The Personal Patient Profile Decision Support for Patients With Bladder Cancer (P3BC)
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PHS 398 Research Plan

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INTRODUCTION TO THE REVISED APPLICATION

This is a resubmission of 1R21NR018942-01. We are grateful for the reviewers' comments and have addressed all points. We are encouraged that the reviewers described several strengths of the project including the focus on highly significant public health challenges and the rigor of prior research. Changes in text are in indicated by left paragraph borders.

There is no scientific knowledge gap identified and it is not clear if patients have any say in the treatment decision.

Response: We have discussed the scientific knowledge gap (see research section). Results of a survey on 1034 patients conducted by the Bladder Cancer Advocacy Network (BCAN), in which the PI leads the Survivorship Group, are provided attesting to the need for decisional aids. A call with 10 BCAN's advocates led by the PI and Berry resulted in a strong recommendation of Web-based decisional aids and including non-muscle invasive patients undergoing cystectomy.

There is no rationale provided for the choice of RCT design.

Response: We have opted for an RCT design to answer significant methodological questions about clinically important characteristics of usual care (UC) that may have an overlap with specific aspects of the B3-BC intervention (e.g., pre-surgical stoma care unit education, in hospital training, discharge information, nurse visits), how patients in both study groups perceive these aspects of UC, and use the information to further improve the timing and content of the P3-BC as well as defining UC for a future R01. The RCT design will allow for exploring potential variations in UC as not all patients receive UC support in standardized and systematic manner, and how these variations affect the P3-BC' utility and outcomes as well. The RCT design will also allow for examining whether this study can be conducted as planned, willingness of patients to be randomized, willingness of clinicians to engage in SDM, and availability of data for a R01.

The expertise in urologic oncology is lacking. Input from the clinical expert on the team appears to be minimal.

Response: Dr. Sfakianos' role is revised to reflect his previous and current contribution as a urologic oncologist.

There seems distinct potential for carryover treatment effect, in that the clinician's practice might change.

Response: In order to completely avoid carry over effect we would need to include a larger sample and randomize by clinician cluster; this would be difficult given the focus and scope of the current study. We acknowledge this limitation and will interview the 3 participating clinicians at the end of the study about SDM and potential carry over effects.

No discussion of approaches that might make the program generalizable outside of this context.

Response: To maximize generalizability we included non-muscle invasive patients and discussed utility in other contexts.

The plan for collecting any data regarding the amount of time spent using the P3-BC relative is not clear.

Response: Revised study measures assess the utility of P3-BC in different ways including: 1) time using P3-BC, 2) understanding of information, 3) using information to inform patient-provider communication and SDM, and 4) patient satisfaction with the information. A knowledge scale is added to assess patients' understanding of their choices.

A web-based tool may pose a challenge to elder and less educated patients. Strategies to prevent bias are lacking.

Response: We added Dr. Heather Goltz who will review all program information to ensure low reading levels; program navigation will be pre-tested in users with little computer experience. Offering use in the clinic with touchscreen devices, as well as remotely and providing supplemental print out materials for all modules will reduce these biases. We will allow patients to meet with the RC again to navigate the program before meeting physicians and surgery based on preferences and a follow-up call will be scheduled to address Internet use and other program related problems and concerns.

Although described as decision support this seems to be simply an educational tool.

Response: We provided more information about the ETEI to clarify the decision-making focus (see our prior studies).

There is no rationale provided for why this needs to be a web-based tool.

Response: The only method to customize the intervention is by delivering in a Web-based format. This format also was requested by patients in our prior studies to facilitate understanding of self-care skills needed. We clarified this issue.

Including an ostomy nurse/expert would be useful.

Response: We have also included an ostomy nurse (Ms. Jocelyn Goffney) who is also an active member of BCAN.

Given that the infrastructure exists, it is unclear that user input would be likely to actually change anything.

Response: The software is available as a framework (i.e., IT language and use cases) not including the ETEI content and tailoring of information we are proposing in this study. We have clarified this issue in the study aims and research section.

If the ultimate goal is shared decision making then the study outcome of interest should include this measure.

Response: We thank the reviewers for this guidance. We have added a shared decision measure to the study outcomes

The REALM instrument is not a good measure of health literacy.

Response: S-TOFHLA is included in the study measures to replace REALM and we added a single item literacy measure.

The study approaches are not particularly novel.

Response: We agree but we believe innovative is the focus on this study population and this specific unmet need.

The question about computer confidence doesn't evaluate literacy. Only 5 usability proxy test users are included.

Response: We have revised these study outcome measures as recommended. We also increased proxy users to 20.

A. SPECIFIC AIMS

Bladder cancer (BC) is the 5th most common cancer in the United States.[1-2] Radical Cystectomy (RC) is the standard treatment for muscle invasive bladder cancer (MIBC; T2-T4a, N0-Nx, M0).[3-10] Other indications for RC include high risk and recurrent non-muscle-invasive bladder cancer (NMIC), Bacillus Calmette-Guérin (BCG)-refractory, BCG-relapsing and BCG-unresponsive.[9-10] Following RC, urine can be diverted into: a) an incontinent stoma; b) a continent urinary reservoir catheterized by the patient; or c) a continent urinary reservoir connected to the urethra to allow for normal voiding.[3-10] The primary goals in selecting a urinary diversion are to provide the lowest potential for complications and the highest quality of life (QOL).[5-8] The decision process is complex and involves consideration of factors related to cancer stage, comorbidities (e.g., impaired renal and hepatic function), clinical judgment, and patient desired outcomes (e.g., avoiding changes to body image).[9-14] We and others have shown patients eligible to several diversion options face a preference-sensitive decision while lacking appropriate information about these options.[4,15-19] The American Urological Association (AUA) and prior research, recommend that eligible patients should be fully informed about the benefits and risks of all possible diversion options and that the decision should be based on shared patient-physician decision making (SDM) process,[20,21] Interactive Web-based patient decision aids can promote SDM as they can provide personalized, and preference-sensitive information and interactively clarify patient values and preferences. Guided by the Ottawa Decision Support Framework (ODSF)[22] we have developed a one-on-one Educational and Training Experiential Intervention (ETEI) to help patients with urinary diversion decisions and postoperative self-care. Here, we propose to use the ETEI to develop and evaluate a personalized Internet-accessible decision aid for RC patients: the Personal Patient Profile - Bladder Cancer **(**P3-BC**)**. The P3-BC provides RC and diversion information personalized to patient preferences and video coaching regarding the benefits and risks and unique outcomes of each option, and SDM support building on: a) AUA guidelines, ETEI content, our literature reviews, and our qualitative research on treatment decision and unmet needs of RC patients,[23-25] b) understanding patient personal factors involved in these decisions (e.g., preferences for urine control)[25-26] and c) our existing program software that we will use to build the P3-BC.[27]

Aim 1: Develop a personalized, Internet-based, patient-oriented decision-support program (the P3-BC).

(Aim1-a): First, using the ETEI content and our qualitative studies to develop narrative and functional use cases (i.e., a list of events defining the interactions between an actor and a system to achieve a goal) to express functional requirements using a Joint Application Development (JAD) model that involves the user (patient) and the developer in the design of the application.[24,28-30] Second, narrative use cases will be validated by expert panel using the JAD methodology in a workshop session to ensure that they capture the essential elements of a patient using the care system. Panel participants will include 3 ethnically diverse survivors with different treatment. Third, panel input will guide further refinement of narrative use cases.

(Aim 1-b): Use existing, generalized platform and functional use cases built by the collaborating Clinical Informatics Research Group[29-30] to satisfy the refined P3-BC narrative use cases.

(Aim 1-c): Assess the usability of the P3-BC with regards to navigation, readability and understanding in a convenience sample of 20 proxy users.[26] Results will guide further program refinement and finalization.

Aim 2: Evaluate the feasibility, acceptability, and utility of the intervention (the P3-BC program)

We will conduct a pilot, randomized study with 45 RC patients at Mount Sinai to examine the feasibility, acceptability and utility of the intervention. Following guidelines[27], the feasibility will be evaluated based on our ability to recruit, randomize and retain (3 months) 45 patients to one of two treatment arms (P3-BC+usual care (UC) vs. UC only), apply appropriate methods for assessment of study outcomes, and implement the P3-BC in pre-operative visits. Program acceptability is defined as > 80% of intervention participants reporting a mean sum score of ≥18 on the acceptability scale included in the study questionnaires.[31] Patients' utility of the program will be assessed by survey questions and usage tracking data collected though software-related metrics. We will employ a 1:2 treatment allocation ratio (i.e., $n_{UC} = 15$; $n_{P3\text{-}BC+UC} = 30$; 50% NMIBC, 50% biological females; 50% ≥ 65 Years) in order to maximize the information gained from participants randomized to the intervention. Pre- and post-intervention questionnaires (1 and 3 months) will also explore differences and changes in study secondary outcomes (e.g., SDM[32], decisional conflict[33] distress,[34] satisfaction with communication,[35] and difficulties in self-care) controlling for covariates (e.g., literacy).[36-37] We hypothesize that P3-BC will be feasible and acceptable. Although the study is not designed to test for group differences, we expect P3-BC to reduce decisional conflict and improve SDM and communication. A brief exit survey will examine physicians' experience with the P3-BC and SDM.[38] **Impact:** The P3-BC has the potential to significantly improve SDM and QOL in patients undergoing RC and decrease their decisional conflict and self-care challenges. P3-BC can be easily integrated into pre-operative clinic visits and adapted for other health conditions requiring bladder removal and urinary diversion (e.g., congenital abnormality, spinal cord injuries).

RESEARCH STRATEGY

BACKGROUND AND SIGNIFICANCE

Disease burden and treatment outcomes in patients undergoing radical cystectomy for bladder cancer

In 2019, 80,470 patients (incidence ratio = 3_{men}: 1_{women}) will be diagnosed with bladder cancer in the United States (US).[1,2] According to AUA and other international guidelines, Radical Cystectomy (RC) is strongly recommended for patients with muscle invasive bladder cancer (MIBC; T2-T4a, N0-Nx, M0) and patients with Bacillus Calmette-Guérin (BCG)-refractory tumors, BCG relapse and BCG unresponsive tumors, which are common in non-muscle invasive bladder cancer (NMIBC).[3,9,11] RC requires an alternate route of flow for urine through three major diversions; ileal conduit, continent cutaneous reservoir, and orthotropic neobladder.[3-11] Ileal conduits involve connecting the ureters to a segment of intestine that is connected to the abdominal wall in the form of a stoma. Ileal conduits necessitate the lifelong use of an appliance into which urine continuously drains.[3-8] Continent cutaneous reservoirs are created from loops of intestine which are connected to the skin via a stoma and emptied via catheterization.[3-8] Neobladders are created from loops of intestine connected to the urethra to allow for normal voiding.[3-8] Stoma complications (e.g., hernia) are common and have been reported in up to 31% of ileal conduits patients.[39] Complications rates for both neobladders and continent reservoirs range from 3% to 7% and from 13% to 30%, respectively.[40] These complications include pouch leakage and rupture (1.5% to 4.3%) and urinary incontinence (3.2% to 7.4%) [40-41] The decision process is complex and involves consideration of factors related to cancer stage, comorbidities (e.g., impaired renal, hepatic function), and patients' desired outcomes (e.g., urine control). [9-14] <u>According to AUA guidelines, clarifying differences in diversions outcomes is a top priority for MIBC and NMIBC patients undergoing RC</u> [3,9,11]

Each urinary diversion has a different impact on patients' health-related quality of life (HRQOL)

Our prior literature reviews[15,17] and two recent systematic reviews[42,43] (n = 3,754) showed that HRQOL declines significantly following RC and this decline is associated with the type of diversion. Ileal conduit patients report impaired body image and social roles, and sexual barriers due to urinary leakage, odor, and frequent stoma care.[8,11-14] In cutaneous reservoir patients, failure to catheterize as frequently as needed (4-5 times per day) can cause urinary leakage and serious urinary retention conditions.[14-15] Night-time catheterization in these patients may also result in a reduced amount of sleep and HRQOL.[44] For neobladder patients, night-time continence is less likely to be achieved.[39] Research has demonstrated significant associations among urinary incontinence, social isolation, and increased distress in other populations.[45,46] Patients' adaptation to self-care demands could be further exacerbated by comorbid disease and age-related decline in physical and cognitive functioning (e.g., forgetfulness, arthritis).[14,15,47] The types of bowel utilized for diversions may also result in varied metabolic disorders owing to the different absorptive characteristics of bowel selected.[48] Given this variability in outcomes the AUA's and other guidelines emphasize the importance of SDM as a component of high-quality care delivery that should be adopted in RC patient management.[10,26,49] <u>However, there is a critical need for validated decisional tools to support these patients with the urinary diversion decision.</u> [19,48,50]

Patients' demographic characteristics are likely to influence the quality of care they receive

Although neobladder can be safely performed in the elderly (average age = 73 years), elderly patients are typically offered ileal conduits to reduce their risks of complications based on surgeons' own judgment about best options for patients.[16,51,52] However, the elderly population is very heterogeneous and life expectancy largely depends on autonomy of the patient.[51] In addition, elderly, female, and black patients experience significant delay in diagnosis and longer time between presentation and hospital referral.[51-54] Differences in HRQOL were reported with respect to age, sex, and race.[51-54] Older patients have greater difficulty with self-care than younger patients.[24] Urinary incontinence and sexual dysfunction are far more common in women compared to men after neobladder.[~~55~~] Women with cutaneous continent diversion report worse physical well-being, and an increase in appetite loss and fatigue compared to women with ileal conduit and neobladder.[53-56] Women also report more limitations in daily activities, distress, and worse HRQOL following ileal conduits compared to men.[53-56]Blacks are less likely than whites to receive neobladder and experience higher rates of adverse outcomes.[52] We have shown that personal characteristics (e.g., age, race) are influential in treatment decisions and therefore should be addressed during consultations.[29-30] <u>There is evidence that decisional aids tailored to patients' characteristics (e.g., age) have more benefits than aids with broader inclusion criteria</u>.[57-58]

Shared decision making about urinary diversions could be enhanced by Web-based decisional aids

To achieve an optimal patient-physician shared decision making (SDM), physician should ensure that patients are well informed about treatment options, and supported to deliberate about those options.[58-62] Despite the prevalence of preference sensitive urological conditions including urinary diversions, few studies have documented the prevalence of SDM use during clinical consultations.[10,63] One large, cross-specialty physician

survey revealed that although >70% of physicians identify SDM as their preferred style of decision making over paternalism or consumerism, the actual implementation of SDM procedure has been as low as 10% in certain settings.[63] We and others have shown that RC patients experience significant unmet information and communication needs and that are necessary to maximize benefits from SDM.[18,24,50,64] Health IT tools such as interactive Web-based decision aids can further help with SDM as they can provided preference-sensitive information and interactively clarify patient values to promote SDM. Research on the utility of Internet in older populations showed that the rates are 82% for 65–69 year olds; 75% for 70–74-year olds, 60% for 75–79- year olds, and 44% for > 80+ year olds making Web-based aids viable for this study patient population.[65]

Two theoretical frameworks to guide the development and evaluation of the P3-BC decision aid

Both the Self-Regulation Theory (SRT)[66] and the Ottawa Decision Support Framework (ODSF)[22] have guided our prior studies and are ideally suited to guide this proposal. The core premise of the SRT is that health behaviors are influenced as much by patients' illness beliefs (e.g., beliefs about consequence) as by their emotional reactions (i.e., distress)[66] The ODSF proposes that treatment decisions could be influenced by patients' perceptions about important others (e.g., physician's pressure to select one option), and personal and external resources (e.g., informational support).[22] Based on the SRT, the decision aid will address patients' misconceptions and emotional reactions to the diversion options and post-operative-care requirements. Based on the ODSF, the aid will provide tailored treatment information, value clarification exercise, and patients' stories depicting skills needed for self-care to enhance both treatment decision making and preparation for post-operative self-care.[22,27] The development and evaluation of this aid will follow general standard guidelines and best practices for the development and evaluation of decisional aids (Figure 1 and Table 1).[22,26]

INNOVATIONS: The study is innovative in several ways. 1) It addresses two clinically significant problems – urinary diversion decisions, and preparation for post-operative self-care in an underserved patient population; 2) The timing of the delivery of P3-BC is tied to pre-operative consultations and the challenges experienced in communication; 3) The modules can been tailored based on patients' preferences and demographics and are brief, interactive, and virtual; thus facilitating integration into everyday clinic practice; 4) The multiple follow-ups will allow for a detailed characterization of the potential pre- and post-operative benefits of the tool. 5) We believe that P3-BC could be easily adapted to other RC clinical context including community clinics and online advocacy and support groups (e.g., BCAN, United Ostomy Association of American) as well as for other health conditions requiring bladder removal (e.g., Crohn disease, spinal injuries), thereby increasing the possibility for its dissemination and adaptation. 6) With limited support opportunities usual care (UC) provides, we expect P3-BC to improve quality of care and patient outcomes. 8) The utility of our existing prostate software framework will facilitate the adaptation of the B3-BC content to meet patients' needs within the limited R21 study period.

RESEARCH APPROACH

Experience of the Study Team: The overwhelming strength of this proposal is based on collaborative efforts of the research team.[15,17,23,24]The team is well positioned to: employ evidence-based decisional tools that are sensitive to RC patients' preferences (Mohamed); collect and integrate patients' demographic characteristics and beliefs into P3-BC and its evaluation (Berry); ensuring low program readability level and cultural sensitivity (Goltz); modify an existing program platform and usability testing (Lober)[67]; clinical management of bladder cancer (Sfakianos); quantitative methods and analyses (Benn); and ostomy and wound care (Goffney).

PRELIMINARY STUDIES: The research team has successfully recruited bladder cancer patients at time of diagnosis for similar interventions. Protocols and strategies for recruiting/retaining patients are well-established (e.g., reminder calls and Emails, patient reimbursement). Studies 1-2 provide preliminary data for the development of P3-BC content, sample recruitment, and characteristics. Studies 3-4 provide evidence for the investigative team's expertise in developing Web-based personalized decisional aids for cancer patients.

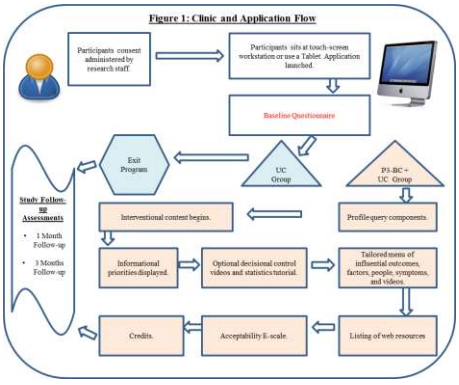
Study 1: Diversions decisions and unmet needs of MIBC patients (1R03CA165768-01A1, PI: Mohamed).[55] Qualitative interviewing of 30 patients showed that 86% searched the Internet for information; 62.5% followed physicians' recommendation, and 80% wished they had more information before treatment options and their pros and cons. Patients < 65 years were dissatisfied with information about sexual function. Women had difficulties with self-care. An online survey in 159 MIBC survivors confirmed these challenges and needs.[23]
A more recent BCAN survey in 10234 RC survivors revealed significant unmet for interactive decisional tool.[68]

Study 2: An educational intervention for MIBC patients (ACS-121193-MRSG-11-103-01-CPPB. PI: Mohamed).[18] Our published data collected from 30 MIBC patients interviews in Phase 1 of this study showed high acceptability of the content of the intervention we built based on ODSM guidelines (e.g., information about diversion options, diversion options' pros and cons, and self-care skills).[18] In Phase 2, a pilot feasibility RCT ($1_{control}$: $2_{intervention}$) we conducted to confirm the acceptability of the refined content (1 hour session with a

nurse to discuss 5 booklets describing diversion options and self-care) and examine the feasibility of the study method (i.e., recruitment, randomization, delivering the intervention, follow-up rates) in 25 newly diagnosed patients showed that the intervention is both acceptable and feasible. Of the 43 invited patients, 58% (N = 25; $n_{control}$ = 8; $n_{intervention}$ = 17) completed baseline assessment and intervention, and 17 (60%) patients completed the post-intervention follow-up ($n_{control}$ = 6; $n_{intervention}$ = 11). 24% were minorities; 40% were women, 64% ≥ 65 Years; 32% had < colleague education; and income range: $14,957 – $115,000. Although the intervention group reported increased knowledge (82% vs. 50%), improved communication (73% vs. 50%), and increased confidence in treatment decisions (73% vs. 50%) compared to the control group, significant limitations and recommendations were reported including: a) lack of an interactive value clarification exercise to improve diversion options comparison and congruence between patient values and decisions, b) reducing information burden by tailoring information to patients' information preferences, c) testimonials and visual, "step-by-step" information on the use of stoma appliances and catheters, d) providing more information about the hospital and community-based support resources for patients.[69] **In this pilot feasibility study, we propose to address these four limitations and further improve intervention content and delivery method for RC patients.**

Study 3: A customized, Internet-based, Personal Patient Profile-Prostate (P3-P) (R21 CA100025; PI: Berry, Co-I: Lober).[25,35] We developed the P3-P decision support program for men with localized prostate cancer (PrCa) and implemented a working prototype in a point-of service setting. We have iteratively tested the usability in 10-30 patients and advisors. Patients finish in < 1 hour prior to clinic visit. P3-PC was described as useful and acceptable.[31] **Study 4:** The P3-P decision support for men with PrCa (NIH, R01-NR009692; PI: Berry)[25,50] We compared usual PrCa education plus P3-P to usual education alone on decisional conflict. Two randomized, clinical trials were conducted with measures at baseline, 1 and 6 months. Compared with the usual education, the P3-P groups in both trials reported significant decrease in decisional conflict.

RESEARCH DESIGN AND METHODS: The proposed project will evaluate the feasibility and acceptability of the P3-BC. Phase I (months 1-6) will focus on the development, refinement and finalization of the P3-BC software. Expert review and 3 ethnically diverse survivors with different cancer stage and diversions will review and finalize the narrative cases developed by the research team in a workshop. The program software will be implemented on an existing platform built by the UW team.[25,50] The overall usability and acceptability of P3-BC will be examined with a convenience sample of 20 proxy users. Results will guide program's refinement and finalization. In Phase II (Month 7-22), the P3-BC will be tested in a small pilot, unbalanced, randomized trial (P3-BC+usual care (UC) vs. UC only) with 45 patients. Eligible patients will be randomized to the B3-BC (n = 30) and UC groups (n = 15). Patients randomized to B3-BC will have access to the aid before consultation with the physician about RC and will be queried about the use and helpfulness of the P3-BC (primary outcomes). Patient secondary outcomes (e.g., SDM, decisional conflict, distress, and satisfaction with communication) will be assessed before the intervention (baseline) and 1- and 3-month thereafter. An exit brief survey will examine the 3 participating physicians' experience with the P3-BC and SDM. This approach, beginning with prototype development and ending with feasibility testing, has been well documented.[70,71]



Aim 1: Develop a personalized, Internet-based, patient-oriented decision-support program (the P3-BC)
Aim 1 –Procedure: Functional use cases development. The functional requirements for the P3-BC software will be specified through the development of a series of narrative and functional use cases that describe aspects of the intended use of the system.[28,72] This procedure begins with a description of the "actors", or participants in a goal-oriented interaction, and develops a series of semi-structured statements, or "scripts" describing the interaction of those actors with the environment, hardware, and/or software.[28]

Narrative use case specifications: Similar to our PrCa aid, narrative use cases will be developed by the research team to capture the essential elements of a RC patient using the system in specific clinical settings (i.e., treatment consultation). The development of narrative cases will be guided by examples from our qualitative studies,[18,24,50] the theoretical framework, and the research team experience.[30] Narrative cases will be used to illustrate various patient personal factors (e.g. age, sex, race, stage, values, roles preferences, self-care skills requirements). Narrative cases will be validated by a panel review using the Joint Application Development (JAD) model that involves the developers and advisors in the design of an application in a structured workshop setting.[29] Narrative use cases will be refined before being employed as final products.

Decision Support Tool Software Development: The existing interface[30] we will use to implement the new P3-BC tool works well with devices equipped with touch sensitive screens and keyboard or mouse navigation. We have found touch sensitive screens to be helpful in our existing work. P3-BC program will: a) dynamically sort and select appropriate treatment information based on the user's input using a brief survey; b) provide printable output with a summary and sample discussion items for the consultation visits; and c) provide customized links to reputable bladder cancer educational web-sites. Literacy level and cultural sensitivity of the content will be confirmed by the team and the lay advisors.

P3-BC program description: After completing the baseline assessment (integrated in the program; Figure 1), the program will initiate a brief inquiry questionnaire to help users tailor the content based on their preferences. Users will be able to choose from a menu to view and print the following: a) summaries of their responses to inquiry survey, b) customized explanation of selected statistics, and c) streamed video vignettes with patient actors of mixed age, sex, race and stage, talking with a clinician about RC and self-care, particularly about the personal preferences for urinary diversions and needed self-care skills. All users who choose to see the vignettes will first see an opening vignette that is scripted: "*Dr., there is a lot of information for me to understand about diversion options. I also want to tell you some things about me that will help with this decision.*" Next, users will have the opportunity to choose from several vignettes for each of the following sets of patient personal factors: a) what the patient does for work and leisure; b) what information and support resources are needed; c) concern about recurrence; d) concerns about complications and self-care; and e) how much the patient wants to participate in decision making. If participants choose to move on and not view any of the options above (a-e), they will be shown a screen that lists their 4 priority categories of "information needed" which they earlier selected in the inquiry questionnaires. The categories from which the top 4 are selected include: prognosis/stage of disease; preparation for RC; risks and benefits of each diversion; risk of recurrence; home self-care; and sexuality. An automatically printed 2-page output will list: 1) patient decision role preference; 2) the 4 highest ranked information preference sheets; and 3) a summary of influential personal factors plus suggested topics to address with the clinician. A list of online and community-based support resources (e.g., NCI; BCAN) will be provided. Voice-over audio and a HELP function will be added.

Usability assessment: will be conducted via application of Neilsen's basic usability principles and NCI's own usability guidance.[72] Proxy users recruited from Mount Sinai, will be given a brief script based on the use case narratives, and asked to use B3-BC in a mock session, using the thinking aloud method. Users' literacy level will be assessed along with their demographic and clinical characteristics.[36-37] Dr. Mohamed will conduct usability tests and the Research Assistant (RA) will record notes (Appendix A). Users' reactions to and acceptance of B3-BC will be audio-recorded. Participants will be asked whether these cases accurately captured patients' experiences. Although guidelines suggest that 5 users are sufficient to find 90% of interface and programming errors,[73] we will enroll 20 unique users (50% survivors; 50% stakeholders) to ensure thorough testing of B3-BC.[74] Usability test results will be incorporated in the iterative revisions of P3-BC. After the software is finalized and deployed, we will continue the usability and acceptability assessment by examining program feasibility in Phase II (Aim 2; Month 7-22).

Eligibility criteria for usability tests/workshop: 1) Patients: MIBC or NMIBC patients qualified for RC; => 18 years; able to communicate in English; and competent to give consent. 2) Stakeholders: Patient advocates, family caregivers, clinicians, nurses, patient navigators and social workers involved in RC care at Sinai.

Aim 2 – Evaluate the feasibility and acceptability of the finalized P3-BC program

Aim 2 – Procedure: The RA will identify eligible patients and stakeholders through the medical record, and through the scheduling offices of the participating physicians, describe the study in detail, and consent patients and other stakeholders who agree to participate in the study. For the feasibility study, after consenting the patients, the RA will schedule patients on the same day or within the same week (i.e., 1 week before the second consultation visit with the urologist to discuss urinary diversion) with the Clinical Research Coordinator (CRC) to access the P3-BC using an Internet-enabled tablet in a private room. Each user will receive a unique passcode to access the P3-BC. Patients who have access to Internet at home will be given a URL (on a printed description of the program and via e-mail) to continue viewing the program using the same passcode. Participants who prefer to access the website/application in the clinic, regardless of whether they have email and internet access and regardless of the reason for their preference, will be accommodated. The application provides a staff-access screen allowing the CRC to identify whether participants have used the P3-BC remotely, and whether they have completed it. When participants who have not completed the P3-BC arrive at the clinic, the CRC will offer them assistance in beginning or continuing using P3-BC in a private research room in the clinic, using a tablet (iPad) dedicated to this purpose. The tablet will be configured in "kiosk" mode,

to ensure that it can access only the secure website/application and that data are not "cached" by the tablet browser. The device and network configurations will comply with Mount Sinai institutional connectivity policies. All P3-BC users will receive a printout of selected modules, patient preference list, and the general content from the P3-BC including information about RC and the 3 diversion procedures. This will allow patients who have no Internet access from home to revisit P3-BC modules and make changes to preference lists as needed. The CRC will be available by phone to address access problems. The RA will conduct the follow-ups. Participants will receive $60 for participation. A fact sheet will standardize recruitment.

Sharing P3-BC preference list with physicians: The CRC who will have access to all P3-BC entries will print the final preference list using the staff-access screen and provide it to the 3 urologists right before the second visit with the patient to discuss treatment. The 3 urologists will receive orientation before the feasibility trial.

Patient eligibility criteria for feasibility study: Mirror those used in the usability test with one additional inclusion criterion: only MIBC or NMIBC patients who will receive RC will be included.

UC Group: Patients will access the P3-BC only to fill the baseline questionnaire and exit the P3-BC and will receive UC (Figure 1). UC description: before RC, patients meet with the urologist to discuss urinary diversions and with the ostomy nurse for site selection, and receive NCI "*What You Need To Know about Bladder Cancer*". After RC, they receive stoma care training in the hospital and discharge information on follow-up care.

Recruitment, randomization, and sample Size. Mount Sinai serves a diverse patient population (45% ethnic minority), and uses a well-established Electronic Health Records (EHR) system. The Tisch Cancer Institute sees about 160 MIBC and NMIBC patients annually who undergo RC (≈13 per month). Over three-quarters of US adults use the Internet and, based on our previous studies, we expect 75% of our sample (n=120) to have such access.[15,65] We will assume a 58% accrual rate of patients (n ≈ 70), with a projected 30% attrition rate from the baseline to the 3 months assessments based on our prior study. This will yield a sample of 49 patients (12 recruitment waves: month 7-month 19). Recruitment will stop when we reach our target number and the allotted stage, age and biological sex distribution (N = 45). If problems arise with accrual, we have access to other MSSM hospitals. These added sources are not included in our accrual estimates. The patients will be randomized (1_{UC}: $2_{P3\text{-}BC+UC}$) using a stratified (1:1: stage (MIBC vs. NMIBC; biological sex; age; 50% ≥65 Years) permuted block randomization scheme to the 2 study groups *(i.e., $n_{UC} = 15$; $n_{P3\text{-}BC+UC} = 30$)*. We will follow the CONSORT criteria in the design, conduct, and evaluation of the RCT.[75]

Primary outcomes: Acceptability: will be assessed with the six-item Acceptability E-scale[31] used by Berry et al. in 3 large trials of patient-centered technologies.[27,85,86] Program acceptability is defined as > 80% of intervention participants reporting a mean sum score of ≥18 on the acceptability scale (see Appendix B).[31] Assessments of patient characteristics and secondary study outcomes are depicted in Table 2.

Program utility: will be assessed by: 1) time using P3-BC (both by questionnaires and usage tracking data collected though software-related metrics), 2) understanding of information (questionnaires), 3) using P3-BC information to inform SDM (questionnaires), and 4) patient satisfaction with the information. Study follow-up questionnaires will also assess time spent reading the P3-BC program printed materials and modules.

Baseline assessment: Questionnaires will also assess patient demographics, clinical information, and secondary outcomes including SDM[38,76], decisional conflict[77] and role preferences,[78] distress,[34] RC knowledge, and their potential covariates (e.g., age, sex, literacy, confidence and computer and internet literacy).[36-37] 1 and 3 months follow-up questionnaires: will reassess secondary outcomes measured at baseline in addition to patient satisfaction with communication,[79] decisional regret,[77] difficulty with self-care, and the number of pre- and post-decision contact with the clinicians. The P3-BC group will also be queried about the utility (time spent), usefulness, and satisfaction with P3-BC and printed information in treatment consultations, communication, surgery preparation and post-operative self-care. All aspects of UC received (e.g., pre-operative ostomy unit consultation, in hospital training, discharge, and home visits), time-to-RC (i.e., within 4–12 weeks of diagnosis)[80], patient diversion choice, physician's recommendation, and all treatments received (e.g., RC, chemotherapy, BCG, urinary diversion) will be recorded and assessed by study questionnaires. The follow-up assessment points coincide with post-RC routine clinic visits. Study questionnaires (with pre-paid mailers) will be given or sent out by the RA to study participants at their scheduled follow-ups. The RA will call/send letters before follow-up to alert participants that a questionnaire is coming and arrange pick up at clinic visits when possible. Repeat 5 calls will be made to those who do not send back the questionnaires within 2 weeks of the scheduled assessments and a second mailing will be sent within 1 month from scheduled assessment if needed. The comparability of electronically entered data (baseline) and paper and pencil questionnaire data has been established.[81-87] Urologist exit survey: Dr. Mohamed will conduct and analyze an exit brief survey with the urologists at the end of the study to examine their utility of the P3-BC preference list during consultations, potential carryover effects, and their engagement in SDM (Appendix B).[32,38]

Table 1
Variables and questionnaires

	ASSESSMENT	
	Upon entering P3-BC (baseline)	1 M & 3 M
Variables and questionnaires used to generate the P3-BC customized Info.		
Sociodemographic characteristics (age, gender, race, education level.	√	
Health literacy:[36-37] The S-TOFHLA will be used to used to assess functional health literacy. The S-TOFHLA, Cronbach's alpha ranges between 0.68 for and 0.97.[36-37]	√	
Decisional role preferences:[78] [Consists of 5 statements designed to elicit patients' preferences for control over decision making].	√	
Variables and questionnaires used to assess study secondary outcomes		
Shared Decision Making: Will be assessed by the SDM-Q-9. The scale has high validity and reliability (Cronbach's alpha = 0.938)[38,76]	√	√
Decisional conflict:[77] [Consists of 16 items measuring uncertainty, and effectiveness on decision making. Coefficient alpha range from 0.78 to 0.92].	√	√
Psychological distress:[66] [Brief Symptom Index (BSI-18) will be used to assess distress Scale. The BSI-18 is well-validated scale with high reliability (0.70- 0.90)].	√	√
Communication satisfaction:[79] [The Cancer Rehabilitation Evaluation System (CARES) - Medical Interaction subscale will be used to assess communicating with providers. Coefficient alpha range from 0.87–0.94].	√	√
Decision regret[77]: 5-items scale to assess decision regret. Coefficient alpha range from 0.81–0.92].		√
Treatment choice/ Time to treatment		√
Utility of information (P3-BC only)		√
Clinician contact/nurse consultation/visit	√	√
Self-care difficulties (team designed)		√
Knowledge (team designed)	√	√

Analysis of feasibility, acceptance, and utility: Given the primary objective of this study is to evaluate the feasibility associated with recruiting, randomizing, and retaining 45 patients for the duration of the study (3 months), define UC and explore potential overlap with P3-BC, applying appropriate methods for outcome assessments, and implementing the P3-BC in a diverse patient population, we intend to focus our analytic plan on descriptive rather than inferential statistics, except when evaluating retention and adherence rates and differences between respondents and non-respondents in demographic and clinical characteristics to quantify the degree of selection bias. This is important given our pilot study is not intended for hypothesis testing of the P3-BC efficacy, but rather for the demonstration of the potential for a successful randomized controlled trial in the future.[70] Using well-established feasibility criteria[70,88,89] we will assess: 1) monthly screening rate, 2) monthly enrollment rate, 3) proportion of eligible participants screened who are actually recruited, 4) proportion and demographic and clinical characteristics of participants who decline to participate and reasons for refusal, 5) retention/drop-out rates, and 7) duration and completion rate of study assessments. Additionally, we will evaluate participants' opinions of the B3-BC and UC using closed-ended ratings, self-record and usage tracking data collected though B3-PC software-related metrics and satisfaction with both the B3-BC and UC.

Study secondary outcomes: Although the study is not designed to test for group differences, we will explore whether the P3-BC improve SDM, communication, and knowledge, and reduces conflict, regret, distress, and difficulties in self-care compared to UC. We will also compare the 2 groups in UC evaluation. Continuous variables will be presented as means with standard deviations or medians with interquartile ranges, and categorical variables as frequencies with proportions in descriptive summaries. Differences between the P3-BC and UC groups in adherence and retention rates and study secondary outcomes will be formally tested using $\chi 2$ or Fisher's Exact tests. Effect size will be estimated using the difference in means for continuous variables and proportions for categorical variables between the two groups to estimate effect size for powering a larger future RCT. Given the stratification scheme, we will present our results stratified by stage, biological sex, and age group.[19] Our recent studies showed that women are more likely to engage their caregivers in treatment decisions compared to men.[19] We will examine whether a caregiver was involved in diversion decisions, or in patient-provider consultation, and will explore patient stage, age, sex, and race differences in utility of P3-BC, and whether the P3-BC was shared with a caregiver. Statistical analyses will be conducted using SAS v9.4 (Cary, NC) and R 3.1.3.[90]

Potential challenges and alternative strategies: We have considered a simple, pre- and post-P3-BC feasibility design. We opted for an RCT design to answer questions about clinically important characteristics of UC that can have a potential overlap with specific aspects of the P3-BC (e.g., stoma care unit training and education), how patients in the P3-BC and UC perceive these aspects of UC, and use the information to further improve the timing and content of the intervention as well as defining UC and related variations. Although we considered including the caregivers in the study, we decided against it for several reasons including challenges in recruitment and retention of caregivers[91], and the need for qualitative studies to explore their needs to inform further modification of P3-BC modules which will not be feasible within this R21 timeframe. The in-clinic workflow proposed for some participants in the feasibility pilot study who have not completed the P3-BC before their visit, and who wish to do so, has the potential to disrupt clinic flow. This has been discussed with the physicians and clinic management staff, who are willing to accommodate this disruption in the interest of improving patient care. We also realize that the choice of a web-based intervention may skew our sample toward those who are not elderly and who are well educated. However, all program information will be at low reading level; and program navigation will be pre-tested in users with little computer experience. Offering use in the clinic as well as remotely and provide print out materials for all modules will reduce these biases. We will also allow patients to meet with the RC again to navigate the program before meeting physicians and surgery based on preferences and a follow-up call will be scheduled to address problems and concerns. Finally, we included English speakers. Future studies will allow for a translation of the program into various languages.

PHS Human Subjects and Clinical Trials Information

OMB Number: 0925-0001 and 0925-0002

Expiration Date: 03/31/2020

Are Human Subjects Involved	● Yes ○ No
Is the Project Exempt from Federal regulations?	○ Yes ● No
Exemption Number	❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5 ❑ 6 ❑ 7 ❑ 8
Other Requested Information	

Human Subject Studies

Study#	Study Title	Clinical Trial?
1	The personal patient profile decision support for patients with bladder cancer	Yes

Section 1 - Basic Information (Study 1)

OMB Number: 0925-0001 and 0925-0002

Expiration Date: 03/31/2020

1.1. Study Title *

The personal patient profile decision support for patients with bladder cancer

1.2. Is this study exempt from Federal Regulations * ○ Yes ● No

1.3. Exemption Number ❑ 1 ❑ 2 ❑ 3 ❑ 4 ❑ 5 ❑ 6 ❑ 7 ❑ 8

1.4. Clinical Trial Questionnaire *

1.4.a. Does the study involve human participants?	● Yes	○ No
1.4.b. Are the participants prospectively assigned to an intervention?	● Yes	○ No
1.4.c. Is the study designed to evaluate the effect of the intervention on the participants?	● Yes	○ No
1.4.d. Is the effect that will be evaluated a health-related biomedical or behavioral outcome?	● Yes	○ No

1.5. Provide the ClinicalTrials.gov Identifier (e.g. NCT87654321) for this trial, if applicable

Section 2 - Study Population Characteristics (Study 1)

2.1. Conditions or Focus of Study

- bladder cancer

2.2. Eligibility Criteria

1) Patients: cystectomy for MIBC and NMIBC; at least 18 years; able to communicate in English; and competent to give consent. 2) Stakeholders: Clinicians, nurses, and social workers involved in cancer care and family caregivers (i.e., identified by the participating patients as individuals involved in assisting patients with activities of daily living and/or medical tasks).

2.3. Age Limits	Min Age: 18 Years	Max Age: 80 Years
2.4. Inclusion of Women, Minorities, and Children	Inclusion of Women and Minorities.pdf	
2.5. Recruitment and Retention Plan	Recruitment and Retention Plan.pdf	
2.6. Recruitment Status	Not yet recruiting	
2.7. Study Timeline	Timeline-2-11.18.19.Final.pdf	
2.8. Enrollment of First Subject	07/01/2020	Anticipated

Inclusion of women and minorities

The target populations for this study include women and minority as well as men. We anticipate that female minorities will be well represented in our sample based on our preliminary data and planned study. We will make every effort to ensure that patients entered into this study reflect a diverse patient population. We expect strong representation of minority participants in the proposed research (see Enrollment Table). Patients will not be excluded on the basis of race, gender, biological sex, or ethnicity in this study. Bladder cancer is primarily a disease of the elderly with the peak incidence occurring at 85 years; 90% of patients are > 55 years and the average age at diagnosis is 73 years. Therefore, children < 18 years will not be included in this study. In this study, similar to our prior research in this patient population, we expect an age range between 52-80 years in this study based on our prior experience with patients presenting at Mount Sinai for cystectomy and urinary diversion procedures (i.e., Mean age = 67 year, SD= 8.99; range: 52–80 years). However, we will not limit the study participation to specific age group over 18 years of age.

Recruitment and Retention Plan

Recruitment from Mount Sinai Health System and its catchment area

Mount Sinai Health System is uniquely positioned to undertake this task due to its large geographic footprint across the 5 boroughs of New York City in one integrated system that is part of a large hospital network and included the NCI-designated Tisch Cancer Institute. This network comprises seven hospitals that treat patients from a diverse racial and socioeconomic population. The high volume of surgeries performed and access to a racially- and socioeconomically-diverse population from the Mount Sinai Health System and its catchment area will ensure successful selection of an ethnically diverse bladder cancer patient population for our proposed research.

Patient recruitment

Mount Sinai serves a diverse patient population (45% ethnic minority), and uses a well-established Electronic Health Records (EHR) system. The Tisch Cancer Institute sees about 160 MIBC and NMIBC patients annually who undergo RC (≈13 per month). Over three-quarters of US adults use the Internet and, based on our previous studies, we expect 75% of our sample (n=120) to have such access. We will assume a 58% accrual rate of patients (n ≈ 70), with a projected 30% attrition rate from the baseline to the 3 months assessments based on our prior study. This will yield a sample of 49 patients (12 recruitment waves: m7-m19). Recruitment will stop when we reach our target number and the allotted stage, age and biological sex distribution (N = 45). If problems arise with accrual, we have access to other MSSM hospitals. This added sources are not included in our accrual estimates. The patients will be randomized (1_{UC}: $2_{P3\text{-}BC+UC}$) using a stratified (1:1: stage (MIBC vs. NMIBC; biological sex; age; 50% ≥65 Years) permuted block randomization scheme to the 2 study groups *(i.e., $n_{UC} = 15$; $n_{P3\text{-}BC+UC} = 30$)*. We will follow the CONSORT criteria in the design, conduct, and evaluation of the pilot feasibility randomized-controlled trial.

Recruitment for the study

The research assistant (RA) funded by the study at Mount Sinai will identify, enroll, and obtain consents from the participating patients and stakeholders for both the usability testing (patients and stakeholders) and the pilot feasibility randomized-controlled feasibility trial (only patients). The RA will identify eligible patients and stakeholders through the medical record, and through the scheduling offices of the participating physicians, describe the study in detail, and consent patients and other stakeholders who agree to participate in the study.

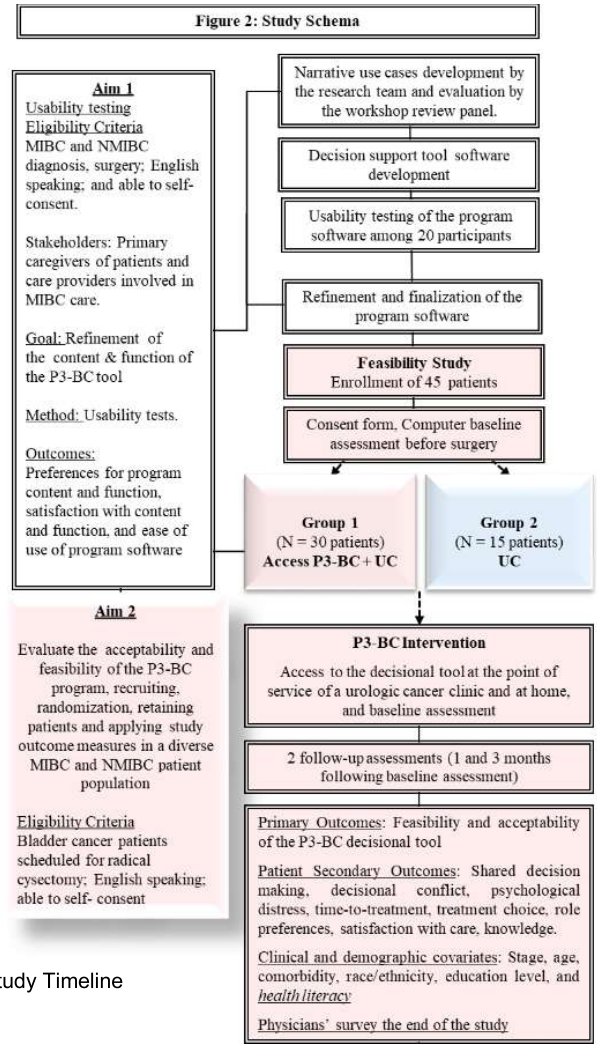
Retention Plan

Retentions strategies we found successful in our prior studies and those recommended by our collaborators will be implemented to ensure full participations of the study participants in both the usability and feasibility study. To bolster participation of patients in the feasibly study will each patient will receive $60 for his/her participation. Additionally, patients will receive printed information including the link to the study information. Study questionnaires (with pre-paid mailers) will also be given or sent out by the research assistant to study participants. The RA will call to alert participants a survey is coming and arrange pick up at clinic and hospital visits when possible. The RA will send a second mailing with a stamped returned envelope as needed. We will also display flyers and attend Urology clinic and community meetings to improve visibility. Repeat 5 calls will be made to those who do not send back the questionnaires within 2 weeks of the scheduled assessments and a second mailing will be sent within 1 month from scheduled assessment if needed.

Study Timeline

Table 1. Project timeline, tasks, deliverables		
Task	**months**	**deliverables**
Aim1, Part 1 Multidisciplinary team and panel review program content	1-2	Narrative use cases will be developed and finalized
Aim1, Part 2 Development of the P3-BC software	1-6	Existing interface we will be used to implement the P3-BC
Aim1, Part 3 Usability and acceptability testing of the P3-BC software and iterative program revisions	5-6	20 participants will examine program's preliminary version. Results will further improve the program function and content
Aim 2, Part 1 pilot testing of the feasibility and acceptability of the P3-BC	7-22	45 patients recruited and randomized; follow-ups questionnaires completed at 1 and 3 months after baseline
Aim2, Part 2 physicians' survey	22-24	3 participating physicians will complete a brief survey
Aim 2, Part 3 data analyses and manuscripts and report writing	25-24	All data analyzed, manuscripts and reports will be written

The proposed project will evaluate the feasibility, usability, and acceptability of the decisional aid (P3-BC) and will provide preliminary data on the efficacy of the decision aid in improving treatment decision making, communication with providers, and preparation for post-operative self-care and reducing patients' psychological distress. Phase I (months 1-6 of this study) will focus on the development, refinement and finalization of the P3-BC software. Three ethnically and treatment diverse lay patient advisors will review and finalize the narrative cases developed by the research team. The program software will be implemented on an existing platform built by the collaborating team. The overall usability and acceptability of the aid will be examined with a convenience sample of 20 proxy users including survivors, caregivers, nurses, health educators, social workers, and patient navigators. Results will guide further program's content and function refinement and finalization. Table 1 depicts the study timeline; and figure 2 depicts the study schema.



In Phase II, during the feasibility study (Month 7-22), the P3-BC will be tested in a small pilot, unbalanced, randomized (P3-BC+usual care (UC) vs. UC only) study. Forty-five patients undergoing cystectomy and urinary diversion recruited from Mount Sinai Health System will be randomized to the intervention and usual care groups (i.e., $n_{UC} = 15$ patients; $n_{P3\text{-}BC+UC} = 30$ patients).

Patients randomized to the intervention (P3-BC+UC) will have access to the aid and related materials before consultation with the physician about cystectomy and urinary diversion (i.e., second consultation visit) and will be queried about the use and helpfulness of the P3-BC (Primary Outcomes). Study secondary outcomes (e.g., shared decision making, decisional conflict, distress, and satisfaction with communication) will be assessed before the intervention (baseline) and 1- and 3-month thereafter. The follow-up measures (i.e., 1- and 3-month) will also assess decisional regret and difficulties with post-operative self-care. An exit brief survey will examine the 3 participating physicians' utility and perceived effectiveness of the P3-BC during consultations and shared decision making. This approach, beginning with prototype development and ending with feasibility testing, has been well documented in prior research.

Inclusion Enrollment Reports

IER ID#	Enrollment Location Type	Enrollment Location
Study 1, IER 1	Domestic	Icahn School of Medicine at Mount Sinai

Inclusion Enrollment Report 1

Using an Existing Dataset or Resource* : ○ Yes ● No

Enrollment Location Type* : ● Domestic ○ Foreign

Enrollment Country(ies): USA: UNITED STATES

Enrollment Location(s): Icahn School of Medicine at Mount Sinai

Comments: About 68 participants are expected to participate in this pilot study. 45 bladder cancer patients will participate in the feasibility study (Phase II); 20 proxy users including survivors, caregivers, health care providers, patient navigators, patient advocates) will participate in the usability testing (Phase I); and 3 survivors will participate in the advisory panel to provide guidance and inform the development of the aid, study method, and outcome measures and analyses.

Planned

Racial Categories	Ethnic Categories				Total
	Not Hispanic or Latino		Hispanic or Latino		
	Female	Male	Female	Male	
American Indian/ Alaska Native	2	2	0	0	4
Asian	4	4	0	0	8
Native Hawaiian or Other Pacific Islander	1	1	0	0	2
Black or African American	6	6	2	2	16
White	15	15	4	4	38
More than One Race	0	0	0	0	0
Total	28	28	6	6	68

Cumulative (Actual)

Racial Categories	Ethnic Categories									Total
	Not Hispanic or Latino			Hispanic or Latino			Unknown/Not Reported Ethnicity			
	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	Female	Male	Unknown/ Not Reported	
American Indian/ Alaska Native	0	0	0	0	0	0	0	0	0	0
Asian	0	0	0	0	0	0	0	0	0	0
Native Hawaiian or Other Pacific Islander	0	0	0	0	0	0	0	0	0	0
Black or African American	0	0	0	0	0	0	0	0	0	0
White	0	0	0	0	0	0	0	0	0	0
More than One Race	0	0	0	0	0	0	0	0	0	0
Unknown or Not Reported	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0

Section 3 - Protection and Monitoring Plans (Study 1)

3.1. Protection of Human Subjects	Protection of Human Subjects.pdf
3.2. Is this a multi-site study that will use the same protocol to conduct non-exempt human subjects research at more than one domestic site?	○ Yes ● No ○ N/A
If yes, describe the single IRB plan	
3.3. Data and Safety Monitoring Plan	Data safty and monitoring.11.18.19.FINAL.pdf
3.4. Will a Data and Safety Monitoring Board be appointed for this study?	● Yes ○ No
3.5. Overall structure of the study team	Structure of the Research Team.pdf

PROTECTION OF HUMAN SUBJECTS

1. Risks to Human Subjects

Human Subjects Involvement, Characteristics, and Design

Patients and other stakeholders will be recruited from the Department of Urology at the Icahn School of Medicine, Mount Sinai Health System (MSHS) in New York and via the Bladder Advocacy Network (BCAN).

Workshop participants and research panel:

The workshop and the 3 lay advisor participants (i.e., bladder cancer survivors representing different cancer stage, race, gender, and urinary diversion groups) will be recruited from both MSHS by the study Research Assistant (RA) under the supervision of Dr. Mohamed and Dr. Sfakianos. Participants will also be recruited from support organizations including The Bladder Cancer Advocacy Network (BCAN)-Survivorship Group which is led by Dr. Mohamed. A date in Month 5-Year 1 will be set for participation in the workshop based on the participants' availability and time preferences. The 3 lay advisors will continue participating in Year 1 and Year 2 to inform the study design, selection of study measures, assist with data interpretation, and inform further revisions and finalization of the intervention for a future clinical randomized large scale trial to examine the efficacy of the intervention in bladder cancer patients undergoing radical cystectomy and urinary diversion.

Usability Testing:

20 proxy users (i.e., 10 survivors and 10 stakeholders including 3 caregivers, an oncology nurse, a stoma care nurse, social worker, a health educator, a patient navigator, a physician assistant, and a clinician) recruited from the Mount Sinai System in the usability testing will be recruited from MSHS. The research assistant (RA) who will identify eligible patients and other proxy user stakeholders through the medical record and clinical departments, and through the scheduling offices of the participating urologists, will describe the study in detail, and consent patients and stakeholders who agree to participate in the usability testing. Dates will be set for participation in the usability test based on the participants' availability and time preferences. Reminder calls will be made to eligible participants several days in advance. Results and outcomes of the workshop and usability tests will guide further refinement of the content and the function of the intervention.

Usability Testing Procedure:

We will conduct pretesting of the content, visuals, and approaches of the P3-BC program by eliciting input from participants at Mount Sinai School of Medicine. As the program is being refined, we will use central intercept interviews to gather quick reactions to the content, function, visuals, and messages of the program. Participants will be asked to use the "Think Aloud" technique to provide insight into how individuals use and interact with the programs. Measures will include time to complete, time spent "wandering" with the mouse, navigation errors, and 'back' button clicks, and readability and literacy level. Weaknesses in the user interface will be readily detected using this technique, along with information gaps and software errors.

Eligibility/Exclusionary criteria for usability tests/workshop:

1) Bladder cancer patients who received radical cystectomy and urinary diversion because of a muscle invasive or high risk non-muscle invasive bladder cancer diagnosis; 18 years or older; able to communicate in English; and competent to give consent. Stakeholders participating in the usability testing may include family caregivers (i.e., individuals identified by the participating patients as persons assisting patients with activities of daily living and/or medical tasks), physicians, nurses, social workers, health educators, clinicians, and patient navigators involved in bladder cancer care.

Randomized, feasibility Pilot Trial:

The RA will identify eligible patients through the medical record, and through the scheduling offices of the participating physicians, describe the study in detail, and consent patients who agree to participate in the study. After consenting the patients for the feasibility study, the RA will schedule patients on the same day or within the same week (i.e., at least 1 week before the second consultation visit with the urologist to discuss

cystectomy and urinary diversion) with the Clinical Research Coordinator (CRC) to access the P3-BC using an Internet-enabled tablet in a private room. Each user will receive a unique passcode to access the program. Patients who have access to Internet at home will be given a URL (on a printed description of the program and via e-mail) to continue viewing the program using the same passcode. Participants who prefer to access the website/application in clinic, regardless of whether they have email and internet access and regardless of the reason for their preference, will be accommodated. The in-clinic workflow proposed for those participants who have not completed the intervention before their visit, and who wish to do so, has the potential to disrupt clinic flow. This has been discussed with physicians and clinic management staff, who are willing to accommodate this disruption in the interest of improving patient care. The intervention application provides a staff-access screen allowing the CRC to identify whether participants have used the P3-BC remotely, and whether they have completed it. When participants who have not completed the P3-BC arrive at the clinic, the CRC will offer them assistance in beginning or continuing using P3-BC in a private research room in the clinic, using a tablet (iPad) dedicated to this purpose. The tablet will be configured in "kiosk" mode, to ensure that it can access only the secure website/application and that data are not "cached" by the tablet browser. The device and network configurations will comply with Mount Sinai institutional computer and connectivity policies. All intervention participants will receive a printout of selected modules, patient preference list, and the general content from the P3-BC including information about cystectomy and the 3 diversion procedures. This will allow patients who have no Internet access from home to revisit different modules and make changes to patient preference lists as needed. The CRC will also be available by phone to address access problems, and questions about the decision aid. The RA will conduct the follow-ups (1 and 3 months thereafter). Participants will receive $60 for their participation.

When patients use the program the first time, and after completing the P3-BC program-based baseline assessment, the program will initiate inquiry questionnaire to help users tailor information based on their preferences and demographics (e.g., age, sex, race). Users will be able to choose from a menu to view on screen and/or print the following: a) text and graphical summaries of their responses to programmed inquiry questionnaire, b) customized explanation of selected statistics, and c) streamed video vignettes with patient actors of mixed age, sex, and race talking with a clinician about aspects of the treatment decision, particularly the personal factors and self-care requirements. When finished, the participant will be queried as to when the next appointment with the urologist is scheduled in order to calculate the time period between the completion of the intervention and the patient-provider discussion about treatment options and patient decisions. Patients randomized to the control group will receive usual care only.

Usual care: Patients meet with the urologist to discuss treatment and with the ostomy nurse for stoma site selection, and receive NCI printed materials "What You Need To Know about Bladder Cancer". During hospital stay, patients will receive stoma care training and discharge information on the day of discharge (e.g., red-flagged symptoms, descriptions and recommendation on stoma appliances). A post-operative nurse home visit will be scheduled based on patients' preferences and needs.

Patient baseline assessment: will assess patient demographics, clinical information, shared decision making, decisional conflict, and role preferences, distress, knowledge, and potential covariates (e.g., age, sex, literacy).

Patient 1 and 3 months questionnaires: will reassess secondary outcomes measured at baseline in addition to patient satisfaction with communication, decisional regret, difficulty with self-care, and the number of pre- and post-decision contact with the clinicians. The follow-up assessment points coincide with routine clinic visits.

Intervention evaluation: The P3-BC group will be queried about the utility, usefulness, and satisfaction with P3-BC and printed information in treatment consultations, communication, surgery preparation and post-operative self-care. Time-to-treatment, patient treatment choice, physician's recommendation, and treatment received will be recorded for all participants.

Usual care evaluation: All patients will be queried about the support they received from the stoma care unit and other clinical team members as part of usual care delivered to all patients and their utility of the materials and information received and usefulness, and satisfaction with usual care.

Study questionnaires (with pre-paid mailers) will be given or sent out by the RA to all study participants at their scheduled follow-ups. The RA will call/send letters before follow-up to alert participants that a questionnaire is coming and arrange pick up at clinic visits when possible. Repeat 5 calls will be made to those who do not send back the questionnaires within 2 weeks of the scheduled assessments and a second mailing will be sent within 1 month from scheduled assessment if needed.

Eligibility/Exclusionary criteria for feasibility study: Mirror those used in the usability test with one addition inclusion/ exclusion criterion. Only patients scheduled for cystectomy and urinary diversion after diagnosis of muscle invasive or high risk non-muscle invasive bladder cancer will be included.

Physicians participating in the study: The three participating urologic oncologists will be invited by the PI (Dr. Mohamed) to participate in an in a brief survey on shared decision making, and their clinical utility of the P3-BC intervention, and implementation evaluation. Dr. Mohamed and Dr. Benn will analyze participants' responses to examine their experience with the utility of the preference list. Patients' and physicians' results will guide further revisions of the intervention for a future trial.

Sources of Materials

The research material collected will be data from the feasibility study and self-reported questionnaires administered online (via the P3-BC program) at baseline, in person, over the phone or by using printed copies of the questionnaires mailed out by the RA to patients for the follow-up assessments; data from the Workshop reviews, and the usability tests (digitally recorded); medical information received from the patient's medical records; and physicians' survey. The consent form (usability and feasibility testing) will include specific description of the medical data and sources of information to be included in the study. The questionnaire quantitative and qualitative data (i.e., usability tests and patients' and physicians' survey) will be collected specifically for the proposed research project. Patient medical chart data will be collected in the regular course of patient treatment. All data pertaining to individual subjects will be identified only by code number and kept in a locked file cabinet in the Department of Urology at the Icahn School of Medicine. Only the study personnel will have access to links between subjects and subject identities. Upon completion of a subject's participation, these links will be destroyed. To ensure the validity and integrity of the study data, all data will be double-entered and checked. De-identified questionnaire data will be entered in to an electronic database stored in a password-protected and encrypted secure folder on Sinai System's secure database. Digital audio recordings will be transcribed without identifiers.

The University of Washington (UW) Collaborators

The UW collaborators are well known for developing and operating secure clinical applications and online interventions. The principles they use, and the measures they take to ensure data security follow the HIPAA security regulations and are detailed at: https://uwcirg.github.io/hipaa-policies/. These policies and procedures include measures to include assure appropriate access controls, auditing, and secure access to the system by participants, providers, and research staff. As noted, the DSMP specifically describes procedures for securely managing study data, as well as the analysis data sets transferred from the intervention.

Potential Risks

There is a slight risk that participants might be made moderately anxious or uncomfortable when being asked questions about personal cancer and treatment experiences. Although unlikely, any survivors expressing distress and requesting consultation will be referred immediately to a licensed clinical psychologist or a license social worker for a phone or in-person consultation at Mount Sinai. Data will be collected on referrals, outcomes, and survivors' evaluation of health care received. Based on prior studies that used these scales and similar questions, we estimate that the time patients will need to complete the full questionnaire about 35 minutes. We would not let our proposed questionnaire be longer than 35 minutes total to reduce subject burden. We also expect the usability testing of the P3-BC to take about 30 minutes. The total duration/time

burden for the patients to go through the P3-BC during the feasibility study based on prior work is ≈ 40 minutes. This time will be sufficient to review the decisional tool and select treatment preferences for a discussion with the physician.

2. Adequacy of Protection against Risks

Recruitment and Informed Consent

The research staff at Mount Sinai will explain to eligible participants that this study is focused on evaluating an intervention to improve treatment decision making and preparation for post-operative self-care and has strong potential for widespread dissemination through the use of a Web-based (electronic) format as an adjunct to clinical care. Participants have the option to refuse participation without any negative effects on patients' medical care. Once potential participants express their interest in participating, they will be consented by the RA. The informed consent procedures will include receiving information about HIPAA regulations. Participants will sign institutionally approved consent forms once the study has been fully explained to them and they have had an opportunity to ask clarifying questions. Because the study will assess patients' use of health care resources, consent forms will include specific descriptions of the type and sources of medical information we will need to collect throughout the study period. Based on the patients' consent, patient information will be obtained from their medical records.

Protections Against Risk

The researchers take the issue of confidentiality very seriously. Extensive efforts will be undertaken to maintain study participant confidentiality and privacy. To ensure patients' and the stockholders' confidentiality and comply with local and federal guidelines, personal identifying information will be protected to the best of our ability during the course of the study and following the completion of the study. All patients and other participants will be informed of their rights to confidentiality, and the process for protecting said rights will be explained prior to their elective enrollment. Each study participant will be given a unique numeric identifier upon study entry. All study materials will be stored at Mount Sinai in locked file cabinets in the Department of Urology to which only study staff will have access. Informed consent forms, recorded interviews, and completed questionnaires will be filed in separate locked file cabinets and saved in protected files. Identifying information, such as a patient's name, will not be included in the final data files for quantitative and qualitative data analyses. All personnel will be instructed in the ethics of electronic data access. All database servers are housed in MSHS's secure data center and are subject to institutional policies on security, backup, recovery, and control. Passwords for data files are managed in accordance with their institutional policies.

Overall, the potential risks of participating in this study are small. Patients participating in the feasibility study may be at risk for emotional distress, which might result from being asked questions about cancer and treatment experiences. Participants will be informed at the beginning of each interview or assessment that potentially sensitive topics will be discussed and they will be ensured that they can skip any part that would make them uncomfortable. Further, all study personnel involved in the study will be trained by the PI (Dr. Mohamed) to recognize distress and embarrassment, and will be instructed to address any distress caused by the study in a sensitive and supportive manner. Additionally, although adverse events (AEs) associated with psychosocial and behavioral (decision making) protocols such as ours are highly unlikely, to protect the safety of participants, all are provided with number for the Emergency Room at Mount Sinai.

3. Potential Benefits of the Proposed Research to Human Subjects and Others

We expect the subjects to benefit from the intervention in terms of better adaptation to bladder cancer and its care, improved treatment decision making, reduced emotional distress, and enhanced communication with

care providers. Information derived from this study may also aid in the care of current and future bladder cancer patients undergoing surgeries. In addition, some subjects may obtain psychological benefit from participation in the intervention. This will empower them to cope with similar difficult health-related decisions, and future challenges in health care. Thus, the potential benefits of participation are expected to outweigh the minimal potential risks to individual participants. Stakeholders participating in the usability testing exposed to the program information can also benefit from this exposure specifically family caregivers exposed to the usability testing as they are more likely to be involved in patient care and support (e.g., utility of stoma appliances, catheters, and symptom management). Other stakeholders can also benefits from this exposure as it is more likely to improve their understanding of patient challenges in shared decision making and post-operative care. The decisional aid can empower patients to effectively participate in consultations with their physicians, shared decision treatment decision, organizing/planning follow-up medical care, and with disease management. Potential benefits to the field include future implementation of the program as a part of standard care. Findings from this project will set the stage for a larger efficacy RCT on bladder cancer patients.

4. Importance of the Knowledge to be Gained

The proposed research addresses the issue of difficulty in treatment decision making and disease self-management among both muscle invasive and high risk non-muscle invasive bladder cancer patients undergoing cystectomy and urinary diversion. These groups of patients may face loss of an important body function, a distortion of body image, and will require lifelong use of stoma appliances and catheters. Treatment decision making is difficult as each diversion options requires specific self-care strategies and influence that patient's quality of life in a different way. By utilizing the P3-BC intervention, we will be able to improve patients' knowledge and shared decision making, understanding of the risks and benefits of these diversion options, and prepare patients for post-surgical self-care. The information collected will also aid in the future implementation of the program as a part of standard care for ladder cancer patients undergoing cystectomy and urinary diversion.

Data Safety and Monitoring Plan (DSMP)

Introduction

The Icahn School of Medicine at Mount Sinai has implemented a Research Quality Assurance (RQA) Group comprising the Bio-statistic Design Group (BDW), the Disease Focus Group (DFG), the Protocol Review & Monitoring Committee (PRMC), and The Institutional Review Board Office group (IRB). The frequency of review is determined based on degree of risk (e.g., experience of the PI), single vs. multiple accrual sites, and complexity of the study. The RQA, BDW, DFG, and IRB groups have reviewed this study and determined the soundness of the study method, human subject protection plan, and protocol and procedure. The groups also determined that the study is low-risk; therefore, we do not anticipate any serious adverse events. The groups will further review any changes needed to the consent form or study design and protocol or conflict of interest issues that might arise during the study. The IRB continuation for this study is currently pending. The IRB office will review study revised protocol based on the NINR reviewers' comments and recommendations and our progress and continuation application till the study is completed. Adverse events that happen during the study (e.g., death, life-threatening event requiring inpatient hospitalization or prolongation of existing hospitalization, persistent or significant disability/incapacity) will be reported to IRB as required by Mount Sinai regulation in a timely manner.

Table 1. The frequency of data review for this study according to the type of data and events' severity

Data type	Frequency of review	Reviewer
Subject accrual (including auditing selected cases for compliance with IRB requirements, conformance with informed consent requirements)	Quarterly	PIs (Mohamed; Lober), Ms. Knauer, and SMC
Status of all enrolled subjects, as of date of reporting	Quarterly	PIs (Mohamed; Lober), Ms. Knauer, and SMC
Adherence data regarding study visits and intervention (including verification of source documents, and investigator compliance).	Quarterly	PI (Mohamed; Lober), Ms. Knauer, and SMC
Adverse events (AEs) and rates including negative mood, depression, and anxiety (mild-moderate).	Quarterly	PIs (Mohamed; Lober), Ms. Knauer, Research Assistant (TBN), IRB, and SMC
Serious adverse events (SAE; sever and serious events) including death, suicidal attempts and ideation, life-threatening event, inpatient hospitalization or prolongation of existing hospitalization, and a persistent or significant disability/incapacity.	Per occurrence	PIs (Mohamed; Lober), Ms. Knauer, Research Assistant (TBN), SMC, IRB, and NINR based on NINR requirements

a) Monitoring Entity: Data Safety & Monitoring Committee (SMC)

The SMC for this study will include 3 independent individuals from the Icahn School of Medicine; Dr. Ketan Badani (Department of Urology), Dr. Umut Ozbek, and Dr. Rachel Jia (Population Health Science and Policy Institute). Dr. Badani will be available in real time and quarterly (a meeting every 3-months to discuss problems and emerging issues) to review and recommend appropriate action regarding adverse events and other safety issues. Drs. Umut Ozbek and Rachel Jia will be available to review study data, protocol, and analyses plan quarterly and as needed. The frequency of the SMC and research staff meetings is listed in Table (1).

The PI (Dr. Mohamed) will oversee preparation of the data report that will be distributed to all SMC members, annual IRB reviews, and NINR report on study progress at least 5 days before the scheduled deadlines for submission. The report will include the summary of cumulative accrual; randomization; cumulative attrition; attrition (including medical withdrawal such as hospitalization), study group, and race/ethnicity; unexpected

problems, adverse events, and serious adverse events (e.g., death, life-threatening event requiring inpatient hospitalization or prolongation of existing hospitalization, persistent or significant disability/incapacity); data completeness and quality (see quality assurance procedures below); and a study Consolidated Standards for Reporting Trials (CONSORT) chart. The PI and research team will make any changes to study procedures deemed necessary by the SMC, the appropriate IRB offices, and funding agency (NINR). In addition to routine study oversight, the SMC committee will consider external factors when interpreting the data, such as scientific or therapeutic developments potentially impacting the safety of the participants or the ethics of the study. The procedure for reporting adverse events is as follows: All adverse events (i.e., any untoward or unfavorable medical occurrence or psychological harms in a human subject, including any abnormal sign, symptom, or disease, temporally associated with the subject's participation in the research, whether or not considered related to the subject's participation in the research) will be reported by the Study Clinical Coordinator (Ms. Cynthia Knauer) and the study Research Assistant (TBN) to the study PI (Dr. Mohamed) immediately. Dr. Mohamed, Ms. Cynthia Knauer and the study Research Assistant will evaluate the adverse event, and if they decide it is moderate or serious (see definition below), they convene SMC committee. All adverse events determined to be serious by the SMC committee will be reported by Dr. Mohamed to our IRB within 48 hours and to the NINR project officers based on the NINR policies. The Co-PI (Dr. Lober) and the key personnel of the research team will be updated on regular basis regarding study accrual, challenges, adverse events, and SMC and IRB reviews.

Mild: An experience that is transient, and requires no special treatment or intervention. The experience does not generally interfere with usual daily activities. This includes negative mood, worries about changes in body image, and concerns about self-care after surgery.

Moderate: An experience that is alleviated with simple therapeutic treatments or psychological intervention. The experience impacts usual daily activities. Includes depression, and anxiety caused by the intervention information (e.g., illustration of urinary diversion forms).

Severe: An experience that requires therapeutic medical or psychological intervention. The experience interrupts usual daily activities. If hospitalization (or prolongation of hospitalization) is required for treatment it becomes an SAE (e.g., suicidal thoughts, and suicidal attempts).

b) <u>The Mount Sinai Health System-The Icahn School of Medicine Security Procedure</u>

The Icahn School of Medicine, where the PI (Mohamed) and the Mount Sinai research team work, has established policies and procedures to maintain the security of personnel and buildings, to ensure the effective, ethical, and legal use of computer equipment at all offices, and to safeguard computer software, hardware, and files. The department has strict network security, allowing users access only to permitted domains. Password changes and login limits are enforced. Protocols are in place to ensure secure storage and restoration of backup tapes. The server uses the built-in firewall that protects from external electronic penetration. To secure access to sensitive data, 256-bit SSL encryption is used.

The PI and Ms. Knauer will review all data collection forms on an ongoing basis for data completeness and accuracy as well as protocol compliance. The procedures by which collected data (by the Research Assistant) will be verified will include list procedures for verification of all primary and secondary endpoint data against original source documents. A statement reflecting the results of the ongoing data review will be incorporated into the Annual Report for the Independent SMC review. Table 1 provides more information about monitoring study safety including monitoring schedule, auditing selected cases for compliance with IRB requirements, conformance with informed consent requirements, verification of source documents, and investigator compliance.

Although the study is deemed low risk by our RQA reviews including IRB reviews, to further minimize research-associated risk (e.g., negative mood, depression, and anxiety induced by participating in the usability testing and intervention), the PI and the physician co-Investigator (Dr. Sfakianos) will provide referral to resources at the Department of Social Work and the Department of Psychiatry at Mount Sinai for psychosocial support. The

planned P3-PC program also include a support module that will be designed to assist patients with their feelings, worries, and concerns (i.e., mild adverse psychological events). Additionally we have created a list of online (e.g., Bladder Cancer Advocacy Network) and community support resources available to all cancer patients and their families in New York area to assist patients with challenges encountered during the cancer and treatment experience.

b-1) Security Procedures for Transfer, Implementation, and Storage of Data at Sinai and UW: All computers used to collect and send data during implementation of the study or to receive or store data at the central location will be password-protected. A password will be required to open Windows and a different password will be required to open the customized protocol software. Electronic information will be stored on the secure dedicated server with appropriate firewalls. The database server is Dell PowerEdge SC 1420 with 3.0 GHz Xeon Processor, 2 GB RAM, 136 GB Total Hard Disk Space, and 129 GB Hard Disk Space Free. A separate server with the same technical specifications is used as a Web server for Web-based data collection. Using two separate servers, one for the database and another one for the Web application, ensures secure storage of the data. Servers are scanned for viruses, and systems are in-place to detect attempts at unauthorized entry. The trained Research Assistant will administer the baseline questionnaire (1 week before surgery) and the follow-up questionnaires (1 and 3 months after baseline). Data will be collected in person (i.e., 1 week before surgery) and in person or by telephone (1 and 3 months). The Research Assistant will enter all study data (i.e., usability tests data, and the pilot RCT data) via the password protected secure server and will have access to both passwords.

Led, by Co-PI Lober, the UW collaborators, who will develop the decisional aid (P3-BC) program, are well known for developing and operating secure clinical applications and online interventions. The principles they use, and the measures they take to ensure data security follow the HIPAA security regulations and are detailed at: https://uwcirg.github.io/hipaa-policies/. These policies and procedures include measures to include assure appropriate access controls, auditing, and secure access to the system by participants, providers, and research staff.

b-2) Transfer Procedures: Transfer of protocol data will occur by the password-protected server. These data are stored on a dedicated server protected from viruses and unauthorized entry. In addition, paper copies of all consent forms (i.e., usability tests, and the pilot RCT) will be retained in a locked file at the central site.

b-3) Protecting Confidentiality: This requires that identifying information (name, address, date of birth, medical record number) not be used as sources of identification for participants. When enrollment forms are received at the Icahn School of Medicine research office (Dr. Mohamed's office), they will be encoded with a four-digit numerical code. This number will then become the identifier of records for all participants. This number will be given to the Research Assistant to enter into the computerized interview system. This number will be transferred along with the name, address, and telephone number of the participant to the data collectors. Only the identification number will be transported with the data to the central location for review by the Data Coordinator. The data will be stored on a secure server and managed by personnel who have been trained to protect confidentiality of participants.

b-4) Quality Assurance Activities: To ensure reliability of data entry, a random sample will be reviewed by the PI and the Co-investigators, and the results compared with the information recorded on the data base program. An acceptable error rate is less than 0.3%, i.e., three per 1000 entries. Quality assurance reports will be prepared on a monthly basis and reviewed by the investigators. The reports will inform the investigators about missing, invalid, and inconsistent data on selected key variables. The PIs, Dr. Mohamed and Dr. Lober, and the Co-Investigator Dr. Benn will oversee preparation of the reports, which will contain a summary of monthly and cumulative accrual, a summary of key characteristics of the study participants, and a summary of the completeness and quality of data.

b-5) Quality assurance begins with good data management. Procedures include monitoring the integrity of data storage and examining frequency distributions to look for anomalies such as an excessive number of "don't know" responses or problems with skip patterns. Project meetings with data collection staff supervised by Dr. Benn will take place monthly and on an as-needed basis.

b-6) Quality Assurance Activities: Conference calls or in-person meetings are scheduled quarterly and on an as-needed basis with all data collectors (Research Assistant, Ms. Knauer, any other research member who will be involved in data collection and management, Dr. Mohamed, Dr. Benn) to review protocol and possible issues. Booster sessions on administering the protocols are given to the research staff (i.e., Research Assistant, Ms. Knauer, any other research member who will be involved in data collection and management) during quarterly retraining sessions. The research staff will also receive a personal performance update with comments on protocol adherence (via trainer-coded data) and completeness of data. All violations of protocol are noted. Any negative or adverse effects and complaints from participants are recorded and dealt with immediately. If an adverse effect occurs from the study protocols, the Mount Sinai IRB will be notified in writing by the project PI. Regardless of whether an adverse event is related to protocol violations or not, the participant's oncology clinics will be notified of the event if it affects the clinical status of the patient. If the adverse event is deemed related to the data collector or any other member of the research staff, that person will be retrained and familiarized with the appropriate manner to implement the protocol. The record of this event is maintained in a permanent file and describes the full nature of the event.

b-7) Unanticipated problems that do not involve adverse events. Finally, if unanticipated problems that do not involve adverse events such as problems with patients (in both the usability and feasibility study) or stakeholders including nurses, social workers, health educators, patient navigators, family members, and clinicians (in the usability study only) recruitment, high drop-out rate, and loss of patient or stakeholder protected information are encountered, we will report these problems to the research staff, SMC, Mount Sinai, IRB, and NINR as relevant. The research staff led by Dr. Mohamed will meet with the SMC group to discuss problems and potential solutions (e.g., changing study protocol, reducing study assessment points, shortening the study questionnaire/usability testing) as appropriate. These changes will be approved by Mount Sinai IRB and reported to NINR annually.

c) Identification of Adverse Effects: The study PI (Mohamed) and Ms. Knauer will monitor potential adverse effects during implementation of the study protocols in several ways. First, adverse effects (i.e., please see definitions and examples above) are monitored throughout Phase I (i.e., usability tests) by Dr. Mohamed and Ms. Knauer, and during the feasibility study (Phase II) by Dr. Mohamed, Ms. Knauer, and the trained Research Assistant. Dr. Mohamed, Ms. Knauer, and the Research Assistant will document any adverse effects reported to them by the study participants and via routine reviews of Patient Electronic Medical Information. Dr. Mohamed, Ms. Knauer, and the Research Assistant will evaluate the adverse event, and if they decide it is moderate or serious (see definition above), they convene SMC committee. All adverse events determined to be serious by the SMC committee will be reported by Dr. Mohamed to our IRB and the NINR Project Officer within 48 hours (i.e., NINR office for unanticipated problems or unexpected serious adverse events that may be related to the study protocol). Any moderate or severe adverse effects that need psychological attention (determined by Dr. Mohamed, Ms. Knauer, Research Assistant, and the SMC Committee) will be reported immediately to the Departments of Social Work and Psychiatry as needed and IRB office at the Icahn School of Medicine at Mount Sinai. Dr. Mohamed, Ms. Knauer, Research Assistant will track referrals made by these Departments and the participating physician for medical issues (Dr. Sfakianos) to ensure that study participants received the recommended health care. The SMC and IRB (if needed) report will be updated with patient referrals information and feedback will be provided to all study research staff during quarterly and annual research meeting. Additionally, all participants are given a toll-free number to contact the study office directly if they have concerns. NINR Grant Officer will be also informed of the type and number of events that would halt study accrual in accordance with NINR requirements. Our annual report to NINR Grant Officer will include information regarding a review of eligibility, monitoring, assessments, intervention, the type and number of events that halt study accrual, and how the resumption of accrual would occur.

Minor (less seriousness) events (e.g., worries, concerns, and difficulty with decision making) will be addressed by providing appropriate resources available at Mount Sinai (e.g., patient support groups meetings) and in the community to help patients deal with challenges in life after cancer. Although according to the IRB evaluation the study is low risk, the literature reviews of prior research in ostomy populations indicated that some patients might have suicidal tendencies following ostomy surgeries. To address this concern, we will add the PHQ-2 (i.e., 2-item scale to screen depression in primary care) to the study assessments (i.e., baseline and follow-up). A trained Research Assistant will screen all patients for major depression using the PHQ-2 as part of the

baseline assessment. A positive score on the PHQ-2 (a score of 1-2) will indicates positive screening of depression. If the patient scores 1-2 on the PHQ-2 or verbally expresses depression during any of the study assessments (baseline-follow-up), we inform the patient's physician to make referral to further depression screening by either the Department of Social Work or the Department of Psychiatry at the Icahn School of Medicine. These patients will be further screened for clinical depression by either a trained social worker of a psychologist in these departments using the PHQ-9 (i.e., 9-item scale to screen for clinical depression in primary care). Positive response to PHQ-9 is defined as a score of 10-27. Participants who score 10-27 on the PHQ-9 will receive depression care at these departments and follow-up assessment of depression and suicidal tendencies using the Columbia-Suicide Severity Rating Scale (C-SSRS). Positive on C-SSRS Screen is defined as a response of "Yes" on Question 2 or 6. We will track participants with clinical levels of depression/suicidal tendencies to document the treatment they receive and follow-up care as part of the study IRB protocol (i.e., medical data of comorbidity and other treatment received). Support resources information we will provide to patients with additional links to support resources at Sanai, in the community, and online (e.g., BCAN's resources), and Mount Sinai IRB phone number, the PI (Mohamed) phone number and contact information to address patients' questions and concerns about the study.

The Research Assistant will also use the Brief Symptom Distress (BSI-18) Scale to assess depression/distress as part of the study secondary outcome measures. The BSI-18 includes an item that assesses suicidal tendency. If a patient selects a response to this item [Thoughts of ending your life; response scale 0 = Not at all - 4 = extremely] more than "not at all", we will have these participants screened further for suicide by the Department of Social Work or the Department Psychiatry, either as part of their clinical depression assessment (PHQ-9) or separately via the Columbia Suicide Severity Index (C-SSRS). As for immediate any action if there is concern for active suicidality or even uncertainty, we will refer these participants to the 24-hour Sinai Psychiatry Emergency Service that is part of the Emergency Department. If the Research Assistant or any member of the research staff attending to these participants is unsure whether to bring the patient there or needs to, we will call 241-5637 and ask to speak to the attending psychiatrist on call. They may be able to help guide the staff person by phone or, at the very least, would appreciate a head's up that the subject is on their way. If patients refuse to go, 911 would need to be called.

d) For Multi-Site Studies, Procedure to Ensure Compliance with Monitoring Plan and Reporting Requirements Across Study Sites.

All subject recruitment and data analyses will be conducted at the Icahn School of Medicine at Mount Sinai.

e) An Assessment of External Factors or Relevant Information (e.g., development in the literature, results of related studies) that may have impact on the safety of participants or on the ethics for the research study).

Although the study is deemed low risk by the Mount Sinai Research Quality Assurance (RQA) reviewers including IRB office, we will continue reviewing the literature on bladder cancer patients to assess new relevant information or external factors that are not taken into account when planning our intervention and study protocol. We will update our intervention (during the design phase) and study protocol as needed based on the research staff and SMC's decisions about the reviewed findings. The PIs will include this updated in the annual progress report to NINR.

f) The Advanced Plans for Interim and/or Futility Analysis

A Randomized controlled pilot trial will be conducted to confirm the acceptability and examine the feasibility and acceptability of the planned Web-based program to enhance bladder cancer treatment decision making among 45 bladder cancer patients. Pre- and post-intervention secondary outcome measures (1 and 3 months after the intervention) will be used to explore potential impact of the intervention. We opted for a randomized design to answer questions about clinically important characteristics of usual care that can have a potential overlap with specific aspects of the intervention (e.g., stoma care unit training and education), how patients in the P3-BC and usual care perceive these aspects, and use the information to further improve the timing and content of the intervention as well as defining UC and related variations. Study outcome measures include shared decision making, decisional conflict, decisional regret, psychological distress, bladder cancer

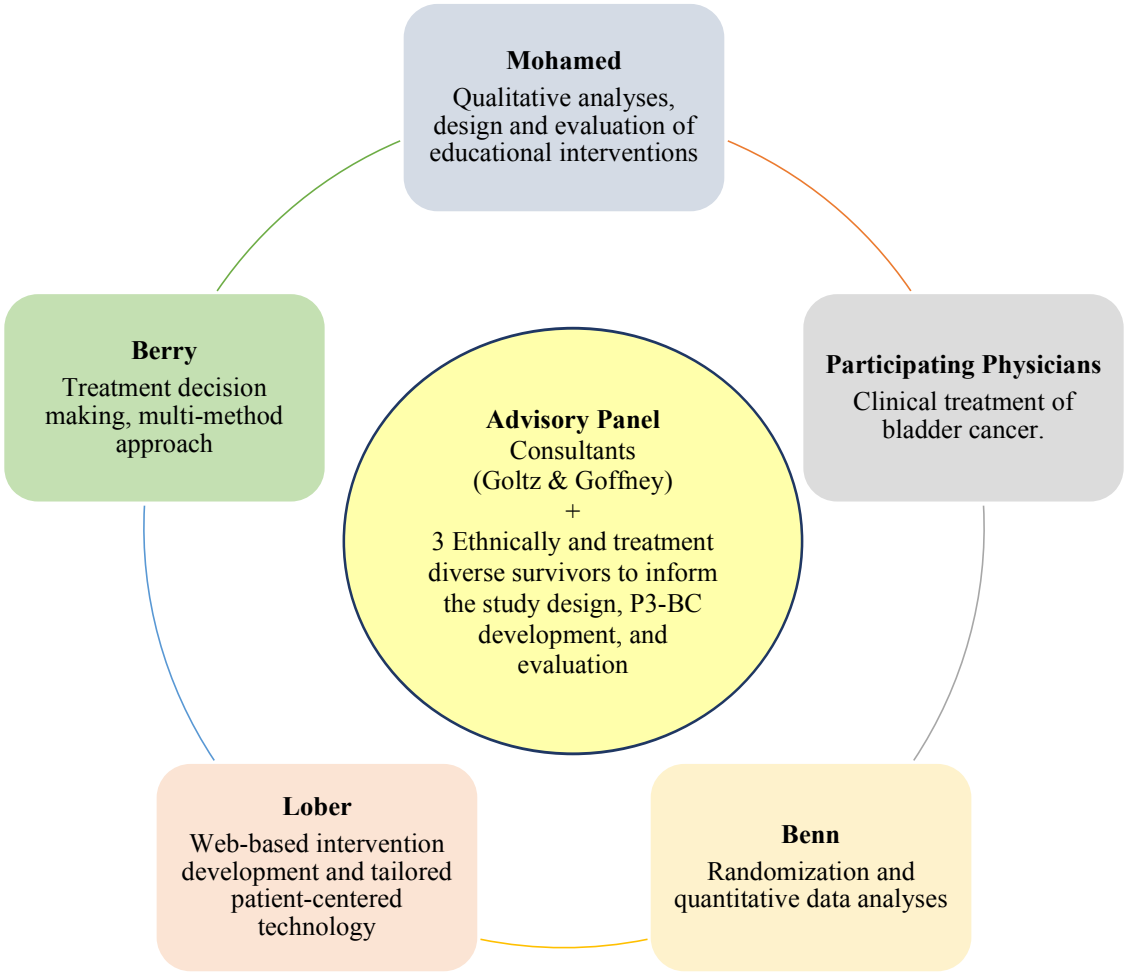
knowledge, and satisfaction with providers' communication. Participants will be recruited from the Mount Sinai Health System. This approach, beginning with prototype development, moving to usability testing and ending with pilot feasibility testing has been well documented in previous research.

Given the primary objective of this study is to evaluate the feasibility associated with recruiting and randomizing patients to the two treatment arms (intervention + usual care versus usual care alone), retaining patients for the entire duration of the study period, applying appropriate methods for assessment, and implementing the intervention in a diverse, urban ostomy patient population, we intend to focus our **Interim and/or futility analyses plan** on descriptive rather than inferential statistics, except when evaluating retention and adherence rates. This is important given our pilot study, as is generally the case for studies of this nature, is not intended for hypothesis testing of treatment efficacy, but rather for demonstration of potential for a subsequent randomized controlled trial in the future. We will evaluate feasibility using criteria suggested by Leon and colleagues: 1) monthly screening rate, 2) monthly enrollment rate, 3) proportion of eligible patients screened who actually enroll, 4) follow-up treatment-specific retention rates (i.e., 1, and 3 months thereafter), and 5) duration and completion rate of study assessments. Additionally, we will evaluate the acceptance of the procedures and elicitation of participants' opinion about aspects of the study and usual care using closed-ended ratings, self-recorded and usage tracking data collected though software-related metrics, and satisfaction with the tool. Means with standard deviations or medians with interquartile ranges will be calculated for continuous variables and frequencies with proportions for categorical variables. Differences between the intervention and usual care groups in study outcomes will be formally tested using Chi-square or Fisher's Exact tests. Effect size will be estimated using the difference in means for continuous variables and proportions for categorical variables between the two groups. Statistical analyses will be conducted using SAS v9.4.64 The PI and the study statistician (Dr. Benn) will consult with the SMC group to assess the impact of significant data loss due to problems in recruitment, retention, or data collection (if encountered). The PIs will include this updated an assessment of futility in the annual progress report to NINR (using statistical means such as descriptive and predictive probability, if appropriate)

Structure of the Research Team

The team led by Dr. Mohamed (Contact PI) and Dr. Lober (PI) is well positioned to: to: 1) employ evidence-based education tools that are sensitive to cystectomy patients' informational needs and conduct qualitative method and analyses (Mohamed); 2) collect and integrate patients' demographics, perspectives, preferences, into the proposed aid and its evaluation (Berry); 3) ensuring low program readability level and cultural sensitivity (Goltz); 2) modify an existing program platform to meet the needs of patients undergoing cystectomy and urinary diversion and usability evaluation of the final product (Lober); 3) clinical management of bladder cancer (Sfakianos); and 4) use rigorous data collection, quantitative analyses, evaluate the implementation process (Benn); 5) inform the training on stoma care and catheterization (Goffney); and 6) and provide input on the actual experience with cystectomy and urinary diversion and guide program refinement (i.e., 3 lay cystectomy and urinary diversion patient advisors). The research team has successfully recruited bladder cancer patients at time of diagnosis for similar interventions. Protocols for recruiting/retaining patients and strategies to patients' participation are well-established (e.g., reminder calls, Emails, patient reimbursement; see figure 2).

Figure 2: Research Team



Section 4 - Protocol Synopsis (Study 1)

4.1. Brief Summary

Bladder cancer patients undergoing cystectomy (bladder removal) face a life-threatening disease, loss of an important body function, distorted body image, and require self-care skills to manage treatment outcomes. Removal of the bladder necessitates diversion of urine via three major procedures, an incontinent stoma; b) a continent urinary reservoir catheterized by the patient; or c) a continent urinary reservoir connected to the urethra to allow for normal voiding. Each of these diversion options has significant side effects and requires specific self-care skills (e.g., use of stoma appliances and self-catheterization). Treatment decision making is difficult and could be influenced by factors including patient's factors (e.g., sex, age, manual dexterity, values and preferences for decisional control, and expectations about urine control). Unfortunately, decisional tools to help patients with treatment decisions are lacking. Guided by our studies in bladder cancer (NCI-1R03CA165768-01A1; ACS-121193-MRSG) and prostate cancer patients (NIH, R29CA77372, R01-NR009692), an educational intervention we developed for muscle invasive non-muscle invasive bladder cancer patients undergoing cystectomy and urinary diversion, and our computerized decisional control and information preference assessment, we aim to: a) develop a personalized, Internet-based, patient-oriented decision-support program (the P3-BC), and b) evaluate its acceptability and feasibility in a randomized, pilot study in 45 bladder cancer patients undergoing cystectomy and urinary diversion.

4.2. Study Design

4.2.a. Narrative Study Description

Introduction

Bladder cancer (BC) is the 5th most common cancer in the United States. Radical Cystectomy (RC) is the standard treatment for muscle invasive bladder cancer (MIBC; T2-T4a, N0-Nx, M0). Other indications for RC include high risk and recurrent non-muscle-invasive bladder cancer (NMIC), Bacillus Calmette-Guérin (BCG)-refractory, BCG-relapsing and BCG-unresponsive. This surgery requires an alternate route of flow for urine through three major diversions; ileal conduit, continent cutaneous reservoir, and orthotropic neobladder. Ileal conduits involve connecting the ureters to a segment of intestine that is connected to the abdominal wall in the form of a stoma. This procedure necessitates the use of an appliance into which urine continuously drains. Continent cutaneous reservoirs are created from loops of intestine which are connected to the skin via a stoma, and emptied via an intermittent catheterization. Neobladders are created from loops of intestine connected to the urethra to allow for normal voiding. The primary goals in selecting a urinary diversion are to provide the lowest potential for complications and the highest quality of life (HRQOL). We and others have shown that eligible patients face a preference-sensitive decision while lacking appropriate information about diversion options. Stoma complications are common and have been reported in up to one-third of ileal conduits patients (e.g., hernia). Complications rates for both neobladders and continent reservoirs range from 3% to 7% and from 13% to 30%, respectively. These complications include pouch leakage and rupture (1.5% to 4.3%) and urinary incontinence (3.2% to 7.4%). The decision process is complex and involves clinical consideration of factors related to cancer stage, comorbidities (e.g., impaired renal function), and patient desired outcomes.

Patients' HRQOL declines following cystectomy. Ileal conduit patients report bother with impaired body image and social roles, and sexual barriers due to altered body image, urinary leakage, odor, and frequent stoma care. In continent cutaneous reservoir patients, failure to catheterize as frequently as needed) can cause urinary leakage and serious urinary retention conditions. Night-time catheterization in these patients may also result in a reduced amount and quality of sleep. For patients with a neobladder, night-time continence is less likely to be achieved. Study findings have demonstrated significant associations among urinary incontinence, social isolation, increased psychological distress, and poor HRQOL in other populations. Patients' adaptation to self-care demands introduced by urinary diversions could be further exacerbated by comorbid disease and age-related decline in physical and cognitive functioning. The types of bowel utilized for certain diversions may also result in varied metabolic disorders further reducing patients' HRQOL. For patients making treatment decisions, supportive care resources primarily consist of a brief pre-operative consultation with an ostomy nurse to discuss surgery and self-care preparations and stoma site selection. To date, no supportive care programs exist to assist patients with urinary diversion decisions and communication with the providers.

To achieve an optimal patient-physician shared decision making (SDM), physician should ensure that patients are well informed about treatment options, and supported to deliberate about those options. Despite the prevalence of preference sensitive urological conditions including urinary diversions, few studies have documented the prevalence of SDM use during clinical consultations. One large, cross-specialty physician survey revealed that although greater than 70% of physicians identify SDM as their preferred style of decision making over paternalism or consumerism, the actual implementation of SDM procedure has been as low as 10% in certain settings. We and others have shown that RC patients experience significant unmet information and communication needs and that are necessary to maximize benefits from SDM. Health IT tools such as interactive Web-based decision aids can further help with SDM as they can provided preference-sensitive information and interactively clarify patient values to promote SDM. Research on the utility of Internet in older populations showed that the rates are 82% for 65-69 year olds; 75% for 70-74-year olds, 60% for 75-79- year olds, and 44% for greater than 80+ year olds making Web-based aids viable for this study patient population. We have shown that patients' personal characteristics such as age and race are influential in cancer

treatment decision making and should be addressed during communications. Recent literature reviews have shown that decisional aid programs tailored to patients' characteristics and values have more benefits than those with broader inclusion criteria. To address this gap in RC care and to optimize treatment decision making, and guided by the Self-Regulation Theory (SRT) and the Ottawa decision support framework (ODSF), we propose to develop and evaluate a personalized Internet-accessible decision aid: the Personal Patient Profile – Bladder Cancer (P3-BC), for patients undergoing RC and urinary diversion following muscle invasive and non-muscle invasive bladder cancer. The P3-BC provides a fresh approach to patient education and support building on: a) our ongoing research on treatment decision and unmet needs of RC patients (, b) the understanding and assessment of influential personal factors involved in cancer treatment decision making; and c) our computerized decisional control and information preference assessment. The P3-BC intervention will be comprised of illustrations, customized text, and video coaching regarding potential outcomes of each diversion option, influential personal factors, and communication with physicians. Here, we aim to:

Aim 1: Develop a personalized, Internet-based, patient-oriented decision-support program (the P3-BC).

(Aim1-a): Develop narrative and functional use cases (i.e., a list of events defining the interactions between an actor and a system, to achieve a goal) to express functional requirements using a Joint Application Development (JAD) model that involves both the patient and the developer in the design of the application. To achieve Aim 1-a, P3-BC narrative use cases will be developed guided by the SRT, ODSF, research team's experience, and narrative examples derived from our qualitative research on MIBC patients making treatment decisions. Second, narrative use cases will be validated by expert panel review using the JAD methodology in a structured workshop session to ensure that they capture the essential elements of a MIBC patient using the health care system. Panel participants will include clinical personnel, and 3 ethnically diverse survivors who received different urinary diversions. Third, narrative use cases will be refined based on panel review input.

(Aim 1-b): Develop the decision support software to satisfy the finalized narrative use cases. The software will be developed and implemented on an existing, generalized platform and functional use cases built by the collaborating Clinical Informatics Research Group.

(Aim 1-c): To assess overall usability of the P3-BC program with regard to navigation, ease of use, readability and understanding in a convenience sample of 20 proxy users (50% survivors; 50% stakeholders).

Aim 2: Evaluate the acceptability and feasibility of the P3-BC program.

We will conduct a pilot, randomized study with 45 MIBC and NMIBC undergoing cystectomy and urinary diversions patients at Mount Sinai to examine the acceptability and usability of the finalized version of the P3-BC program. Following previously established guidelines, the feasibility will be evaluated based on our ability to recruit and randomize patients to the two treatment arms (P3-BC+usual care (UC) vs. UC only), retain participants for the entire duration of the study period (3 months), apply appropriate methods for assessment of study outcomes, and implement the P3-BC. Program acceptability is defined as greater than 80% of intervention participants reporting a mean sum score of 18 or more on the acceptability scale. We will employ a 1:2 treatment allocation ratio (i.e., n UC = 15 patients; n P3-BC+UC = 30 patients; 50% NMIBC, 50% are biological females; 50% 65 Years and older) in order to maximize the information gained from participants randomized to the intervention. Pre- and post-intervention measurements (1 and 3 months) will explore differences and changes over time in patient secondary outcomes (e.g., shared decision making, decisional conflict, distress, satisfaction with communication, burden of care) controlling for potential covariates (e.g., stage, age, sex, literacy levels). We hypothesize that the P3-BC will be acceptable, will facilitate treatment decision making, and will reduce psychological distress in patients. A brief exit survey will examine physicians' (N = 3) utility and perceived effectiveness of the P3-PC and shared decision making.

Innovation: The study is innovative in several ways. 1) It is designed to add value to SDM. 2) It addresses two clinically significant problems -urinary diversion decision, and preparation for post-operative self-care; 3) The timing of the delivery of P3-BC is tied to pre-operative consultations and the challenges experienced in communication; 4) The modules can been tailored based on patients' preferences and demographics and are brief, interactive, and virtual; thus facilitating integration into everyday clinic practice; 5) The multiple follow-ups will allow for a detailed characterization of the potential pre- and post-operative benefits of the tool. 6) We believe that P3-BC could be easily adapted to other RC clinical context including community clinics and online advocacy and support groups (e.g., United Ostomy Association of American) as well as for other health conditions requiring bladder removal (e.g., Crohn disease, spinal injuries), thereby increasing the possibility for its dissemination and adaptation. 7) With limited support opportunities UC provides, we expect P3-BC to improve quality of care and patient outcomes. 8) The utility of our existing prostate software framework will facilitate the adaptation of the B3-BC content to meet patients' needs within the limited R21 study period.

The Research Team: The overwhelming strength of this proposal is based on collaborative efforts of the research team. The team is well positioned to: employ evidence-based decisional tools that are sensitive to RC patients' preferences (Mohamed); collect and integrate patients' demographic characteristics and beliefs into P3-BC and its evaluation (Berry); ensuring low program readability level and cultural sensitivity (Goltz); modify an existing program platform and usability testing (Lober); clinical management of bladder cancer (Sfakianos); quantitative methods and analyses (Benn); and ostomy and wound care (Goffney).

RESEARCH DESIGN AND METHODS

In Phase I (months 1-6 of this study) will focus on the development, iterative refinement and finalization of the P3-BC software. Expert review and 3 ethnically and treatment diverse lay patient advisors will review and finalize the narrative cases developed by the research team in a workshop (Month 5). The program software will be implemented on an existing platform built by the collaborating team. The overall usability and acceptability of the aid will be examined with a convenience sample of 20 proxy users. Results will guide program's refinement and finalization. In Phase II, during

the feasibility study (Month 7-22), the P3-BC will be tested in a small pilot, unbalanced, randomized (P3-BC+usual care (UC) vs. UC only) trial with 45 MIBC and NMIBC patients recruited from Mount Sinai Health System. Eligible patients will be randomized to the intervention and UC groups (i.e., n UC = 15 patients; n P3-BC+UC = 30 patients). Patients randomized to the intervention will have access to the aid and related materials before consultation with the physician about RC and urinary diversion and will be queried about the use and helpfulness of the P3-BC (primary Outcomes). Study secondary outcomes (e.g., shared decision making, decisional conflict, distress) will be assessed before the intervention (baseline) and 1- and 3-month thereafter. An exit brief survey will examine the 3 participating physicians' utility and perceived effectiveness of the P3-BC. This approach, beginning with prototype development and ending with feasibility testing, has been well documented.

Aim 1: Develop a personalized, Internet-based, patient-oriented decision-support program (the P3-BC)

Aim 1 -Procedure: Functional use cases development.

The functional requirements for the P3-BC software will be specified through the development of a series of narrative and functional use cases that describe aspects of the intended use of the system. This procedure begins with a description of the "actors", or participants in a goal-oriented interaction, and develops a series of semi-structured statements, or "scripts" describing the interaction of those actors with the environment, hardware, and/or software. These scripts will typically include a number of variations, or specific scenarios that must be taken into account. By systematically describing the actors and their interactions across these variations, a set of logical, consistent, and complete functional requirements for the system may be specified. We will develop detailed or "fully-dressed" use cases that include a formal structure and specification of variation, by developing template expansions of initial narrative use case specifications.

Narrative use case specifications:

Narrative use cases will be developed by the research team to capture the essential elements of a MIBC patient using the system in specific clinical settings (i.e., treatment decision making). The development of narrative cases will be guided by examples from our qualitative studies the theoretical framework and the research team experience. Narrative cases will be used to illustrate various personal factors (e.g. age, sex, race, values, and decision role preferences) and clinical challenges that may affect decisions. Narrative cases will be validated by expert panel review using the Joint Application Development (JAD) model that involves both the patient and the developer in the design of an application in a structured workshop setting. Participants will include the research team and 3 demographic and treatment diverse survivors. Narrative use cases will be refined based on reviewers' input before being employed as the final functional specifications.

The existing interface we will use to implement the new P3-BC tool works well with devices equipped with touch sensitive screens and keyboard or mouse navigation. We have found touch sensitive screens to be helpful in our existing work. The P3-BC program will: a) dynamically sort and select appropriate treatment information based on the patient's input using a brief survey; b) provide printable output with a summary and sample discussion items for the consultation visits; and c) provide customized links to other reputable bladder cancer educational web-sites. Literacy level and cultural sensitivity of the content will be confirmed by the study consultants.

P3-BC program description:

After completing the patient baseline assessment, the program will initiate a brief inquiry questionnaire to help users in the intervention group tailor the content based on their preferences. Users will be able to choose from a menu to view and print the following: a) summaries of their responses to inquiry questionnaire, b) customized explanation of selected MIBC statistics, and c) streamed video vignettes with patient actors of mixed stage, age, sex, and race talking with a clinician about MIBC treatment and self-care, particularly the patient's personal preferences and factors. All users who choose to see the vignettes will first see an opening vignette that is scripted: "Dr., there is a lot of information for me to understand about MIBC treatment. I also want to tell you some things about me (the patient) that will help with this treatment decision." Next, users will have the opportunity to choose from several vignettes for each of the following sets of patient personal factors: a) what the patient does for work and leisure; b) what information and support resources are needed; c) concern about tumor spread and survival; d) concerns about complications of treatment; and e) how much the patient wants to participate in making this treatment decision. If participants choose to move on and not view any of the options above (a-e), they will be shown a screen that lists their 4 priority categories of "information needed" which they earlier selected in the inquiry questionnaires. The categories and descriptive statements from which the top 4 are selected include: prognosis and stage of disease; preparation for surgery; surgery side effects and urinary diversions; risk factors of cancer and recurrence; home self-care; and sexuality. An automatically printed 2-page output will list: 1) patient decision control preference; 2) the 4 highest ranked information preference sheets based on patient preferences; and 3) a summary of influential patient personal factors plus suggested discussion topics to address with the clinician. A list of reputable sites for gaining accurate/up-to-date medical facts will be provided. Voice-over audio and a HELP function will be added.

Usability assessment: will be conducted via application of Neilsen's 10 basic usability principles and NCI's own usability guidance. Ten ethnically and treatment diverse survivors and 10 stakeholders recruited from the Mount Sinai System, will be given a brief script based on the use case narratives, and asked to use the software in a mock session, using the simplified thinking aloud method. Participants' literacy level will also be assessed along with participants' demographic and clinical characteristics. Dr. Mohamed will conduct usability tests and the Research Assistant (RA) will record notes. Users' reactions to and acceptance of the aid and their performance and ability to understand instructions will be audio-recorded. Survivors will be asked whether these cases accurately captured patients' experiences using the health care system. Guidelines suggest that five users are usually sufficient to find 90% of interface and programming errors. To

ensure thorough testing, we will exceed this recommendation by enrolling 20 unique users. Usability test results will be incorporated in the iterative revisions of the program. After the software is finalized and deployed, we will continue the usability and acceptability assessment by examining P3-BC program feasibility (Aim 2; Month 7-22).

Eligibility criteria for usability tests/workshop: 1) MIBC or NMIBC patients who received RC; 18 years and older; able to communicate in English; and competent to give consent. 2) Stakeholders: Patient advocates, family caregivers, clinicians, nurses, patient navigators and social workers involved in RC care at Sinai.

Aim 2 - Evaluate the feasibility and acceptability of the finalized P3-BC program

Aim 2 - Procedure: The RA will identify eligible patients and stakeholders through the medical record, and through the scheduling offices of the participating physicians, describe the study in detail, and consent patients and other stakeholders who agree to participate in the study. For the feasibility study, after consenting the patients, the RA will schedule patients on the same day or within the same week (i.e., 1 week before the second consultation visit with the urologist to discuss urinary diversion) with the Clinical Research Coordinator (CRC) to access the P3-BC using an Internet-enabled tablet in a private room. Each user will receive a unique passcode to access the P3-BC. Patients who have access to Internet at home will be given a URL (on a printed description of the program and via e-mail) to continue viewing the program using the same passcode. Participants who prefer to access the website/application in the clinic, regardless of whether they have email and internet access and regardless of the reason for their preference, will be accommodated. The application provides a staff-access screen allowing the CRC to identify whether participants have used the P3-BC remotely, and whether they have completed it. When participants who have not completed the P3-BC arrive at the clinic, the CRC will offer them assistance in beginning or continuing using P3-BC in a private research room in the clinic, using a tablet (iPad) dedicated to this purpose. The tablet will be configured in "kiosk" mode, to ensure that it can access only the secure website/application and that data are not "cached" by the tablet browser. The device and network configurations will comply with Mount Sinai institutional connectivity policies. All P3-BC users will receive a printout of selected modules, patient preference list, and the general content from the P3-BC including information about RC and the 3 diversion procedures. This will allow patients who have no Internet access from home to revisit P3-BC modules and make changes to preference lists as needed. The CRC will be available by phone to address access problems. The RA will conduct the follow-ups. Participants will receive $60 for participation. A fact sheet will standardize recruitment.

Sharing P3-PC treatment preference list with physicians: The CRC who will have access to all patients P3-BC entries will print the patient's final treatment preference list and provide it to the 3 urologists right before the second visit with the patient to discuss treatment. Patients may also print the final preference lists to make notes in preparation for the second visit. The participating urologists will receive orientation before the feasibility trial.

Patient eligibility/exclusionary criteria: Mirror those used in the usability test with one additional inclusion criterion: only MIBC or NMIBC patients who will receive RC will be included.

UC Group: Patients will access the P3-BC only to fill the baseline questionnaire and exit the P3-BC and will receive UC. UC description: before RC, patients meet with the urologist to discuss urinary diversions and with the ostomy nurse for site selection, and receive NCI "What You Need To Know about Bladder Cancer". After RC, they receive stoma care training in the hospital and discharge information on follow-up care.

Recruitment and Randomization: Feasibility Study- Accrual Plan and Sample Size

Mount Sinai serves a diverse patient population (45% ethnic minority), and uses a well-established Electronic Health Records (EHR) system. The Tisch Cancer Institute sees about 160 MIBC and NMIBC patients annually who undergo RC (approximately 13 per month). Over three-quarters of US adults use the Internet and, based on our previous studies, we expect 75% of our sample (n=120) to have such access. We will assume a 58% accrual rate of patients (n = 70), with a projected 30% attrition rate from the baseline to the 3 months assessments based on our prior study. This will yield a sample of 49 patients (12 recruitment waves: month 7-month 19). Recruitment will stop when we reach our target number and the allotted stage, age and biological sex distribution (N = 45). If problems arise with accrual, we have access to other MSSM hospitals. This added sources are not included in our accrual estimates. The patients will be randomized (1 UC: 2 P3-BC+UC) using a stratified (1:1: stage (MIBC vs. NMIBC; biological sex; age; 50% 65 Years and older) permuted block randomization scheme to the 2 study groups (i.e., n UC = 15; n P3-BC+UC = 30). We will follow the CONSORT criteria in the design, conduct, and evaluation of the RCT. Acceptability: will be assessed with the six-item Acceptability E-scale used by Berry et al. in 3 large trials of patient-centered technologies. Program acceptability is defined as greater than 80% of intervention participants reporting a mean sum score of equal to or greater than 18 on the acceptability scale.

Completion time and modules accessed: The program will record the amount of time the participant spends in each reviewed section and the total time.

Questionnaires: will also assess time spent on program print materials, utility of intervention information, and other information resources that patients used. Baseline questionnaire will assess patient demographics, patient clinical information, patient decisional conflict and role preferences, RC and urinary diversion knowledge, and their potential covariates (e.g., stage, age, sex, literacy level).

Separate follow-up assessments will measure secondary outcomes measured at baseline in addition to patient shared decision making, satisfaction with communication, patient decisional regret, patient difficulty with patient self-care, and the number of pre- and post-decision contact with the clinicians. The P3-BC group will be queried about the utility (time spent using P3-BC), usefulness, and satisfaction with P3-BC and printed information in treatment consultations, communication, surgery preparation and post-operative self-care. Time-to-treatment, patient treatment choice, physician's recommendation, and treatment received will be recorded for all participants.

Study questionnaires (with pre-paid mailers) will be given or sent out by the RA to all study participants at their scheduled follow-ups. The RA will call/send letters before follow-up to alert participants that a questionnaire is coming and arrange pick up at clinic visits when possible. Repeat 5 calls will be made to those who do not send back the questionnaires within 2 weeks of the scheduled assessments and a second mailing will be sent within 1 month from scheduled assessment if needed. The comparability of electronically entered data (baseline) and paper and pencil questionnaire data has been established in multiple studies.

Urologist exit survey: Dr. Mohamed will conduct and analyze an exit brief survey with the participating 3 urologists at the end of the study to examine their experience with the utility of the preference list and shared decision making.

Analysis of Feasibility, Acceptance, Satisfaction and Usage:

Given the primary objective of this study is to evaluate the feasibility associated with recruiting, randomizing, and retaining patients for the entire duration of the study period, applying appropriate methods for outcome assessments, and implementing the P3-BC aid in a diverse patient population, we intend to focus our analytic plan on descriptive rather than inferential statistics, except when evaluating retention and adherence rates and differences between respondents and non-respondents in demographic and clinical characteristics to quantify the degree of selection bias. This is important given our pilot study is not intended for hypothesis testing of B3-BC efficacy, but rather for the demonstration of the potential for a successful randomized controlled trial in the future. Using well-established feasibility criteria we will assess: 1) monthly screening rate, 2) monthly enrollment rate, 3) proportion of eligible participants screened who are actually recruited, 4) proportion and demographic and clinical characteristics of participants who decline to participate and reasons for refusal, 5) retention/drop-out rates, and 7) duration and completion rate of study assessments. Additionally, we will evaluate participants' opinions and acceptance of study procedures using closed-ended ratings, self-record and usage tracking data collected though software-related metrics and their satisfaction with the decision aid (80% acceptable ratings).

Study secondary outcomes:

Continuous variables will be presented as means with standard deviations or medians with interquartile ranges, and categorical variables as frequencies with proportions in descriptive summaries. Differences between the intervention and usual care groups in in adherence and retention rates and study secondary outcomes will be formally tested using or Fisher's Exact tests. Effect size will be estimated using the difference in means for continuous variables and proportions for categorical variables between the two groups to estimate effect size for powering a larger future RCT. Given the stratification scheme, we will present our results stratified by patient biological sex and age group. Our recent studies showed that women are more likely to engage their family caregivers in the diversion decision making compared to men. We will examine whether a caregiver was involved in the decision (Yes/No), and will explore user, sex, and gender differences in utility of P3-BC, whether the utility of the program or treatment decision was shared with a family member (Yes/No); and study secondary outcomes. Statistical analyses will be conducted using SAS v9.4 (Cary, NC) and R 3.1.3.

Potential challenges and possible solutions:

In spite of the feasibility focus of this R21 study, we opted for an RCT design to answer questions about clinically important characteristics of UC that can have a potential overlap with specific aspects of the P3-BC, how patients in the P3-BC and UC perceive these aspects of UC, and use the information to further improve the timing and content of the P3-Bc for both shared decision making and self-care aspects as well as defining UC and related variations. The in-clinic workflow proposed for some participants in the feasibility pilot study who have not completed the P3-BC before their visit, and who wish to do so, has the potential to disrupt clinic flow. This has been discussed with the physicians and clinic management staff, who are willing to accommodate this disruption in the interest of improving patient care. We also realize that the choice of a web-based intervention may skew our sample toward those who are not elderly and who are well educated. However, all program information will be at low reading level; and program navigation will be pre-tested in users with little computer experience. Offering use in the clinic as well as remotely and provide print out materials for all modules will reduce these biases. Finally we believe that the P3-BC will address a significant gap and will add value to consultations and shared decision making about cystectomy and urinary diversion in an underserved population.

4.2.b. Primary Purpose: Supportive Care

4.2.c. Interventions

Type	Name	Description

Behavioral (e.g., Psychotherapy, Lifestyle Counseling)	P3-BC	The decisional aid will be developed to enhance patients' communication about cystectomy and urinary diversions with the clinicians, patients' decisions and preparation for self-care. Program users will be able to choose from a menu to view and print: a) summaries of their responses to inquiry questionnaire about information needed, b) selected statistics about specific side effects and self-care, and c) streamed video vignettes with patient actors of mixed cancer stages, age, sex, and race talking with a clinician about their treatment outcomes and self-care. An automatically printed 2-page output to facilitate discussion will list: 1) decision role preference; 2) the 4 highest ranked information preference sheets; and 3) a summary of personal factors plus suggested discussion topics to address with the clinician. The 2-pages will be provided to the treating physician by the research coordinator before the patient's next consultation appointment.

4.2.d. Study Phase: Phase 1

Is this an NIH-defined Phase III Clinical Trial? ○ Yes ● No

4.2.e. Intervention Model: Parallel

4.2.f. Masking ○ Yes ● No

❑ Participant ❑ Care Provider ❑ Investigator ❑ Outcomes Assessor

4.2.g. Allocation: Randomized

4.3. Outcome Measures

Type	Name	Time Frame	Brief Description
Primary	Acceptability	Frame 1 and 3	will be assessed with the six-item Acceptability E-scale used by Berry et al. in 3 large trials of patient-centered technologies. The acceptability is defined as 80% acceptable ratings (using mean score of more than 18 on the scale).
Primary	Feasibility	Study Duration	Using well-established feasibility criteria we will assess: 1) monthly screening rate, 2) monthly enrollment rate, 3) proportion of eligible patients screened who are actually recruited, 4) proportion and demographic and clinical characteristics of patients who decline to participate and reasons for refusal, 5) retention/drop-out rates, and 7) duration and completion rate of study assessments. Additionally, we will evaluate participants' opinions and acceptance of study procedures using closed-ended ratings, self-record and usage tracking data collected though software-related metrics, and their satisfaction with the decision aid.
Secondary	Secondary Outcomes	Study Duration	Secondary outcomes include shared decision making, decisions conflict, distress, satisfaction with communication, knowledge about bladder cancer, cystectomy, and diversion choice, and self-care difficulty

4.4. Statistical Design and Power: Statistical Design and Power.11.18.19.pdf

4.5. Subject Participation Duration	24 Months
4.6. Will the study use an FDA-regulated intervention?	○ Yes ● No
4.6.a. If yes, describe the availability of Investigational Product (IP) and Investigational New Drug (IND)/ Investigational Device Exemption (IDE) status	
4.7. Dissemination Plan	Dessimination Plans.11.18.19.Final.pdf

Statistical Design and Power

Mount Sinai Health System serves a diverse bladder cancer patients including the study targeted population muscle invasive bladder cancer (MIBC) and non-muscle invasive bladder cancer (NMIBC) patient undergoing radical cystectomy and urinary diversion (45% ethnic minority), and uses a well-established Electronic Health Records (EHR) system. Mount Sinai serves a diverse patient population (45% ethnic minority), and uses a well-established Electronic Health Records (EHR) system. The Tisch Cancer Institute at Mount Sinai sees about 160 MIBC and NMIBC patients annually who undergo RC (≈13 per month). Over three-quarters of US adults use the Internet and, based on our previous studies, we expect 75% of our sample (n=120) to have such access. We will assume a 58% accrual rate of patients (n ≈ 70), with a projected 30% attrition rate from the baseline to the 3 months assessments based on our prior study. This will yield a sample of 49 patients (12 recruitment waves: m7-m19). Recruitment will stop when we reach our target number and the allotted stage, age and biological sex distribution (N = 45). If problems arise with accrual, we have access to other MSSM hospitals. This added sources are not included in our accrual estimates. The patients will be randomized (1_{UC}: $2_{P3\text{-}BC+UC}$) using a stratified (1:1: stage (MIBC vs. NMIBC; biological sex; age; 50% ≥65 Years) permuted block randomization scheme to the 2 study groups *(i.e., n_{UC} = 15; $n_{P3\text{-}BC+UC}$ = 30)*. We will follow the CONSORT criteria in the design, conduct, and evaluation of the RCT.

Study primary outcomes analyses plan: Given the primary objective of this study is to evaluate the feasibility associated with recruiting, randomizing, and retaining patients for the entire duration of the study period, applying appropriate methods for outcome assessments, and implementing the P3-BC aid in a diverse bladder cancer patient population including both MIBC and NMIBC, we intend to focus our analytic plan on descriptive rather than inferential statistics, except when evaluating retention and adherence rates and differences between respondents and non-respondents in demographic and clinical characteristics to quantify the degree of selection bias. This is important given our pilot study is not intended for hypothesis testing of P3-BC efficacy, but rather for the demonstration of the potential for a successful randomized controlled trial in the future. Using well-established feasibility criteria we will assess: 1) monthly screening rate, 2) monthly enrollment rate, 3) proportion of eligible participants screened who are actually recruited, 4) proportion and demographic and clinical characteristics of participants who decline to participate and reasons for refusal, 5) retention/drop-out rates, and 7) duration and completion rate of study assessments.

Additionally the utility of the randomized design in this study will help answer questions about clinically important characteristics of usual care that can have a potential overlap with specific aspects of the P3-BC (e.g., stoma care unit training and education), how patients in the P3-BC and usual care perceive these aspects, and use the information to further improve the timing and content of the intervention as well as defining UC and related variations. We will evaluate participants' opinions and acceptance of study procedures and usual care (and potential overlap) using closed-ended ratings, self-record and usage tracking data collected though software-related metrics and their satisfaction with the decision aid.

Study secondary outcomes analyses plan: Baseline questionnaires will assess patient demographics, clinical information, shared decision making, decisional conflict and role preferences, distress, bladder cancer and treatment knowledge, and their potential covariates (e.g., age, sex, literacy). Follow-up questionnaires (at 1- and 3-months following baseline) will examine secondary outcomes measured at baseline in addition to satisfaction with communication with providers, decisional regret, difficulty with self-care, and the number of pre- and post-decision contact with the clinicians and oncology nurses.

The P3-BC group will be queried about the utility, usefulness, and satisfaction with P3-BC and printed information in treatment consultations, communication, surgery preparation and post-operative self-care. Treatment received, Time-to-radical cystectomy and urinary diversion, patient treatment choice, physician's recommendation, and urinary diversion received will be recorded for all participants. Although the study is not designed to test for group differences (intervention vs. usual care), we will explore group differences in all study secondary outcomes as well as changes in these outcomes over the 3-month assessment period. Continuous variables will be presented as means with standard deviations or medians with interquartile ranges, and categorical variables as frequencies with proportions in descriptive summaries.

Differences between the intervention and usual care groups in adherence and retention rates (primary outcomes) and all study secondary outcomes will be formally tested using $\chi 2$ or Fisher's Exact tests. Effect

size will be estimated using the difference in means for continuous variables and proportions for categorical variables between the two groups to estimate effect size for powering a larger future RCT. Given the stratification scheme, we will present our results stratified by cancer stage, biological sex, and age group. We will explore stage, sex and gender differences in utility of P3-BC, whether the utility of the program or treatment decision was shared with a family member; and study group and patient characteristics related differences in study secondary outcomes. Statistical analyses will be conducted using SAS v9.4 (Cary, NC) and R 3.1.3.

DISSEMINATION PLAN

Following standards measures of dissemination, our dissemination plan includes major elements: 1) research findings/product; 2) end users and dissemination partners; 3) communication; and 4) evaluation of dissemination and work plan.

1. **Research findings and products.** If the proposed intervention (P3-BC) is found feasible and acceptable based on our pilot study results, we will discuss our study findings with the Bladder Cancer Advocacy Network Survivorship Working Group (BCAN-SWG) led by Dr. Mohamed and Dr. Goltz (Consultant) to ensure that research findings are relevant to the needs of the targeted populations. We will also present our preliminary study findings during the BCAN's annual Think Tank meeting that includes > 6000 patient and caregiver members and > 300 bladder cancer clinical specialists and health care providers (e.g., urologists, radiation oncologists, oncology nurses, ostomy nurses) to identify barriers and facilitators of the program future implementation and dissemination. Their input will guide the further improvement of the P3-BC program for a future efficacy study and implementation efforts.

2. **End users dissemination partners.** The oncology nurse specialist is ideally placed to assist the patient from the time of diagnosis through the period of adaptation to treatment outcomes and follow-up care. Thus, the P3-BC program could be integrated in the standard care services offered by the oncology team to patients diagnosed with bladder cancer. However, access to the P3-BC program shouldn't be limited to clinics and hospitals. Bladder cancer patients undergoing cystectomy and urinary diversion, nurses, physicians, and stakeholders should be able to access the major components of the P3-BC program from advocacy organizations' websites (e.g., BCAN; United Ostomy Association of America (UOAA); Bladder Cancer Web Café; PatientsLikeMe; the Wound, Ostomy and Continence Nurses Society (WOCN); and the American Cancer Society (ACS). This dissemination efforts will be achieved after the efficacy of the intervention is confirmed by a future R01-efficacy trial. However, future dissemination plans with these partners could be discussed during conferences, workshops, or research meeting with representatives of these organizations.

3. **Communication**—Because effective dissemination relies on the use of several channels, we will advertise the study findings and the P3-BC program using academic and none-academic journal publications and reports, regular newspapers, special interests newsletters (e.g., BCAN's newsletter), interests group list serve (e.g., UOAA's list serve), websites (e.g., ACS website, YouTube, FaceBook, and Twitter), and Radio and TV interviews. We will also advertise the program in academic meetings and conferences (e.g., American Urological Association (AUA), CDC National Cancer Conference, The Biennial Cancer Survivorship Research Conference, and The American Association For Cancer Research (AACR). Paper and poster presentations and study fliers will describe the study and our findings and will showcase the program to researchers and potential collaborators. Materials we will use to advertise the study will be tailored to the targeted audience. For example, advertisement of the study findings and the program targeting patients will be written in plain language and all information presented will be on a 5th to 7th grade reading level, common denominator for health education materials.

4. **Evaluation and dissemination work plan**—Patients who will use the program will be asked about how helpful the program was in enhancing shared decision making, diversion decisions, and post-operative follow-up care, and how to optimize sharing this program with other patients and family caregivers. A final brief survey with the participating physicians will explore the utility of the P3-BC preference list produced by the program in shared decision making and possible future dissemination efforts to maximize the utility of the program. Feedback from patients and stakeholders will guide further modifications of the program content, utility, and future dissemination efforts. Health care providers (i.e., physicians and nurses) participating in the user testing will be asked about their feedback regarding the implementation of the program in their clinics and hospitals, their suggestions for improving the program, challenges and difficulties they might encounter while using the program, and future plans to continue using the program if found efficacious).

Delayed Onset Studies

Delayed Onset Study#	Study Title	Anticipated Clinical Trial?	Justification
The form does not have any delayed onset studies			

Multiple PI Leadership Plan

The proposed application will be implemented at two collaborating sites: Mount Sinai Health System and University of Washington. Each site will have a PI/Co-I and research staff. Dr. Mohamed (Contact PI) and Dr. Lober (PI), the project PIs, will be responsible for coordinating and facilitating the research collaboration across sites. Dr. Mohamed (Contact PI) and Dr. Lober (PI), the project PIs, will be responsible for coordinating and facilitating the research collaboration across sites. Dr. Lober and his team at UW will develop the program software and oversee the utlity of the software over the study period. The proposed project will benefit from many of the communication routines that have been established through past and ongoing collaborations. In addition to organizing weekly conference calls and quarterly face-to-face meetings, the PIs will ensure that a responsive system of communication and coordination among sites is maintained and that potential problems and concerns are identified in a timely manner. Both Dr. Mohamed and Dr. Lober will be responsible for designing, implementing, and maintaining a quality control monitoring system (QCMS). The QCMS will include markers of quality assurance at each site, including refinement of the intervention content and accrual of target numbers of participants (Dr. Mohamed), developing the program software and tracking and responding to technical problems and inquiries conveyed by intervention participants (Dr. Lober), and monitoring response rates to the follow-up interviews conducted for process and outcome evaluation (Dr. Mohamed and Dr. Lober). In these roles, Dr. Mohamed and Dr. Lober will be responsible for the implementation of the Scientific Agenda, the Leadership Plan and the specific aims and ensure that systems are in place to guarantee institutional compliance with US laws, DHHS and NIH policies including human research, data and facilities. Publication authorship will be based on the relative scientific contributions of the PIs and key personnel, as is currently handled in any collaboration. If a potential conflict develops, the PIs shall meet and attempt to resolve the dispute. If they fail to resolve the dispute, the disagreement will be referred to a multiple PI arbitration committee composed of faculty of ISMMS. In addition, UW may elect to send a faculty member to serve on this committee. The committee will be co- chaired by the Dean for Research Operations and Infrastructure and the Dean for Translational Biomedical Research. The PIs agree that any decisions made by the committee will be final and binding. Any intellectual property resulting from this proposal will be handled according to the terms of the subaward agreement and applicable US patent laws.

References

1. American Cancer Society. Cancer Facts & Figures 2019. Atlanta, Ga: American Cancer Society; 2019.
2. Howlader N, Noone AM, Krapcho M, et al. SEER Cancer Statistics Review, 1975-2012, National Cancer Institute. Bethesda, MD, http://seer.cancer.gov/csr/1975_2012/, based on November 2014 SEER data submission, posted to the SEER web site, April 2015.
3. Stenzl A, Cowan NC, De Santis M, et al. Treatment of muscle-invasive and metastatic bladder cancer: Update of the EAU guidelines. *Eur Urol*. 2011; 59: 1009-1018.
4. Parekh DJ, Donat SM. Urinary Diversion: Options, patient selection, and outcomes. *Semin Oncol*. 2007; 2: 98–109.
5. Månsson A, Månsson W. When the bladder is gone: Quality of life following different types of urinary diversion. *World J Urol*. 1999; 17(4): 211-8.
6. Shimko MS, Tollefson MK, Umbreit EC, et al. Long-term complications of conduit urinary diversion. *J Urol*. 2011; 185(2): 562-67.
7. Nordstrom GM, Nyman CR. Living with a urostomy. A follow up with special regard to the peristomal-skin complications, psychosocial and sexual life. *Scand J Urol Nephrol.* 1991; 138: 247-51.
8. Hardt J, Flipas D, Hohenfellner R, et al. Quality of life in patients with bladder carcinoma after cystectomy: First results of a prospective study. *Qual Life Res*. 2000; 9(1): 1-12.
9. Babjuk M, Burger M, Comperat EM, et al. European association of urology guidelines on muscle invasive bladder cancer (TaT1 and Carcinoma In Situ) – 2019 Update. Euro Urol. 2019; 76(5): 639:657.
10. Chang SS, Bochner BH, Chou R, et al. Treatment of non-metastatic muscle invasive bladder cancer: AUA/ASCO/ASTRO/SUP Guideline (2017). J urol. 2017; 198(3):552-559.
11. Turner WH, Studer UE. Cystectomy and urinary diversion. *Semin Surg Oncol*. 1997; 13(5): 350-8.
12. Wright JL, Porter MP. Quality-of-life assessment in patients with bladder cancer. *Nat Clin Pract Urol*. 2007; 4(3): 147-54.
13. Stein JP, Lieskovsky G, Cote R, et al. Radical cystectomy in the treatment of invasive bladder cancer: Long-term results in 1,054 patients. *J Clin Oncol*. 2001; 19(3): 666-75.
14. Krupski T, Theodorescu D. Orthotopic neobladder following cystectomy: Indications, management, and outcomes. *J Wound Ostomy Continence Nurs*. 2001; 28(1): 37-46.
15. Mohamed NE, Diefenbach MA, Goltz HH, et al. Muscle invasive bladder cancer: From diagnosis to survivorship. *Adv Uro*l. 2012; 142135: 1-10.
16. Kwan ML, Leo MC, Danforth KN, et al. Factors That Influence Selection of Urinary Diversion Among Bladder Cancer Patients in 3 Community based Integrated Health Care Systems. Urology. 2019; 125: 222-229.
17. Mohamed NE, Gilbert F, Lee CT, et al. Pursuing Quality in the Application of Bladder Cancer Quality of Life Research. *Bladder Cancer*. 2016;2(2):139–149.
18. Mohamed NE, Pisipati S, Cassara M, et al. Patients' Evaluation of an Educational and Training Experiential Intervention (ETEI) to Enhance Treatment Decision and Self-Care Following the Diagnosis of Muscle Invasive Bladder Cancer. *JOJ Uro & Nephron*. 2017; 4(2): 555635
19. Pozzar RA, Berry DL. Gender Differences in Bladder Cancer Treatment Decision Making. *Online Nursing Forum.* 2017; 44(2), 204-209.
20. Stenzl A, Cowan NC, De Santis M, et al. Treatment of muscle-invasive and metastatic bladder cancer: Update of the EAU guidelines. *Eur Urol*. 2011; 59: 1009-1018.
21. Lee RK, Abol-Enein H, Aritbani W, et al. Urinary diversion after radical cystectomy for bladder cancer: options, patient selection and outcomes. BJUI. 2014; 113: 11-23.
22. Ottawa Health Research Institute. Ottawa decision support framework: Update, gaps and research priorities. http://decisionaid.ohri.ca/odsf.html. Accessed November, 2019.
23. Leung TM, Benn EKT, Galsky M, et al. Examining the psychometric properties of bladder cancer needs assessment survey. JOJ Urol & Neph. 2017; 4(1):001-14.
24. Mohamed NE, Chaoprang HP, Hudson S, et al. Muscle invasive bladder cancer: Examining survivors' burden and unmet needs. *J Urol*. 2014; 191(1):48-53.
25. Berry DL, Ellis WJ, Woods NF, et al. Treatment decision making by men with localized prostate cancer: The influence of personal factors. *Urol Oncol.* 2003; 21: 93-100.

26. O'Connor A, Jacobsen M. Decisional conflict: Supporting people experiencing uncertainty about options affecting their health. Ottawa Hospital Research Institute. 2007.
27. Wilkie D, Berry D, Schwartz A, et al. Extending Computer Technology to Hospice Research: Interactive Pentablet Measurement of Symptoms by Hospice Cancer Patients in Their Homes-2003. *Journal of Family and Community Health*. 2001; 24 (3): 48-62.
28. Wood J, Silver D. Joint application development. New York, NY: John Wiley and Sons, Inc.1995; 402.
29. Berry DL, Halpenny B, Wolpin S, et al. Development and evaluation of the personal patient profile-prostate (P3P), a web-based decision support system for men newly diagnosed with localized prostate cancer. *J Med Internet Res*. 2010; 12: e67.
30. Berry DL, Halpenny B, Hong F, et al. The personal patient profile–prostate decision support for men with localized prostate cancer: A multi-center randomized trial. *Urol Oncol*. 2011.
31. Tariman JD, Berry DL, Halpenny B, et al. Validation and testing of the acceptability E-scale for web-based patient-reported outcomes in cancer care. *Appl Nurs Res*. 2011; 24(1): 53–58.
32. Scholl I, Kriston L, Dirmaier J, et al. Development and psychometric properties of the Shared Decision Making Questionnaire-physician version (SDM-Q-Doc) Patient Educ Couns. 2012;88(2):284–90.
33. O'Connor AM. Validation of a decisional conflict scale. *Med Decis Making*. 1995; 15: 25-30.
34. Derogatis L. BSI 18: Brief Symptom inventory 18: Administration, scoring, and procedure manual. Minneapolis, MN: NCS Pearson; 2001.
35. Berry DL, Ellis WJ, Russell KJ, et al. Factors That Predict Treatment Choice and Satisfaction with the Decision in Men with Localized Prostate Cancer. *Clinical Genitourinary Cancer*. 2006;5(3):219-226.
36. Baker DW, Williams MV, Parker RM, et al. Development of a brief test measure functional health literacy. Patient Education and Counseling. 1999; 38(1):33-42
37. Morris NS, MacLean CD, Chew LD, et al. The single item literacy screener: Evaluation of a brief instrument to identify limited reading ability. BMC family practice, 2006; 7(21).
38. Doherr H, Christalle E, Kriston, et al. Use of the 9-item Shared Decision-Making Questionnaire (SDM-Q-9 and SDM-Q-Doc) in intervention studies: a systematic review. PLoS One. 2017;12(3):e0173904.
39. Clark PE. Urinary diversion after radical cystectomy. *Current Science*. 2002; 3(5): 389-402.
40. Hautmann RE, Gschwend JE, de Petriconi RC, et al. Cystectomy for transitional cell carcinoma of the bladder: Results of a surgery only series in the neobladder era. *J Urol.* 2006; 176(2), 468-492.
41. Penson MC, Olson CA. Continent urinary diversion. *Urol Clin North Am.* 1999; 26, 125-147.
42. Yang LS, Shan BL, Shan LL, et al. A systematic review and meta-analysis of quality of life outcomes after radical cystectomy for bladder cancer. Surg Oncol. 2016; 25(3): 281-97.
43. Cerruto MA, D'Elia C, Siracusano S, et al. Systematic review and meta-analysis of non RCT's on health related quality of life after radical cystectomy using validated questionnaires: Better results with orthotopic neobladder versus ileal conduit. Eur J Surg Oncol. 2016; 42(3): 343-60.
44. Filipas D, Egle UT, Budenbender C, et al. Quality of life and health in patients with urinary diversion: A comparison of incontinent versus continent urinary diversion. *Eur Urol.* 1997; 32: 23-9.
45. Coyne KS, Sexton CC, Irwin DE, et al. The impact of overactive bladder, incontinence and other lower urinary tract symptoms on quality of life, work productivity, sexuality and emotional wellbeing in men and women: Results from the EPIC study. *BJU Int*. 2008; 101(11): 1388-95.
46. Lalos O, Berglund LA, Lalos A. Impact of urinary and climacteric symptoms on social and sexual life after surgical treatment of stress urinary incontinence in women: A long term outcome. *J Adv Nurs*. 2001; (33): 316–327.
47. Liedberg F, Holmberg E, Holmäng S, et al. Long-term follow-up after radical cystectomy with emphasis on complications and reoperations: A Swedish population-based survey. *Scand J Surg*. 2012; 46(1): 14-8.
48. Lee CT and Latini DM: Urinary diversion: evidence-based outcomes assessment and integration into patient decision-making. BJU Int. 2008;102:1326.
49. Galsky MD, Diefenback M, Mohamed N et al. Web-based tool to facilitate shared decision making with regard to neoadjuvant chemotherapy use in muscle invasive bladder cancer. JCO Clinical Cancer Informatics. 2017; 1:1-12.
50. Berry DL, Nayak M, Halpenny B, et al. Treatment Decision Making in Patients with Bladder Cancer. *Bladder cancer (Amsterdam, Netherlands).* 2015;1(2):151-158.

51. Shariat SF, Sfakianos JP, Droller MJ, et al. The effect of age and gender on bladder cancer: A critical review of the literature. *BJU Int.* 2009; 105: 300-8.
52. Yeed DS, Ishillc NM, Lowrancea WT, et al. Ethnic differences in bladder cancer survival. *Urology*. 2011; 78(3): 544-49.
53. Messer JC, Shariat SF, Dinney CP, et al. Female gender is associated with a worse survival after radical cystectomy for urothelial carcinoma of the bladder: A competing risk analysis. *Urology*. 2014; (13): 01506-9.
54. Lyratzopoulos G, Abel GA, McPhail S, et al. Gender inequalities in the promptness of diagnosis of bladder and renal cancer after symptomatic presentation: Evidence from secondary analysis of an English primary care audit survey. *BMJ Open.* 2013; 3(6).
55. Mohamed NE, Pisipati S, Lee CT, et al. Unmet informational and supportive care needs of patients followign cystectomy for bladder cancer based on age, sex, and treatment choices. Urol Oncol. 2016; 34(12): 531.e7-531.
56. Gacci M, Saleh O, Cai T, et al. Quality of life in women undergoing urinary diversion for bladder cancer: Results of a multicenter study among long-term disease-free survivors. *Health Qual Life Outcomes*. 2013; 11(43): 1-6.
57. Stacey D, Légaré F, Lewis K, et al. Decision aids for people facing health treatment or screening decisions. Cochrane Database of Systematic Reviews 2017; 4(1): CD001431
58. Stacey D, Samant R, Bennett C. Decision Making in Oncology: A Review of Patient Decision Aids to Support Patient Participation. *CA: A Cancer Journal for Clinicians*. 2008; 58: 293–304.
59. Elwyn G, Tsulukidze M, Edwards A et al. Using a 'talk' model of shared decision making to propose an observation-based measure: Observer OPTION 5 item. Patient Educ Couns. 2013; 93(2): 265-71.
60. Hobbs GS, Landrum MB, Arora NK, et al. The role of families in decisions regarding cancer treatments. *Cancer*. 2015;121(7):1079-1087.
61. Al-Bahri A, Al-Moundhri M, Al-Azri M. The Role of Patients' Families in Cancer Treatment Decision-Making: Perspectives among Eastern and Western families. *Sultan Qaboos University medical journal*. 2017;17(4):e383-e385.
62. Jones RA, Steeves R, Ropka ME, et al. Capturing treatment decision making among patients with solid tumors and their caregivers. *Oncol Nursing Forum*. 2013;40(1):E24-E31.
63. Makarov DV, Chrouser K, Gore JL, et al. AUA white paper on implementation of shared decision making into urological practice. Urology Practice. 2016
64. Pozzar R, Berry D. Gender Differences in Bladder Cancer Treatment Decision Making. *Oncol Nursing Forum*. 2017;44:204-209.
65. Anderson M and Perrin A. Tech adoption climbs among older adults. Pew Research Center: Internet, Science & Technology. 2017. Internet and Technology. Available at: http://www.pewinternet.org/2017/05/17/tech- adoption-climbs-among-older-adults/ (accessed 28 August 2019).
66. Cameron L, Leventhal H. The self-regulation of health and illness behavior. *American Psychological Associations*. 2003; 17
67. Tran DT, Zhang X, Stolyar A, et al. Patient-centered design for a personal health record system. *AMIA Annu Symp Proc*. 2005;2005:1140.
68. Smith AB, Chisolm S, Deal AM, et al. Patient centered prioritization of bladder cancer research. Cancer. 2018
69. Mohamed N, Leung TM, Shah QN, et al. Involving patients in development and evaluation of an education and training experiential intervention (ETEI) to improve muscle invasive bladder cancer treatment decision making and post-operative self-care: a mixed methods approach. J Cancer Educ. 2019.
70. Leon A, Davis L, Kraemer H. The role and interpretation of pilot studies in clinical research. *J Psychiatr Res*. 2011;45(5): 626-629.
71. Fawcett SB, Suarez-Belcazar Y, Balcazar FE, et al. Conducting intervention research. In: Rothman J, Thomas EJ, ed. *Intervention Research: Design and Development for Human Service*. New York, NY: Haworth Press, 1994: 22-54.
72. Neilsen J. Guerrilla HCI: Using discount usability engineering to penetrate intimidation barrier. In: Bias RG, Mayhem DJ, ed. *Cost-Justifying Usability*. Boston, MA: Academic Press, 1994.

73. Guidelines for useability tests The Patient Education Materials Assessment Tool (PEMAT) and User's Guide. October 2013. Agency for Healthcare Research and Quality, Rockville, MD.http://www.ahrq.gov/professionals/prevention-chronic-care/improve/self-mgmt/pemat/index.html
74. U.S. Dept. of Health and Human Services. The research-based web design & usability guidelines, enlarged/expanded edition. Washington: U.S. Government Printing Office, 2006.
75. Bian ZX, Moher D, Dagenais S, et al. Improving the quality of randomized controlled trials in Chinese herbal medicine, part IV: applying a revised CONSORT checklist to measure reporting quality. Zhong Xi Yi Jie He Xue Bao/Journal of Chinese Integrative Medicine 2006;4(3):233-42.
76. Kriston L, Scholl I, Hözel L, et al. The 9-item Shared Decision-Making Questionnaire (SDM-Q-9). Development and psychometric properties in a primary care sample. Patient Educ Couns. 2010;80(1):94–9
77. Brehaut JC, O'Connor AM, Wood TJ, et al. Validation of a decision regret scale. *Med Decis Making.* 2003; 23(4), 281-292.
78. Degner LF, Sloan JA. Decision making during serious illness: What role do patients really want to play? *J Clin Epidemiol.* 1992; 45: 941-50.
79. Schag CA, Heinrich RL. Development of a comprehensive quality of life measurement tool: CARES. *Oncology (Williston Park)*. 1990; 4(5), 135-138.
80. Poletajew S, Lisiński J, Moskal K, et al. The time from diagnosis of bladder cancer to radical cystectomy in Polish urological centres - results of CysTiming Poland study. *Cent European J Urol*. 2014;67(4):329–332.
81. Muehlhausen W, Doll H, Quadri N, et al. Equivalence of electronic and paper administration of patient-reported outcome measures: a systematic review and meta-analysis of studies conducted between 2007 and 2013. *Health Qual Life Outcomes*. 2015;13:167-167.
82. Yarnold PR, Stewart MJ, Stille FC, Martin GJ. Assessing functional status of elderly adults via microcomputer. *Percept Mot Skills.* 1996; 82: 689-90.
83. Skinner HA, Allen BA. Does the computer make a difference? Computerized versus face-to-face versus self-report assessment of alcohol, drug, and tobacco use. *J Consult Clin Psychol*.1983; 51: 267-75.
84. Taenzer PA, Speca M, Atkinson MJ, et al. Computerized quality-of-life screening in an oncology clinic. *Cancer Pract.* 1997; 5: 168-75.
85. Taenzer P, Bultz BD, Carlson LE, et al. Impact of computerized quality of life screening on physician behavior and patient satisfaction in lung cancer outpatients. *Psychooncology.* 2000; 9: 203-13.
86. Pouwer F, Snoek FJ, van der Ploeg HM, et al. A comparison of the standard and the computerized versions of the Well- being Questionnaire (WBQ) and the Diabetes Treatment Satisfaction Questionnaire (DTSQ). *Qual Life Res*. 1998; 7: 33-8.
87. Giuliano AR, Mokuau N, Hughes C, et al. Participation of minorities in cancer research: The influence of structural, cultural, and linguistic factors. *Ann Epidemiol*. 2000; 10: S22-34
88. Kraemer HC, Mintz J, Noda A, et al. Caution Regarding the Use of Pilot Studies to Guide Power Calculations for Study Proposals. *Arch Gen Psychiatry.* 2006;63(5):484–489.
89. Tickle-Degnen L. Nuts and Bolts of Conducting Feasibility Studies. *American Journal of Occupational Therapy*. 2013; 67: 171-176.
90. R Core Team. R: A language and environment for statistical computing. 2015. R Foundation for Statistical Computing, Vienna, Austria. URL http://www.R-project.org/.
91. Heckel L, Gunn KM, Livingston PM. The challenges of recruiting cancer patient/caregiver dyads: informing randomized controlled trials. *BMC Medicial Research Methodology*. 2018;18(1):146-146.