact of urinary incontinence. Neurourol Urodyn 2004; 23:322–30.

1. Rehabilitation Measures Database. Timed up and go. Available at http://www

.rehabmeasures.org/Lists/RehabMeasures/DispForm.aspx?ID=903. Accessed December 5, 2014.

1. CDC. Framework for program evaluation in public health. MMWR. 1999; 48: 1-40.