DEVELOPMENT OF A PATIENT CENTERED OUTCOMES QUESTIONNAIRE FOR ADVANCED LUNG CANCER PATIENTS

by

Ellen F. Krueger

A Thesis

Submitted to the Faculty of Purdue University

In Partial Fulfillment of the Requirements for the degree of

Master of Science

Department of Psychology at IUPUI

Indianapolis, Indiana

May 2020

THE PURDUE UNIVERSITY GRADUATE SCHOOL
STATEMENT OF COMMITTEE APPROVAL

Dr. Catherine Mosher, Chair

Department of Psychology

Dr. Adam Hirsh

Department of Psychology

Dr. John McGrew

Department of Psychology

Approved by:

Dr. Jesse Stewart

ACKNOWLEDGMENTS

I would like to thank my committee chair and academic mentor, Dr. Catherine Mosher, for all the time and effort she has put into mentoring me throughout this project and in all professional aspects these past two years. I would also like to thank my committee members, Drs. Adam Hirsh and John McGrew, for their time and suggestions that helped develop my project and critical thinking skills throughout this process. Lastly, I would like to thank my peers for their encouragement and support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Symptom research with advanced lung cancer patients has primarily focused on symptom severity, frequency, and distress; yet, little is known about advanced lung cancer patients' priorities and success criteria for symptom improvement. To address these gaps in the literature, this study examined these outcomes using a modified Patient Centered Outcomes Questionnaire (PCOQ), which has largely been used with adults with chronic pain. Advanced lung cancer patients (N = 102) were recruited from the Indiana University Simon Cancer Center to participate in a one-time self-report survey, including demographic and medical questionnaires, symptom treatment history, standardized measures of symptom severity and quality of life, and the modified PCOQ focused on eight common symptoms in advanced lung cancer. Cancer information was collected from medical records. My primary aim was to evaluate the construct validity of the PCOQ. As hypothesized, symptom severity ratings on the PCOQ were positively correlated with standardized assessments of the same symptoms as well as functional status. Greater severity of most symptoms on the PCOQ was also correlated with worse quality of life, and greater severity of four symptoms was correlated with having more medical comorbidities. Positive, moderate correlations were found between the severity and importance of seeing improvement in cough, fatigue, sleep problems, and pain on the PCOQ. Patients considered low levels of symptom severity to be acceptable following symptom treatment; no differences were found across the eight symptoms. Latent profile analysis identified four patient subgroups based on the importance of seeing improvement in each of the symptoms: (1) those who rated all symptoms as low in importance (n = 12); (2) those who rated bronchial symptoms and sleep problems as low in importance and all other symptoms as moderately important (n = 29); (3) those who rated nausea and emotional distress as low in importance and all other symptoms as

moderately important (n = 23); and (4) those who rated all symptoms as highly important (n = 33). These subgroups were unrelated to demographic and clinical factors, except for functional status. Findings suggest that symptom severity and importance are related yet distinct aspects of the advanced lung cancer symptom experience. Furthermore, patients have heterogeneous priorities for symptom management, which has implications for tailoring treatment.

CHAPTER 1. INTRODUCTION

Cancer symptom research has largely focused on symptom severity, frequency, and distress (Reeve et al., 2014). This literature suggests that advanced lung cancer patients are more likely to experience high symptom burden than patients with other cancer types (Shi et al., 2011). However, little is known about advanced lung cancer patients' success criteria for symptom improvement (i.e., acceptable symptom severity) and symptom management priorities. Understanding patients' perspectives in these domains is critical for patient-centered care, which has been associated with improved patient satisfaction with health care, health outcomes, treatment adherence, and efficiency of care (Joosten et al., 2008; McMillan et al., 2013; Rathert, Wyrwich, & Boren, 2013; J. H. Robinson, Callister, Berry, & Dearing, 2008).

Patient-centered care encompasses three core values: considering patients' needs, values, and preferences; providing patients with opportunities to participate in their care; and enhancing the patient-clinician relationship (Epstein, Fiscella, Lesser, & Stange, 2010). One aspect of patient-centered care is shared decision making in which the clinician describes treatment options, including their risks and benefits, and the patient shares his or her preferences and values related to these options (Barry & Edgman-Levitan, 2012). Thus, patients are empowered to actively participate in medical decision making and symptom management (te Boveldt et al., 2014). Patient-defined success criteria for symptom improvement inform shared treatment decisions by providing indices of clinically meaningful improvement from the patients' perspective. In addition, given that lung cancer patients have, on average, 14 symptoms (Choi & Ryu, 2018; Wong et al., 2017), assessing their priorities for symptom improvement is also critical for shared decision making.

Success criteria and priorities for symptom improvement have been assessed with the Patient Centered Outcomes Questionnaire (PCOQ) in non-cancer populations, such as patients with chronic pain, Parkinson's disease, fibromyalgia, or upcoming liver transplantation (Brown et al., 2008; Im Yi, Kim, Ha, & Lim, 2014; Nisenzon et al., 2011; O'Brien et al., 2010; M. E. Robinson et al., 2005; Rodrigue, Hanto, & Curry, 2011; Sanderson et al., 2012; Stutts et al., 2009; Zeppieri, Bialosky, & George, 2020; Zeppieri et al., 2012). The PCOQ (M. E. Robinson et al., 2005) measures patients' usual symptom levels, desired or ideal symptom levels, successful symptom levels following symptom treatment, expected symptom levels following symptom treatment, and the importance of seeing improvement in each symptom. The PCOQ assesses these domains for each of the following outcomes: pain, fatigue, emotional distress, and symptom interference with daily activities.

Research using the PCOQ has found differences across medical populations in the level of symptom reduction considered a treatment success. Patients with various types of chronic pain required a 56-75% reduction in pain, 57-71% reduction in fatigue, 52-77% reduction in emotional distress, and a 66-80% reduction in symptom interference with daily activities to consider symptom treatment successful (Im Yi et al., 2014; M. E. Robinson et al., 2005; Zeppieri et al., 2012). Similarly, fibromyalgia patients required 54-63% reductions in pain, fatigue, emotional distress, and symptom interference to consider treatment successful (O'Brien et al., 2010). Other medical populations had lower criteria for treatment success. For example, people awaiting liver transplant required 33-56% reductions in the same symptom domains to consider their transplantation successful (Rodrigue et al., 2011), and those with Parkinson's disease required 40-52% reductions in these domains (Nisenzon et al., 2011).

Furthermore, subgroups of patients with chronic pain have been identified based on their symptom improvement priorities on the PCOQ. Robinson et al. (2005) found three patient subgroups with: 1) high importance in all domains (i.e., multi-focused high importance), 2) moderate importance in all domains (i.e., multi-focused moderate importance), and 3) low importance in all domains except for pain (i.e., pain-focused importance). The multi-focused high importance subgroup was significantly older and had higher usual levels of fatigue, distress, and symptom interference with daily activities than the other two groups. The multi-focused high importance group also had higher usual levels of pain than the multi-focused moderate importance group. These findings were partially replicated in another study of patients with chronic pain (Im Yi et al., 2014). Specifically, the following subgroups were identified using the PCOQ: 1) high importance in all domains (i.e., pain, fatigue, distress, and symptom interference with daily activities), 2) moderate importance in all domains except for high pain importance, and 3) low importance in all domains except for high pain importance. The patient subgroup with high importance in all domains had significantly greater depressive symptoms and anxiety than the other subgroups (Im Yi et al., 2014). A third study of patients with chronic pain found only two patient clusters based on symptom importance ratings: 1) multi-focused high importance and 2) pain-focused importance; these subgroups did not differ on any clinical or demographic variables (Zeppieri et al., 2012). These results were partially replicated in a fourth study of adults with musculoskeletal pain (Zeppieri et al., 2020). Three subgroups were found using the PCOQ: 1) multi-focused high importance, 2) importance of pain and functional outcomes, and 3) pain-focused importance. These subgroups differed with respect to pain, depressive symptoms, and anxiety, with the multi-focused high importance subgroup reporting greater pain than the other two subgroups, greater depressive symptoms than the subgroup

focused on pain and functional outcomes, and greater anxiety than the pain importance subgroup (Zeppieri et al., 2020).

To date, only one study has examined cancer patients' success criteria for symptom improvement and symptom management priorities (Tometich et al., 2018). For this study, the PCOQ was modified to include 10 common symptoms in metastatic breast cancer patients. The sample rated fatigue, cognitive problems, and sleep problems as their most severe symptoms, although these ratings were in the moderate severity range. In addition, patients required a significantly greater reduction in fatigue (49%) than all other symptoms except for cognitive problems (48%) and sleep problems (43%) to consider symptom treatment successful (Tometich et al., 2018). The following subgroups based on priorities for symptom improvement also were found: 1) patients who rated cognitive problems, sleep problems, and fatigue as highly important, 2) patients who rated pain as highly important, and 3) patients who rated all symptoms as highly important. Few differences in demographic, medical, and symptom severity variables were found across subgroups. Subgroup 1 reported higher education levels than subgroup 2 and higher levels of cognitive problems than subgroups 2 and 3.

It is important to expand research on success criteria for symptom improvement and symptom treatment priorities to other cancer populations with high symptom burden. In particular, advanced lung cancer patients often experience various symptoms that are a major source of distress, impairment, and disability (Cooley, 2000; Iyer, Roughley, Rider, & Taylor-Stokes, 2014; Shin et al., 2014; Tanaka, Akechi, Okuyama, Nishiwaki, & Uchitomi, 2002). A greater percentage of lung cancer patients report moderate to severe fatigue/tiredness, disturbed sleep, pain, shortness of breath, dry mouth, lack of appetite, nausea, constipation, and emotional distress compared to patients with other cancer diagnoses (Cleeland et al., 2013; Dudgeon,

Kristjanson, Sloan, Lertzman, & Clement, 2001; Linden, Vodermaier, MacKenzie, & Greig, 2012; Zabora, BrintzenhofeSzoc, Curbow, Hooker, & Piantadosi, 2001). Regarding advanced lung cancer patients, the majority experience at least mild levels of lack of appetite (81-88%), fatigue (79-96%), sleep problems (79%), cough (77-84%), breathlessness (76-82%), emotional distress (73-89%), pain (58-77%), and nausea (43-69%) (Alt-Epping et al., 2012; Choi & Ryu, 2018; Walling et al., 2015). Fatigue, pain, breathlessness, and lack of appetite are among the most severe symptoms in advanced lung cancer (Iyer, Taylor-Stokes, & Roughley, 2013; Lee, Oh, Kim, & Kim, 2019). Increased symptom severity has been associated with decrements in lung cancer patients' functional status and quality of life (Akin, Can, Aydiner, Ozdilli, & Durna, 2010).

Symptom clusters in advanced lung cancer patients have also been identified. One study found the following three symptom clusters in patients with inoperable lung cancer: a pain cluster consisting of pain, nausea, bowel issues, appetite loss, and fatigue; a mood cluster consisting of mood, outlook, concentration, and insomnia; and a respiratory cluster consisting of breathing difficulties and cough (Henoch, Ploner, & Tishelman, 2009). Another study found three different symptom clusters in advanced lung cancer patients: a treatment symptom cluster consisting of nausea, vomiting, disturbed sleep, pain, and lack of appetite; a lung symptom cluster consisting of sore throat, breathlessness, cough, constipation, dry mouth, and drowsiness; and a psychoneurological symptom cluster consisting of distress, sadness, forgetfulness, fatigue, and numbness/tingling in hands and feet (Choi & Ryu, 2018). Symptom clusters have been associated with reduced quality of life in lung cancer patients (Fox & Lyon, 2006).

Although the high symptom burden of advanced lung cancer has been well documented (Alt-Epping et al., 2012; Choi & Ryu, 2018; Walling et al., 2015), current measures do not assess

patients' success criteria and priorities for symptom improvement. To date, only one study has examined advanced lung cancer patients' perceptions of symptom importance (Yount et al., 2012). In this study, 50 advanced lung cancer patients ranked their top five most important symptoms or concerns, which informed the development of the NCCN-FACT Lung Symptom Index-17 (NFLSI-17). The top-ranked symptoms or concerns were fatigue (n = 22), being able to enjoy life (n = 15), and worry that their condition will get worse (n = 15). Only descriptive analyses were conducted, and the final measure did not assess patients' success criteria or priorities for symptom improvement. To address these gaps in the literature, we developed a modified version of the PCOQ focused on eight common symptoms in advanced lung cancer patients. The new PCOQ assesses advanced lung cancer patients' usual symptom severity level, acceptable symptom severity level following symptom treatment, and importance of seeing improvement in each symptom. Thus, the present study had the following specific aims:

Aim 1: Evaluate the construct validity of the new PCOQ measure for advanced lung cancer patients.

Hypotheses:

1a. Symptom severity ratings on the PCOQ will be positively correlated with standardized assessments of the same symptoms.

1b. Greater symptom severity on the PCOQ will be correlated with greater medical comorbidities and worse functional status and quality of life.

1c. Greater importance of seeing improvement in each symptom will be correlated with higher levels of symptom severity.

Secondary Aims:

2a. Compare the level of symptom severity considered to be acceptable following symptom treatment across the eight symptoms.

2b. Identify subgroups of patients based on the importance of seeing improvement in each of the eight symptoms and examine potential correlates of these subgroups, including usual symptom severity, demographics, and clinical variables, such as current cancer treatment and symptom treatment history.

CHAPTER 2. METHOD

This study examined a portion of the data from a Walther-funded study on advanced lung cancer patients' health and well-being. The Indiana University (IU) Institutional Review Board (1901972719) and IU Simon Cancer Center Scientific Review Committee approved study procedures. This study complied with the Health Insurance Portability and Accountability Act (HIPAA).

2.1. Participants

One hundred and two advanced lung cancer patients were recruited from the IU Simon Cancer Center to participate in a one-time survey. Eligible patients met the following inclusion criteria: (1) at least three weeks post-diagnosis of inoperable stage IIIB, IIIC, or IV non-small cell lung cancer or inoperable extensive stage small cell lung cancer; (2) received care at the IU Simon Cancer Center; (3) at least 18 years old; (4) able to read and speak English; and (5) no evidence of severe cognitive impairment. Cognitive impairment was based on investigator judgment or exceeding a clinical cut-point (3 or more errors) on a 6-item validated cognitive screening assessment (Callahan, Unverzagt, Hui, Perkins, & Hendrie, 2002).

2.2. Procedure

IU Simon Cancer Center medical records were screened to identify potentially eligible patients. Their oncologists were contacted to verify eligibility for the current study. Eligible patients were then mailed an introductory letter signed by their oncologist and the principal investigator along with informed consent and HIPAA authorization forms. The letter included the option to opt out of further contact by calling or emailing the research assistant.

Approximately one week after the mailing, research assistants called patients who did not opt out to discuss the study, administer a cognitive screening assessment (Callahan et al., 2002) to interested patients, and obtain verbal informed consent. Patients who refused to participate were asked to provide a reason as well as their age, race/ethnicity, and gender to assess for possible selection bias. Within three days of obtaining consent, patients were sent a REDCap online survey via email or a paper survey via postal mail, depending on their preference. If the REDCap or paper survey was not received within approximately two weeks, research assistants spoke to the participant up to five times to remind them to complete the survey. If the REDCap survey was not received, automated emails were also sent from REDCap every 4 days for 20 days following the initial survey invitation to remind them to complete the survey. Once the survey was received by the study team, participants were mailed a $25 Target gift card for their participation.

2.3. Measures

2.3.1. Demographics

Participants reported their ethnicity, race, marital status, employment status, and levels of education and income. Age and gender were assessed via medical record review.

2.3.2. Medical Information

Advanced stage lung cancer diagnosis date and treatment history (e.g., chemotherapy, radiation, targeted therapy, immunotherapy) were collected from medical records following informed consent.

2.3.3. Medical Comorbidities and Functional Status

Eight medical conditions diagnosed or treated within the past three years were assessed with a self-report measure that has been used in prior research with cancer patients (Kroenke et al., 2009). In a study using a similar measure assessing 10 medical comorbidities, a simple count of these comorbidities predicted hospitalization and mortality in older adults (ROC = 0.633 and 0.659, respectively) (Perkins et al., 2004). General functional status was assessed with the activities and function item from the Patient-Generated Subjective Global Assessment (PG-SGA) (Bauer, Capra, & Ferguson, 2002; Dajczman et al., 2008); this is the patient-reported version of the Eastern Cooperative Oncology Group (ECOG) Performance Status score (Oken et al., 1982).

2.3.4. Symptom Treatment History

Using an author-constructed checklist, participants indicated whether they had received treatment in the past three months for each of the eight symptoms assessed by the modified PCOQ (i.e., breathlessness, cough, fatigue, sleep problems, pain, nausea, emotional distress, and lack of appetite). Treatment was defined as over-the-counter or prescribed medication, oxygen, psychotherapy/counseling, or other treatments.

2.3.5. Physical and Psychological Symptoms

Eight physical and psychological symptoms were selected based on their high prevalence in advanced lung cancer patients (Alt-Epping et al., 2012; Choi & Ryu, 2018; Walling et al., 2015). Four-item NIH Patient-Reported Outcomes Measurement Information System (PROMIS) measures (Cella et al., 2010; Pilkonis et al., 2014) assessed anxiety and depressive symptoms on a scale from 1 (*never*) to 5 (*always*) and fatigue on a scale from 1 (*not at all*) to 5 (*very much*). In addition, a 4-item PROMIS measure (Yu et al., 2011) assessed sleep disturbance with the first

three items rated on a scale ranging from 1 (*not at all*) to 5 (*very much*) and the last item ("My sleep quality was…") rated on a scale from 1 (*very good*) to 5 (*very poor*). A 3-item PROMIS measure (Cella et al., 2010) also was used to assess pain intensity over the past week on a scale from 1 (*had no pain*) to 5 (*very severe*) and pain intensity "right now" on a scale from 1 (*no pain*) to 5 (*very severe*). Cancer patients provided input during the development of PROMIS measures (Garcia et al., 2007), and there is strong evidence of their reliability and validity in research with cancer patients (Jensen et al., 2017; Wagner et al., 2015; Yost, Eton, Garcia, & Cella, 2011).

PROMIS measures have not been developed to assess nausea, cough, and lack of appetite, and the PROMIS measure of breathlessness only assesses how short of breath patients become when performing certain activities (i.e., "dressing yourself without help," "sweeping or mopping") (Cella et al., 2010). Therefore, these four symptoms were assessed with items from the Memorial Symptom Assessment Scale (MSAS) (Portenoy et al., 1994), a standardized assessment developed for cancer patients. Participants indicated whether they had experienced each symptom during the past week. For each endorsed symptom, patients also indicated how often they had experienced the symptom on a scale from 1 (*rarely*) to 4 (*almost constantly*), how severe the symptom usually was on a scale from 1 (*slight*) to 4 (*very severe*), and how much the symptom distressed or bothered them on a scale from 0 (*not at all*) to 4 (*very much*). MSAS subscales have moderate to high internal consistency (Cronbach's αs = 0.58 to 0.88) and have evidence of construct, convergent, and discriminant validity in research with cancer patients (Portenoy et al., 1994).

2.3.6. Patient Centered Outcomes Questionnaire

The Patient Centered Outcomes Questionnaire (M. E. Robinson et al., 2005) was modified to include the eight symptoms described above. The original PCOQ for patients with chronic pain consists of five sections measuring usual levels of symptom severity during the past week, desired or ideal levels of symptom severity, success criteria for symptom treatment, expectations for symptom treatment, and the importance of symptom improvement. The original PCOQ showed adequate test-retest reliability for usual symptom severity over a 48-hour period, with values ranging from 0.84 to 0.90, and good concurrent validity with other standardized measures of pain, disability, and emotional distress, with *r* values ranging from 0.52 to 0.75 (Brown et al., 2008). Our modified PCOQ measure initially consisted of four sections, with the section on desired symptom levels omitted because the ideal outcomes were likely to be "none" (Nisenzon et al., 2011).

To summarize our process of modifying the PCOQ, cognitive interviews were conducted via phone with advanced lung cancer patients ($N = 10$) to obtain in-depth feedback on the modified PCOQ measure. Three coders (Mosher, Krueger, and Secinti) analyzed the transcripts using the inductive approach of content analysis (Berg, 2001), with two of the coders generating codes independently for each transcript. The coders met on a regular basis to discuss the codes and reach a consensus. Then the coders generated themes by categorizing recurring codes. In accordance with the generated themes, we made changes to our PCOQ measure. First, we changed the overall formatting of the PCOQ. The original PCOQ had separate sections for each patient-centered outcome (e.g., usual severity level, success criteria). We found that patients referred to each symptom's usual symptom level when answering the other sections. Therefore, we changed the formatting such that items were organized by symptom rather than patient-centered outcome. Second, the original PCOQ required participants to answer each section for

every symptom, regardless of whether they experienced the symptom in the past week. Participants found it very difficult to respond to items on success criteria, expectations, and priorities for symptom improvement for any symptoms that they were not currently experiencing. Therefore, we changed the PCOQ so that when a participant answered 0 (*none*) for the usual severity of a symptom, they would skip the subsequent items for that symptom. Third, we omitted the section regarding expectations for symptom treatment, as patients did not understand this conceptualization. For example, many patients could not differentiate between "successful" symptom levels and "expected" symptom levels; they expected their treatment to be successful and thought that the measure was repetitious.

Fourth, we found that patients disliked the term "successful" with reference to symptom levels following treatment. When prompted to think out-loud, participants commonly used the word "acceptable" as a substitute for the word "successful." Thus, we changed the instructions for the section regarding success criteria from, "Using the scale below, please indicate the level each of these symptoms would have to be at for you to consider symptom treatment successful," to "What level of [symptom] would be acceptable to you if you were to receive treatment for [symptom]?". Lastly, our initial version of the PCOQ for advanced lung cancer patients included ten symptoms: breathlessness, cough, fatigue, sleep problems, neuropathy, pain, nausea, emotional distress, lack of appetite, and cognitive problems. To reduce participant burden, neuropathy and cognitive problems were omitted from the final modified PCOQ. Other reasons for omission of these symptoms were neuropathy's redundancy with pain, the exclusion of patients with significant cognitive impairment from the study, and the lack of evidence-based treatments in cancer for these symptoms (Asher & Myers, 2015; Bhandari, Mehta, Mavai, & Raj Singh, 2016; Finnerup, Sindrup, & Jensen, 2010; Staff, Grisold, Grisold, & Windebank, 2017).

The final PCOQ for advanced lung cancer patients focused on eight symptoms with three sections. Because patients in the cognitive interview study asked whether the items referred to cancer-related symptoms, the overarching instructions read, "Please rate your usual level of each symptom during the past week, whether or not you think it was related to cancer, its treatment, or other medical conditions." For each symptom, participants reported their usual level of symptom severity during the past week on a scale from 0 (*none*) to 10 (*worst imaginable*). If their usual symptom severity level was greater than zero, participants then responded to the following questions: "What level of [symptom] would be acceptable to you if you were to receive treatment for [symptom]?" on a scale from 0 (*none*) to 10 (*worst imaginable*) and, "How important is it for you to see improvement in your level of [symptom]?" on a scale from 0 (*not at all important*) to 10 (*most important*).

2.4. Data Analysis

Descriptive statistics, scatterplots, histograms, and residual score analysis were used to examine data for normality, linearity, kurtosis, homoscedasticity, and outliers. I also examined the subject to parameter ratio and whether data were missing completely at random using Little's Missing Completely at Random (MCAR) test (Little, 1988).

To test Hypotheses 1a-c, construct validity was assessed using correlational analyses in SPSS statistical software (version 25.0; SPSS, Chicago, IL, USA). Construct validity would be evidenced by positive correlations between usual symptom severity on the PCOQ and assessments of the same symptoms on either PROMIS or MSAS measures (Hypothesis 1a). Correlations were also computed between PCOQ usual symptom severity items and indices of medical comorbidities, functional status, and quality of life as well as the importance of symptom improvement (Hypotheses 1b-c). We estimated the statistical power to detect a

medium to large effect size with the G*Power statistical power analysis program (Faul, Erdfelder, Buchner, & Lang, 2009). A post-hoc power analysis for bivariate correlations was performed. With a sample size of 102 and a two-tailed alpha of 0.01, we have 71-100% power to detect medium to large effect sizes (ρs = 0.3-0.6).

For secondary objective 2a, linear mixed modeling was performed in SPSS to examine differences in levels of acceptable symptom severity following treatment across the eight symptoms. Only participants who reported a usual symptom severity level of one or higher on a 0 to 10 scale were included in these analyses.

For secondary objective 2b, a latent profile analysis (LPA) was conducted with Mplus statistical software, which uses full information maximum likelihood (FIML) data imputation to address missing values (Muthén & Muthén, 2012). FIML generates implied values for missing values based on data patterns (Craig K. Enders, 2001a; Craig K Enders, 2001b). This strategy allows retention of the original sample size and produces more accurate parameter estimates than deletion methods and single-imputation methods (Craig K. Enders, 2001a). The LPA examined possible subgroups of advanced lung cancer patients based on importance ratings for each of the eight symptoms. LPA assumes that patterns of the observed variables can be explained by an unobserved latent classification variable that divides cases into groups. This analysis uses model-based methods for determining the total number of classes, or subgroups, within the sample. Furthermore, LPA makes probabilistic assignments to classes, whereas hierarchical cluster analysis uses absolute methods for class assignment (Hagenaars & McCutcheon, 2002).

There is no consensus regarding the best criteria for determining the number of classes in LPA; however, the Bayesian Information Criterion (BIC) and bootstrap likelihood ratio test (BLRT) typically have the best overall performance when determining the number of classes in

simulation studies (Nylund, Asparouhov, & Muthén, 2007). Therefore, a variety of information criteria were considered, such as the BIC, BLRT, Akaike Information Criterion (AIC), Consistent AIC (CAIC), and sample size adjusted BIC (ssBIC). For this analysis, the most weight was given to the BIC and the BLRT when determining the number of patient subgroups based on symptom importance ratings. Lower values of the BIC and a statistically significant value for the BLRT indicate better model fit. Feasibility of class interpretation was also considered when determining model fit (Hagenaars & McCutcheon, 2002). Entropy measures of fit determine the number of classes based on optimal class separation; entropy values closer to 1 than 0 indicate more class separation (Celeux & Soromenho, 1996; Clark & Muthén, 2009). Entropy was used to evaluate whether the classes were well separated in the model.

LPA is a type of latent class analysis with continuous variables. Previous research has used latent class analysis to identify symptom clusters in cancer patients (Bobevski et al., 2018; Doong et al., 2015; Miaskowski et al., 2015; Tometich et al., 2019). As LPA is exploratory, no formal power analysis based on sample size is possible (Dziak, Lanza, & Tan, 2014). Vermunt's 3-step approach using multinomial logistic regressions (Vermunt, 2010) was performed to examine potential correlates of patient subgroups, including usual symptom severity, demographics, and clinical variables (i.e., cancer stage, time since diagnosis, current cancer treatments, symptom treatment history, and medical comorbidities). A value of $p < .01$ was considered statistically significant due to the number of analyses. LPA makes probabilistic assignments to classes; Vermunt's 3-step approach accounts for error in class assignment by estimating the probability of a patient being assigned to their "true" class or incorrectly assigned to another class (Vermunt, 2010).

CHAPTER 3. RESULTS

Of the 176 patients who were sent recruitment mailings, 115 (65%) completed the screening assessment, 21 refused, 9 were deceased, and 27 were lost to follow-up. Of the 111 patients who were eligible, all of them consented to participate and 103 (93%) completed the survey. The most common reason for refusal was lack of interest in the study, and other reasons included illness or lack of time. Participants and those who declined participation did not differ with respect to gender ($\chi^2(1, N = 132) = .44, p = .51$) and age ($t(130) = .87, p = .31$). Due to the small number of approached patients who were ethnic minorities ($n = 21$), we were unable to conduct the same analysis by race/ethnicity. One patient was found to be ineligible following survey completion.

Participant characteristics are shown in Tables 1 and 2. Patients were mostly White (82%) and 46% were male, with an average age of 65 years (SD = 11.9). Patients were, on average, 2.6 years (SD = 2.5) from their advanced lung cancer diagnosis. The majority had received chemotherapy (61%) and immunotherapy (55%).

Descriptive statistics for the PCOQ and standardized symptom measures are found in Tables 3 and 4, respectively. All variables were within the expected ranges for each measure. Internal consistency reliability was adequate to good for MSAS subscales (αs = .73 to .82) and good to excellent for PROMIS measures (αs = .86 to .96) (see Table 4). Skewness and kurtosis for the main study variables were all less than the absolute values of 3.0 and 8.0, respectively; thus, data were within normality guidelines (Kline, 2010). Little's MCAR test revealed that data were missing completely at random ($\chi^2(1745, N = 102) = 1{,}839.38, p = 0.06$). Furthermore, less than 5% of data were missing for each variable, with the exception of income (9% missing).

For aim #1, correlational analyses were conducted with pairwise deletion. Consistent with hypothesis 1a, the usual severity of all symptoms on the PCOQ was positively correlated with standardized assessments of the same symptoms, *rs*(97 - 102) = 0.69 – 0.91, *ps* < 0.01 (see Table 5). I also hypothesized positive correlations between PCOQ usual symptom severity and medical comorbidities and functional status as well as negative correlations between PCOQ usual symptom severity and quality of life (Hypothesis #1b). Results were partially consistent with hypotheses (see Table 6). The severity of breathlessness, fatigue, sleep problems, and lack of appetite was positively correlated with medical comorbidities, *rs*(101 – 102) = 0.29 – 0.31, *ps* < 0.01, whereas the severity of emotional distress, cough, pain, and nausea showed small, non-significant correlations with medical comorbidities, *rs*(99 – 102) =.07 – .20, *ps* = .04 – .47. In addition, the severity of all symptoms was positively correlated with functional status, *rs*(98 – 101) = 0.36 – 0.62, *ps* < 0.01, and the severity of most symptoms (i.e., breathlessness, fatigue, sleep problems, pain, lack of appetite, and emotional distress) was negatively correlated with quality of life, *rs*(97 – 100) = -0.31 – -0.48, *ps* < 0.01. The severity of cough and nausea had small, non-significant associations with quality of life, *rs*(98) = -0.25 – -0.26, *ps* < 0.05.

Results were also partially consistent with the hypothesis (#1c) that greater symptom importance would be correlated with higher levels of symptom severity (see Table 7). Moderate, positive correlations were found between the importance and severity of cough, fatigue, sleep problems, and pain, *rs*(57 – 90) = 0.46 – .58, *ps* < 0.01. Whereas importance and severity were also moderately correlated for breathlessness, nausea, and emotional distress, results fell short of statistical significance, *rs*(29 – 71) = 0.30 – .39, *p* < 0.05. The severity of lack of appetite was not significantly correlated with its importance, *r*(39) = .26, *p* = .12.

For secondary aim #2a, a linear mixed model analysis was conducted to examine differences in levels of acceptable symptom severity following symptom treatment across the eight symptoms. Estimated marginal means indicated that the lowest mean acceptable severity level was 1.73 for nausea, whereas the highest acceptable level was 2.71 for lack of appetite. No significant differences in acceptable symptom severity were found across the eight symptoms (see Table 8).

For secondary aim #2b, an LPA was conducted to identify subgroups of patients based on the importance of seeing improvement in each of the eight symptoms. Five patients did not provide any importance ratings and, thus, were excluded from this analysis. Five latent profile models were estimated (see Table 9). Due to the BIC's decreasing value and the statistical significance of the BLRT as the model increased from a 3-class to 4-class solution, the 4-class model provided the best fit and was the most conceptually meaningful. However, the 4-class model resulted in a subject-to-parameter ratio less than 5:1; therefore, these results are interpreted with caution.

Four patient subgroups were identified (see Figure 2 and Table 10). Subgroup 1 rated all symptoms as low in importance (n=12; 12%). Subgroup 2 rated bronchial symptoms (i.e., breathlessness, cough) and sleep problems as low in importance and all other symptoms as moderately important (n=29; 30%). Subgroup 3 rated nausea and emotional distress as low in importance and all other symptoms as moderately important (n=23; 24%). Subgroup 4 rated all symptoms as highly important (n=33; 34%). Multinomial logistic regressions using Vermunt's 3-step approach were conducted to examine differences between subgroups on demographics and medical factors, including usual symptom severity, past and current cancer treatments, and symptom treatment history (see Tables 11 and 12). Only one significant difference ($p < .01$)

emerged between subgroups; worse functional status was associated with a greater likelihood of being in subgroup 3 than subgroup 1 (OR = 5.25, 95% CI = 1.52, 18.07).

CHAPTER 4. DISCUSSION

The modified PCOQ measure showed evidence of construct validity in advanced lung cancer patients. As hypothesized, the severity of all eight symptoms on the PCOQ was related to standardized measures of the same symptoms and functional status. Additionally, for many symptoms on the PCOQ, their severity was correlated with quality of life, medical comorbidities, and the importance of seeing improvement in the symptom. Moderate associations were found between the severity of most symptoms and their importance, suggesting that they are related but distinct aspects of the symptom experience in advanced lung cancer. For all symptoms, patients, on average, considered a low symptom level to be acceptable following symptom treatment, and no differences in acceptable symptom severity were found across the eight symptoms. Lastly, advanced lung cancer patients had heterogeneous priorities for symptom treatment, which were largely unrelated to demographic and clinical factors.

Results partially supported the hypothesis (1b) that functional status, quality of life, and medical comorbidities would be correlated with symptom severity. As hypothesized, increased severity of all symptoms on the PCOQ was correlated with worse functional status, consistent with prior research with older lung cancer patients (Gift, Jablonski, Stommel, & Given, 2004). Furthermore, the severity of most symptoms was negatively correlated with quality of life, as found in previous lung cancer research (Lee et al., 2019; Sarna et al., 2004). However, the severity of cough and nausea had small, non-significant associations with quality of life, which might be due to the low mean severity of these symptoms. Consistent with our hypothesis, more severe breathlessness, fatigue, sleep problems, and lack of appetite were correlated with greater medical comorbidities. However, the severity of emotional distress, cough, pain, and nausea was not correlated with the number of medical comorbidities. Patients reported, on average, 1.4

comorbid medical conditions. The most frequently endorsed medical condition was hypertension, a condition that often has minimal to no symptom burden (Elliott, 2007). Thus, range restriction for medical comorbidities and certain symptoms may have contributed to null findings.

Consistent with hypothesis 1c, the severity of cough, fatigue, sleep problems, and pain showed moderate, positive correlations with the importance of seeing improvement in these symptoms. Moderate, positive associations were also found between the severity and importance of seeing improvement in breathlessness, nausea, and emotional distress, although they fell short of statistical significance. In addition, the severity and importance of lack of appetite were unrelated, which is likely due to low endorsement of this symptom. Taken together, findings suggest that symptom severity and importance are related but distinct constructs. Other studies in chronic pain and cancer also have found significant associations between usual symptom severity and patient subgroups based on importance ratings, although the size of these associations was not reported (Im Yi et al., 2014; Nisenzon et al., 2011; M. E. Robinson et al., 2005; Tometich et al., 2018; Zeppieri et al., 2020). Only two studies have not found significant associations between symptom severity and patient subgroups based on importance ratings (Rodrigue et al., 2011; Zeppieri et al., 2012). Their relatively small sample sizes may have reduced statistical power for detecting associations.

During cognitive interviews regarding our modified PCOQ measure, advanced lung cancer patients reported several reasons for their symptom importance ratings aside from symptom severity. Some patients connected their lower symptom importance ratings to their ability to *tolerate* higher symptom severity, rather than their actual symptom severity. One patient based her importance ratings on symptoms' interference with daily activities. Another

patient stated that her low importance ratings reflected a focus on improving survival rather than symptoms. These findings provide possible explanations for the moderate correlations between symptom severity and importance that warrant examination in future research.

Differences in acceptable severity levels were not found across the eight symptoms; for all symptoms, low severity was considered acceptable. The original PCOQ used the term "successful" to characterize a positive symptom treatment outcome (M. E. Robinson et al., 2005). We changed this term to "acceptable" based on our cognitive interviews with advanced lung cancer patients; when prompted to think out-loud, participants commonly used the word "acceptable" as a substitute for the word "successful." In this study, mean usual severity scores for breathlessness, cough, nausea, lack of appetite, and emotional distress were near or below the acceptable mean levels for those symptoms, suggesting that patients generally viewed their current symptom severity as acceptable. Fatigue severity was the furthest from its acceptable level, consistent with research suggesting that fatigue is the most concerning symptom for advanced lung cancer patients (Butt et al., 2008). The current sample's acceptable severity levels were comparable to metastatic breast cancer patients' and chronic pain patients' success criteria for symptom improvement (O'Brien et al., 2010; M. E. Robinson et al., 2005; Tometich et al., 2018; Zeppieri et al., 2012). Patients with chronic pain often adjust their success criteria such that higher symptom levels are more acceptable after experiencing partial pain relief with treatment (Brown et al., 2008). Therefore, our current sample's generally low acceptable symptom levels may be related to their low rates of recent symptom treatment. Although about one third of our sample had received treatment for pain in the past three months, only small subgroups received treatment for other symptoms (range = 9-28%).

Four distinct patient subgroups were identified based on priorities for symptom improvement. Subgroup 1 rated all symptoms as low in importance. Subgroup 2 rated bronchial symptoms (i.e., breathlessness, cough) and sleep problems as low in importance and all other symptoms as moderately important. Subgroup 3 rated nausea and emotional distress as low in importance and all other symptoms as moderately important, and subgroup 4 rated all symptoms as highly important. These results suggest that advanced lung cancer patients have heterogeneous priorities for symptom improvement. Previous work in chronic pain has found similar heterogeneity. Specifically, studies have typically found two or three subgroups of patients based on importance ratings for pain, fatigue, distress, and interference with daily activities, with one patient subgroup rating all symptoms as highly important (Im Yi et al., 2014; Nisenzon et al., 2011; M. E. Robinson et al., 2005; Zeppieri et al., 2012). In addition, a pain-focused importance subgroup was found in nearly all studies of patients with chronic pain (Im Yi et al., 2014; M. E. Robinson et al., 2005; Zeppieri et al., 2012). Conversely, only one study in chronic pain has found a subgroup rating all symptoms as low in importance (Nisenzon et al., 2011). The low importance subgroup in our study may be related to low usual symptom severity (i.e., mean rating $\leq$3 on a 0 to 10 scale), except for fatigue. Nearly a third of patients in our sample were on a cancer treatment break; without treatment side effects, patients may have not experienced symptoms that were distressing and important to improve at the time of this study.

Only one prior study has modified the PCOQ to examine subgroups of cancer patients based on symptom importance ratings (Tometich et al., 2018). In this study, advanced breast cancer patients rated the importance of 10 common symptoms and the following patient subgroups were found: (1) those who rated thinking problems, sleep problems, and fatigue as highly important, (2) those who rated pain as moderately important, and (3) those who rated all

symptoms as highly important. Differences in sample characteristics (e.g., gender, time since diagnosis, disease and treatment side effects) between this study and the current project likely contributed to differences in patient subgroups based on symptom importance. In addition, the number and type of the symptoms included in the PCOQ differed between the two projects, and the metastatic breast cancer patients rated the importance of symptoms regardless of their current symptom level. Nevertheless, both studies found a subgroup that rated all symptoms as highly important. As advanced cancer patients, on average, experience 11 symptoms of varying severity (Declan Walsh & Rybicki, 2006), prioritizing treatment of certain symptoms may be challenging for some patients. The lack of a pain-focused subgroup in the current sample may be related to the even more expansive and severe symptom burden in advanced lung cancer compared to advanced breast cancer (Cleeland et al., 2013; Cooley, 2000).

Demographics and medical factors, such as usual symptom severity, cancer treatments, and symptom treatment history, were examined as correlates of subgroups based on symptom importance. Only one factor was associated with subgroups; worse functional status was related to a higher likelihood of being in subgroup 3 (rating all symptoms as moderately important except for low nausea and emotional distress) than subgroup 1 (rating all symptoms as low in importance). Associations between functional status and patient subgroups based on symptom importance have rarely been examined, with the study in metastatic breast cancer finding no relationship between these variables (Tometich et al., 2018). Our largely null findings may be a function of the small sample size and relatively homogeneous sample with respect to certain characteristics (e.g., race/ethnicity, symptom treatment history). Additionally, our results mirror findings in the general PCOQ literature; few demographic and clinical correlates of subgroups based on symptom importance have been found (Im Yi et al., 2014; Nisenzon et al., 2011; M. E.

Robinson et al., 2005; Rodrigue et al., 2011; Tometich et al., 2018; Zeppieri et al., 2020; Zeppieri et al., 2012). However, several studies in cancer and chronic pain have found that age, education, and usual symptom severity are correlated with these subgroups (Im Yi et al., 2014; Nisenzon et al., 2011; M. E. Robinson et al., 2005; Tometich et al., 2018; Zeppieri et al., 2020).

In this study, symptom treatment history was unrelated to patient subgroups based on symptom importance. Some patients had received treatment for symptoms and perceived them to be at an acceptable level; thus, these symptoms might be viewed as no longer important to treat. Conversely, other patients might have recently begun treatment for symptoms and may have rated them as highly important to improve. In addition, because experiences with symptom treatment are not uniformly successful, the relationship between symptom treatment history and symptom importance is likely to be complex.

Limitations of this study should be noted. It is possible that patients who agreed to participate in our survey differed than those who chose not to participant. Study participants may have had fewer or less severe symptoms than non-participants, as a common reason for refusal was not feeling well enough to participate. Additionally, except for the medical record data, all measures were self-reported. Inaccurate retrospective symptom recalls and social desirability biases may have affected symptom reports. However, many of the symptoms are subjective experiences that cannot be evaluated objectively. There are also limitations regarding the generalizability of these findings. We enrolled patients with advanced lung cancer at one academic medical center in the midwestern United States, most of whom were Caucasian. Thus, our findings may not generalize to patients with other cancer types, ethnic minorities, or those in other geographic settings. Additionally, the relatively small sample size and insufficient variance in certain variables contributed to null findings. Lastly, the cross-sectional design did

not allow for examination of test-retest reliability in our study and change in acceptable symptom severity and symptom treatment priorities over time. These factors are likely to vary throughout the cancer experience. Due to these limitations, the results of this study provide only preliminary evidence of our PCOQ's psychometric properties.

These findings have important implications for the tailoring of symptom treatment for advanced lung cancer patients. In general, results point to the importance of considering patient preferences, such as their acceptable symptom severity and symptom improvement priorities, when discussing symptom treatment options to foster shared decision-making. Specifically, results suggest that advanced lung cancer patients typically require low symptom severity levels to consider symptoms acceptable, highlighting the need for patient-provider discussions about possible symptom treatment outcomes. Results also suggest that advanced lung cancer patients have heterogeneous priorities for symptom improvement. Thus, providers can ask patients about their individual priorities and goals for symptom treatment to better inform shared decision-making and patient-centered care. For example, after assessing the severity of patient symptoms, a provider could ask, "What is the most important symptom to treat?"

Furthermore, our findings indicate that fatigue may be an important symptom for intervention in advanced lung cancer patients, as it had the highest mean severity rating and was also rated as highly important. Previous research with advanced lung cancer patients has found that fatigue often co-occurs with other symptoms (Choi & Ryu, 2018; Henoch et al., 2009); therefore, treating other symptoms may help reduce fatigue. For example, evidence suggests that cognitive-behavioral interventions may help improve the severity of the pain-fatigue-sleep symptom cluster in patients with various cancers (Kwekkeboom, Cherwin, Lee, & Wanta, 2010). However, treatment for one symptom, such as steroids or stimulants for fatigue, may negatively

impact other symptoms, such as anxiety and sleep problems (Escalante & Manzullo, 2009; Sturdza et al., 2008). Thus, providers should discuss symptom treatment side effects with advanced lung cancer patients to ensure that treatment is consistent with their priorities for symptom improvement.

Further research is needed to examine the psychometric properties of our measure in larger, more diverse samples that fully represent the advanced lung cancer population. Additionally, longitudinal research should be conducted to provide evidence of test-retest reliability. Future research could also validate the PCOQ in other advanced cancer populations, such as prostate or gastrointestinal cancer patients. Although the PCOQ would require modification to reflect the symptom experiences of each cancer group, a number of symptoms are prevalent across advanced cancers (Teunissen et al., 2007; D. Walsh, Donnelly, & Rybicki, 2000). Thus, researchers could use the PCOQ to determine whether acceptable severity levels or treatment priorities for certain symptoms vary across advanced cancer diagnoses.

Future research may also examine how acceptable symptom levels and symptom improvement priorities change over the entire lung cancer trajectory from diagnosis to phases of treatment and end-of-life care. These perceptions are expected to change as symptom severity fluctuates. For example, chemotherapy and radiation are related to increased fatigue (Bower, 2014), and symptom burden generally increases over time in advanced lung cancer (LeBlanc et al., 2015; Lövgren, Tishelman, Sprangers, Koyi, & Hamberg, 2008). Additionally, stepped-care intervention trials targeting symptom clusters could consider patients' priorities for symptom improvement when determining the sequence of care. This research could ultimately inform patient-centered approaches to optimizing quality of life and functioning in advanced cancer.

REFERENCES

Akin, S., Can, G., Aydiner, A., Ozdilli, K., & Durna, Z. (2010). Quality of life, symptom experience and distress of lung cancer patients undergoing chemotherapy. *European Journal of Oncology Nursing, 14*(5), 400-409. doi:10.1016/j.ejon.2010.01.003

Alt-Epping, B., Stäritz, A. E., Simon, S. T., Altfelder, N., Hotz, T., Lindena, G., & Nauck, F. (2012). What is special about patients with lung cancer and pulmonary metastases in palliative care? Results from a nationwide survey. *Journal of Palliative Medicine, 15*(9), 971-977. doi:10.1089/jpm.2011.0434

Asher, A., & Myers, J. S. (2015). The effect of cancer treatment on cognitive function. *Clinical Advances in Hematology and Oncology, 13*(7), 441-450.

Barry, M. J., & Edgman-Levitan, S. (2012). Shared decision making—the pinnacle of patient-centered care. *New England Journal of Medicine, 366*(9), 780-781. doi:10.1056/NEJMp1109283

Bauer, J., Capra, S., & Ferguson, M. (2002). Use of the scored Patient-Generated Subjective Global Assessment (PG-SGA) as a nutrition assessment tool in patients with cancer. *European Journal of Clinical Nutrition, 56*(8), 779. doi:10.1038/sj.ejcn.1601412

Berg, B. L. (2001). *Qualitative research methods for the social sciences*. Boston, MA: Pearson.

Bhandari, B., Mehta, B., Mavai, M., & Raj Singh, Y. (2016). Chemotherapy induced peripheral neuropathy; Mechanism and treatment. *International Physiology, 4*(2), 73-76. doi:10.21088/ip.2347.1506.4216.6

Bobevski, I., Kissane, D., Vehling, S., McKenzie, D., Glaesmer, H., & Mehnert, A. (2018). Latent class analysis differentiation of adjustment disorder and demoralization, more severe depressive and anxiety disorders, and somatic symptoms in patients with cancer. *Psycho-Oncology, 27*(11), 2623-2630. doi: 10.1002/pon.4761

Bower, J. E. (2014). Cancer-related fatigue—mechanisms, risk factors, and treatments. *Nature Reviews Clinical Oncology, 11*, 597-609. doi:10.1038/nrclinonc.2014.127

Brown, J. L., Edwards, P. S., Atchison, J. W., Lafayette-Lucey, A., Wittmer, V. T., & Robinson, M. E. (2008). Defining patient-centered, multidimensional success criteria for treatment of chronic spine pain. *Pain Medicine, 9*(7), 851-862. doi:10.1111/j.1526-4637.2007.00357.x

Butt, Z., Rosenbloom, S. K., Abernethy, A. P., Beaumont, J. L., Paul, D., Hampton, D., . . . Cella, D. (2008). Fatigue is the most important symptom for advanced cancer patients who have had chemotherapy. *Journal of the National Comprehensive Cancer Network, 6*(5), 448-455. doi:10.6004/jnccn.2008.0036

Callahan, C. M., Unverzagt, F. W., Hui, S. L., Perkins, A. J., & Hendrie, H. C. (2002). Six-item screener to identify cognitive impairment among potential subjects for clinical research. *Medical Care, 40*(9), 771-781. doi:10.1097/01.MLR.0000024610.33213.C8

Celeux, G., & Soromenho, G. (1996). An entropy criterion for assessing the number of clusters in a mixture model. *Journal of Classification, 13*(2), 195-212. doi:10.1007/BF01246098

Cella, D., Riley, W., Stone, A., Rothrock, N., Reeve, B., Yount, S., . . . Choi, S. (2010). The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item banks: 2005–2008. *Journal of Clinical Epidemiology, 63*(11), 1179-1194. doi:10.1016/j.jclinepi.2010.04.011

Choi, S., & Ryu, E. (2018). Effects of symptom clusters and depression on the quality of life in patients with advanced lung cancer. *European Journal of Cancer Care, 27*(1), e12508. doi:10.1111/ecc.12508

Clark, S. L., & Muthén, B. (2009). Relating latent class analysis results to variables not included in the analysis. Retrieved from https://www.statmodel.com/download/relatinglca.pdf

Cleeland, C. S., Zhao, F., Chang, V. T., Sloan, J. A., O'Mara, A. M., Gilman, P. B., . . . Fisch, M. J. (2013). The symptom burden of cancer: evidence for a core set of cancer-related and treatment-related symptoms from the Eastern Cooperative Oncology Group Symptom Outcomes and Practice Patterns study. *Cancer, 119*(24), 4333-4340. doi:10.1002/cncr.28376

Cooley, M. E. (2000). Symptoms in adults with lung cancer: a systematic research review. *Journal of Pain and Symptom Management, 19*(2), 137-153. doi:10.1016/S0885-3924(99)00150-5

Dajczman, E., Kasymjanova, G., Kreisman, H., Swinton, N., Pepe, C., & Small, D. (2008). Should patient-rated performance status affect treatment decisions in advanced lung cancer? *Journal of Thoracic Oncology*, *3*(10), 1133-1136. doi:10.1097/JTO.0b013e318186a272

Doong, S.-H., Dhruva, A., Dunn, L. B., West, C., Paul, S. M., Cooper, B. A., . . . Langford, D. J. (2015). Associations between cytokine genes and a symptom cluster of pain, fatigue, sleep disturbance, and depression in patients prior to breast cancer surgery. *Biological Research for Nursing, 17*(3), 237-247. doi:10.1177/1099800414550394

Dudgeon, D. J., Kristjanson, L., Sloan, J. A., Lertzman, M., & Clement, K. (2001). Dyspnea in cancer patients: prevalence and associated factors. *Journal of Pain and Symptom Management, 21*(2), 95-102. doi:10.1016/S0885-3924(00)00258-X

Dziak, J. J., Lanza, S. T., & Tan, X. (2014). Effect size, statistical power, and sample size requirements for the bootstrap likelihood ratio test in latent class analysis. *Structural Equation Modeling: A Multidisciplinary Journal, 21*(4), 534-552. doi:10.1080/10705511.2014.919819

Elliott, W. J. (2007). Systemic hypertension. *Current Problems in Cardiology, 32*(4), 201-259. doi:10.1016/j.cpcardiol.2007.01.002

Enders, C. K. (2001a). The performance of the full information maximum likelihood estimator in multiple regression models with missing data. *Educational and Psychological Measurement, 61*(5), 713-740. doi:10.1177/0013164401615001

Enders, C. K. (2001b). A primer on maximum likelihood algorithms available for use with missing data. *Structural Equation Modeling, 8*(1), 128-141. doi:10.1207/S15328007SEM0801_7

Epstein, R. M., Fiscella, K., Lesser, C. S., & Stange, K. C. (2010). Why the nation needs a policy push on patient-centered health care. *Health Affairs, 29*(8), 1489-1495. doi:10.1377/hlthaff.2009.0888

Escalante, C. P., & Manzullo, E. F. (2009). Cancer-related fatigue: The approach and treatment. *Journal of General Internal Medicine, 24*(2), 412-416. doi:10.1007/s11606-009-1056-z

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods, 41*(4), 1149-1160. doi:10.3758/BRM.41.4.1149

Finnerup, N. B., Sindrup, S. H., & Jensen, T. S. (2010). The evidence for pharmacological treatment of neuropathic pain. *Pain, 150*(3), 573-581. doi:10.1016/j.pain.2010.06.019

Fox, S. W., & Lyon, D. E. (2006). Symptom clusters and quality of life in survivors of lung cancer. *Oncology Nursing Forum, 33*(5), 931-936. doi:10.1188/06.ONF.931-93

Garcia, S. F., Cella, D., Clauser, S. B., Flynn, K. E., Lad, T., Lai, J.-S., . . . Weinfurt, K. (2007). Standardizing patient-reported outcomes assessment in cancer clinical trials: a patient-reported outcomes measurement information system initiative. *Journal of Clinical Oncology, 25*(32), 5106-5112. doi: 10.1200/JCO.2007.12.2341

Gift, A. G., Jablonski, A., Stommel, M., & Given, C. W. (2004). Symptom clusters in elderly patients with lung cancer. *Oncology Nursing Forum, 31*(2), 202-212. doi:10.1188/04.ONF.202-212

Hagenaars, J. A., & McCutcheon, A. L. (2002). *Applied latent class analysis*. New York, NY: Cambridge University Press.

Henoch, I., Ploner, A., & Tishelman, C. (2009). Increasing stringency in symptom cluster research: a methodological exploration of symptom clusters in patients with inoperable lung cancer. *Oncology Nursing Forum, 36*(6), E282-292. doi:10.1188/09.ONF.E283-E292

Im Yi, T., Kim, B. K., Ha, S. A., & Lim, J. Y. (2014). The relationships between determination of treatment success and emotional factors in patients with chronic musculoskeletal pain. *Annals of Rehabilitation Medicine, 38*(1), 77-83. doi:10.5535/arm.2014.38.1.77

Iyer, S., Roughley, A., Rider, A., & Taylor-Stokes, G. (2014). The symptom burden of non-small cell lung cancer in the USA: a real-world cross-sectional study. *Supportive Care in Cancer, 22*(1), 181-187. doi:10.1007/s00520-013-1959-4

Iyer, S., Taylor-Stokes, G., & Roughley, A. (2013). Symptom burden and quality of life in advanced non-small cell lung cancer patients in France and Germany. *Lung Cancer, 81*(2), 288-293. doi:10.1016/j.lungcan.2013.03.008

Jensen, R. E., Moinpour, C. M., Potosky, A. L., Lobo, T., Hahn, E. A., Hays, R. D., . . . Keegan, T. H. (2017). Responsiveness of 8 Patient-Reported Outcomes Measurement Information System (PROMIS) measures in a large, community-based cancer study cohort. *Cancer, 123*(2), 327-335. doi:10.1002/cncr.30354

Joosten, E. A., DeFuentes-Merillas, L., De Weert, G., Sensky, T., Van Der Staak, C., & de Jong, C. A. (2008). Systematic review of the effects of shared decision-making on patient satisfaction, treatment adherence and health status. *Psychotherapy and Psychosomatics, 77*(4), 219-226. doi:10.1159/000126073

Kline, R. B. (2010). *Principles and practice of structural equation modeling* (Vol. 3rd ed). New York: The Guilford Press.

Kroenke, K., Theobald, D., Norton, K., Sanders, R., Schlundt, S., McCalley, S., . . . Carpenter, J. S. (2009). The Indiana Cancer Pain and Depression (INCPAD) trial: design of a telecare management intervention for cancer-related symptoms and baseline characteristics of study participants. *General Hospital Psychiatry, 31*(3), 240-253. doi:10.1016/j.genhosppsych.2009.01.007

Kwekkeboom, K. L., Cherwin, C. H., Lee, J. W., & Wanta, B. (2010). Mind-body treatments for the pain-fatigue-sleep disturbance symptom cluster in persons with cancer. *Journal of Pain and Symptom Management, 39*(1), 126-138. doi:10.1016/j.jpainsymman.2009.05.022

LeBlanc, T. W., Nickolich, M., Rushing, C. N., Samsa, G. P., Locke, S. C., & Abernethy, A. P. (2015). What bothers lung cancer patients the most? A prospective, longitudinal electronic patient-reported outcomes study in advanced non-small cell lung cancer. *Supportive Care in Cancer, 23*(12), 3455-3463. doi:10.1007/s00520-015-2699-4

Lee, K., Oh, E. G., Kim, S., & Kim, S.-W. (2019). Symptom experiences and health-related quality of life among non-small cell lung cancer patients participating in clinical trials. *Journal of Clinical Nursing, 28*(11-12), 2111-2123. doi:10.1111/jocn.14803

Linden, W., Vodermaier, A., MacKenzie, R., & Greig, D. (2012). Anxiety and depression after cancer diagnosis: prevalence rates by cancer type, gender, and age. *Journal of Affective Disorders, 141*(2-3), 343-351. doi:10.1016/j.jad.2012.03.025

Little, R. J. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association, 83*(404), 1198-1202. doi:10.1080/01621459.1988.10478722

Lövgren, M., Tishelman, C., Sprangers, M., Koyi, H., & Hamberg, K. (2008). Symptoms and problems with functioning among women and men with inoperable lung cancer--a longitudinal study. *Lung Cancer, 60*(1), 113-124. doi:10.1016/j.lungcan.2007.09.015

McMillan, S. S., Kendall, E., Sav, A., King, M. A., Whitty, J. A., Kelly, F., & Wheeler, A. J. (2013). Patient-centered approaches to health care: a systematic review of randomized controlled trials. *Medical Care Research and Review, 70*(6), 567-596. doi:10.1177/1077558713496318

Miaskowski, C., Dunn, L., Ritchie, C., Paul, S. M., Cooper, B., Aouizerat, B. E., . . . Yates, P. (2015). Latent class analysis reveals distinct subgroups of patients based on symptom occurrence and demographic and clinical characteristics. *Journal of Pain and Symptom Management, 50*(1), 28-37. doi:10.1016/j.jpainsymman.2014.12.011

Muthén, L. K., & Muthén, B. O. (2012). MPlus: statistical analysis with latent variables--User's guide.

Nisenzon, A. N., Robinson, M. E., Bowers, D., Banou, E., Malaty, I., & Okun, M. S. (2011). Measurement of patient-centered outcomes in Parkinson's disease: what do patients really want from their treatment? *Parkinsonism & Related Disorders, 17*(2), 89-94. doi:10.1016/j.parkreldis.2010.09.005

Nylund, K. L., Asparouhov, T., & Muthén, B. O. (2007). Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Structural Equation Modeling: A Multidisciplinary Journal, 14*(4), 535-569. doi:10.1080/10705510701575396

O'Brien, E. M., Staud, R. M., Hassinger, A. D., McCulloch, R. C., Craggs, J. G., Atchison, J. W., . . . Robinson, M. E. (2010). Patient-centered perspective on treatment outcomes in chronic pain. *Pain Medicine, 11*(1), 6-15. doi:10.1111/j.1526-4637.2009.00685.x

Oken, M. M., Creech, R. H., Tormey, D. C., Horton, J., Davis, T. E., Mcfadden, E. T., & Carbone, P. P. (1982). Toxicity and response criteria of the Eastern Cooperative Oncology Group. *American Journal of Clinical Oncology, 5*(6), 649-656.

Perkins, A. J., Kroenke, K., Unützer, J., Katon, W., Williams, J. W., Hope, C., & Callahan, C. M. (2004). Common comorbidity scales were similar in their ability to predict health care costs and mortality. *Journal of Clinical Epidemiology, 57*(10), 1040-1048. doi:10.1016/j.jclinepi.2004.03.002

Pilkonis, P. A., Yu, L., Dodds, N. E., Johnston, K. L., Maihoefer, C. C., & Lawrence, S. M. (2014). Validation of the depression item bank from the Patient-Reported Outcomes Measurement Information System (PROMIS) in a three-month observational study. *Journal of Psychiatric Research, 56,* 112-119. doi:10.1016/j.jpsychires.2014.05.010

Rathert, C., Wyrwich, M. D., & Boren, S. A. (2013). Patient-centered care and outcomes: a systematic review of the literature. *Medical Care Research and Review, 70*(4), 351-379. doi:10.1177/1077558712465774

Reeve, B. B., Mitchell, S. A., Dueck, A. C., Basch, E., Cella, D., Reilly, C. M., . . . Fisch, M. J. (2014). Recommended patient-reported core set of symptoms to measure in adult cancer treatment trials. *Journal of the National Cancer Institute, 106*(7), 1-8. doi:10.1093/jnci/dju129

Robinson, J. H., Callister, L. C., Berry, J. A., & Dearing, K. A. (2008). Patient-centered care and adherence: Definitions and applications to improve outcomes. *Journal of the American Academy of Nurse Practitioners, 20*(12), 600-607. doi:10.1111/j.1745-7599.2008.00360.x

Robinson, M. E., Brown, J. L., George, S. Z., Edwards, P. S., Atchison, J. W., Hirsh, A. T., . . . Fillingim, R. B. (2005). Multidimensional success criteria and expectations for treatment of chronic pain: the patient perspective. *Pain Medicine, 6*(5), 336-345. doi:10.1111/j.1526-4637.2005.00059.x

Rodrigue, J. R., Hanto, D. W., & Curry, M. P. (2011). Patients' expectations and success criteria for liver transplantation. *Liver Transplantation, 17*(11), 1309-1317. doi:10.1002/lt.22355

Sanderson, K. B., Roditi, D., George, S. Z., Atchison, J. W., Banou, E., & Robinson, M. E. (2012). Investigating patient expectations and treatment outcome in a chronic low back pain population. *Journal of Pain Research, 5*, 15-22. doi:10.2147/JPR.S28636

Sarna, L., Evangelista, L., Tashkin, D., Padilla, G., Holmes, C., Brecht, M. L., & Grannis, F. (2004). Impact of respiratory symptoms and pulmonary function on quality of life of long-term survivors of non-small cell lung cancer. *Chest, 125*(2), 439-445. doi:10.1378/chest.125.2.439

Shi, Q., Smith, T. G., Michonski, J. D., Stein, K. D., Kaw, C., & Cleeland, C. S. (2011). Symptom burden in cancer survivors 1 year after diagnosis: A report from the American Cancer Society's Studies of Cancer Survivors. *Cancer, 117*(12), 2779-2790. doi:10.1002/cncr.26146

Shin, J. A., Kosiba, J. D., Traeger, L., Greer, J. A., Temel, J. S., & Pirl, W. F. (2014). Dyspnea and panic among patients with newly diagnosed non-small cell lung cancer. *Journal of Pain and Symptom Management, 48*(3), 465-470. doi:10.1016/j.jpainsymman.2013.10.021

Staff, N. P., Grisold, A., Grisold, W., & Windebank, A. J. (2017). Chemotherapy-induced peripheral neuropathy: A current review. *Annals of Neurology, 81*(6), 772-781. doi:10.1002/ana.24951

Sturdza, A., Millar, B.-A., Bana, N., Laperriere, N., Pond, G., Wong, R. K. S., & Bezjak, A. (2008). The use and toxicity of steroids in the management of patients with brain metastases. *Supportive Care in Cancer, 16*(9), 1041-1048. doi:10.1007/s00520-007-0395-8

Stutts, L. A., Robinson, M. E., McCulloch, R. C., Banou, E., Gremillion, H. A., Waxenberg, L. B., & Staud, R. (2009). Patient centered outcome criteria for successful treatment of facial pain and fibromyalgia. *Journal of Orofacial Pain, 23*(1), 47-53.

Tanaka, K., Akechi, T., Okuyama, T., Nishiwaki, Y., & Uchitomi, Y. (2002). Impact of dyspnea, pain, and fatigue on daily life activities in ambulatory patients with advanced lung cancer. *Journal of Pain and Symptom Management, 23*(5), 417-423. doi:10.1016/S0885-3924(02)00376-7

te Boveldt, N., Vernooij-Dassen, M., Leppink, I., Samwel, H., Vissers, K., & Engels, Y. (2014). Patient empowerment in cancer pain management: An integrative literature review. *Psycho-Oncology, 23*(11), 1203-1211. doi:10.1002/pon.3573

Teunissen, S. C. C. M., Wesker, W., Kruitwagen, C., de Haes, H. C. J. M., Voest, E. E., & de Graeff, A. (2007). Symptom prevalence in patients with incurable cancer: A systematic review. *Journal of Pain and Symptom Management, 34*(1), 94-104. doi:10.1016/j.jpainsymman.2006.10.015

Tometich, D. B., Mosher, C. E., Hirsh, A. T., Rand, K. L., Johns, S. A., Matthias, M. S., . . . Storniolo, A. M. V. (2018). Metastatic breast cancer patients' expectations and priorities for symptom improvement. *Supportive Care in Cancer, 26*(11), 3781-3788. doi:10.1007/s00520-018-4244-8

Tometich, D. B., Small, B. J., Carroll, J. E., Zhai, W., Luta, G., Zhou, X., . . . Clapp, J. D. (2019). Pretreatment psychoneurological symptoms and their association with longitudinal cognitive function and quality of life in older breast cancer survivors. *Journal of Pain and Symptom Management, 57*(3), 596-606. doi:10.1016/j.jpainsymman.2018.11.015

Vermunt, J. K. (2010). Latent class modeling with covariates: Two improved three-step approaches. *Political Analysis, 18*(4), 450-469. doi:10.1093/pan/mpq025

Wagner, L. I., Schink, J., Bass, M., Patel, S., Diaz, M. V., Rothrock, N., . . . Rosen, S. (2015). Bringing PROMIS to practice: Brief and precise symptom screening in ambulatory cancer care. *Cancer, 121*(6), 927-934. doi:10.1002/cncr.29104

Walling, A. M., Weeks, J. C., Kahn, K. L., Tisnado, D., Keating, N. L., Dy, S. M., . . . Malin, J. L. (2015). Symptom prevalence in lung and colorectal cancer patients. *Journal of Pain and Symptom Management, 49*(2), 192-202. doi:10.1016/j.jpainsymman.2014.06.003

Walsh, D., Donnelly, S., & Rybicki, L. (2000). The symptoms of advanced cancer: Relationship to age, gender, and performance status in 1,000 patients. *Supportive Care in Cancer, 8*(3), 175-179. doi:10.1007/s005200050281

Walsh, D., & Rybicki, L. (2006). Symptom clustering in advanced cancer. *Supportive Care in Cancer, 14*(8), 831-836. doi:10.1007/s00520-005-0899-z

Wong, M. L., Paul, S. M., Cooper, B. A., Dunn, L. B., Hammer, M. J., Conley, Y. P., . . . Miaskowski, C. (2017). Predictors of the multidimensional symptom experience of lung cancer patients receiving chemotherapy. *Supportive Care in Cancer, 25*(6), 1931-1939. doi:10.1007/s00520-017-3593-z

Yost, K. J., Eton, D. T., Garcia, S. F., & Cella, D. (2011). Minimally important differences were estimated for six Patient-Reported Outcomes Measurement Information System-Cancer scales in advanced-stage cancer patients. *Journal of Clinical Epidemiology, 64*(5), 507-516. doi:10.1016/j.jclinepi.2010.11.018

Yount, S., Beaumont, J., Rosenbloom, S., Cella, D., Patel, J., Hensing, T., . . . Abernethy, A. P. (2012). A brief symptom index for advanced lung cancer. *Clinical Lung Cancer, 13*(1), 14-23. doi:10.1016/j.cllc.2011.03.033

Yu, L., Buysse, D. J., Germain, A., Moul, D. E., Stover, A., Dodds, N. E., . . . Pilkonis, P. A. (2011). Development of short forms from the PROMIS sleep disturbance and Sleep-Related Impairment item banks. *Behavioral Sleep Medicine, 10*(1), 6-24. doi:10.1080/15402002.2012.636266

Zabora, J., BrintzenhofeSzoc, K., Curbow, B., Hooker, C., & Piantadosi, S. (2001). The prevalence of psychological distress by cancer site. *Psycho-Oncology, 10*(1), 19-28. doi:10.1002/1099-1611(200101/02)10:1<19::AID-PON501>3.0.CO;2-6

Zeppieri, G., Bialosky, J., & George, S. Z. (2020). Importance of outcome domain for patients with musculoskeletal pain: Characterizing subgroups and their response to treatment. *Physical Therapy*. doi:10.1093/ptj/pzaa009

Zeppieri, G., Lentz, T. A., Atchison, J. W., Indelicato, P. A., Moser, M. W., Vincent, K. R., & George, S. Z. (2012). Preliminary results of patient-defined success criteria for individuals with musculoskeletal pain in outpatient physical therapy settings. *Archives of Physical Medicine and Rehabilitation, 93*(3), 434-440. doi:10.1016/j.apmr.2011.10.007

TABLES

Table 1

Participant Demographic Characteristics (N = 102)

Characteristic	
Age	
Mean (SD)	64.96 (11.87)
Range	34 – 92
Gender, no. (%)	
Male	47 (46.08)
Female	55 (53.92)
Race, no. (%)	
White	84 (82.35)
African American/Black	13 (12.75)
Other[a]	5 (4.90)
Ethnicity, no. (%)	
Non-Hispanic	96 (98.97)
Hispanic	1 (0.98)
Married or Living with a Partner, no. (%)	68 (66.67)
Employed, no. (%)	27 (26.47)
Level of Education, no. (%)	
No college	34 (33.33)
Some college	32 (31.37)
Graduated college/graduate school	36 (35.29)
Household Income, no. (%)	
$0 - $30,999	21 (20.59)
$31,000 - $99,999	48 (47.06)
$100,000 or more	24 (23.53)

Note. [a]Multi-racial, Asian American, Native American, and other.

Table 2

Participant Medical Characteristics (N = 102)

Medical Characteristic	
Lung Cancer Stage, no. (%)	
NSCLC IIIB	16 (15.69)
NSCLC IIIC	1 (0.98)
NSCLC IV	78 (76.47)
SCLC Extensive	7 (6.86)
Years since Advanced or Extensive Stage Diagnosis	
Mean (SD)	2.60 (2.54)
Range	0.06 – 11.30
Cancer Treatment History,[a] no. (%)	
Surgery	31 (30.39)
Chemotherapy	62 (60.78)
Radiation	36 (35.29)
Chemoradiation	26 (25.49)
Targeted Therapy	39 (38.24)
Immunotherapy	56 (54.90)
Clinical Trial	14 (13.73)
Current Cancer Treatment,[b] no. (%)	
Chemotherapy	17 (16.67)
Radiation	1 (0.98)
Chemoradiation	3 (2.94)
Targeted Therapy	27 (26.47)
Immunotherapy	32 (31.37)
Clinical Trial	0 (0.00)
Symptom Treatment History,[c] no. (%)	
Breathlessness	28 (27.45)
Cough	21 (20.59)
Fatigue	22 (21.57)
Sleep Problems	24 (23.53)
Pain	36 (35.29)
Nausea	23 (22.55)
Lack of Appetite	9 (8.82)
Emotional Distress	17 (16.67)
Medical Comorbidities	
Mean (SD)	1.44 (1.04)
Range	0 – 4
Medical Comorbidities, no. (%)	
Asthma, emphysema, or chronic bronchitis	28 (27.45)
Hypertension	55 (53.92)
Diabetes	15 (14.71)
Arthritis	25 (24.51)
Angina, heart failure, or other types of heart disease	10 (9.80)
Strokes, seizures, Parkinson’s disease, or other neurological condition	5 (4.90)

Liver disease	3 (2.94)
Kidney or renal disease	6 (5.88)

Note. NSCLC = non-small cell lung cancer. SCLC = small cell lung cancer.
[a]Treatment >4 weeks before study completion.
[b]Treatment ≤4 weeks before study completion.
[c]Treatment in the past 3 months for a particular symptom.

Table 3

Descriptive Statistics and Normality Estimates for PCOQ Constructs

					Normality estimate	
Variable	*n*	Mean	SD	Range	Skewness	Kurtosis
Usual Severity						
Breathlessness	102	2.26	2.20	0 – 10	.93	.60
Cough	100	1.87	2.25	0 – 9	1.18	.48
Fatigue	101	4.39	2.72	0 – 10	.04	-.92
Sleep problems	102	3.09	2.78	0 – 9	.49	-.95
Pain	99	3.04	2.80	0 – 9	.32	-1.33
Nausea	100	1.00	1.96	0 – 8	2.12	3.74
Lack of appetite	102	1.79	2.74	0 – 10	1.44	1.04
Emotional distress	102	2.22	2.64	0 – 10	1.14	.57
Acceptable Severity						
Breathlessness	70	2.31	2.18	0 – 8	.82	-.24
Cough	58	2.09	1.92	0 – 8	1.09	.77
Fatigue	88	2.60	1.88	0 – 9	.59	.30
Sleep problems	73	2.70	2.31	0 – 10	1.33	1.76
Pain	66	2.71	2.13	0 – 10	1.02	1.11
Nausea	29	2.14	2.28	0 – 10	1.53	3.56
Lack of appetite	40	3.10	2.18	0 – 9	.61	.13
Emotional distress	58	2.41	1.70	0 – 8	.81	1.33
Importance						
Breathlessness	71	6.42	3.13	0 – 10	-.52	-.81
Cough	57	5.47	3.46	0 – 10	-.05	-1.51
Fatigue	90	6.54	2.94	0 – 10	-.70	-.48
Sleep problems	72	5.76	3.09	0 – 10	-.14	-1.09
Pain	66	6.85	2.93	0 – 10	-.64	-.53
Nausea	29	5.55	3.38	0 – 10	-.01	-1.18
Lack of appetite	39	5.18	3.03	0 – 10	-.04	-.89
Emotional distress	58	6.09	3.24	0 – 10	-.28	-1.27

Note. PCOQ = Patient Centered Outcomes Questionnaire.

Table 4

Descriptive Statistics and Normality Estimates for PROMIS and MSAS Symptom Severity

					Normality estimate		
Variable	*n*	Mean	SD	Range	Skewness	Kurtosis	Cronbach's α
Breathlessness[a]	100	1.32	1.19	0.00 – 4.00	0.12	-1.35	.82
Cough[a]	100	0.95	1.09	0.00 – 3.73	0.60	-1.02	.79
Fatigue[b]	102	11.74	4.33	4.00 – 20.00	0.22	-0.86	.96
Sleep problems[b]	102	10.49	3.92	4.00 – 20.00	0.32	-0.48	.86
Pain[b]	102	6.53	3.00	3.00 – 13.00	0.25	-1.11	.91
Nausea[a]	102	0.45	0.97	0.00 – 3.67	1.94	2.43	.81
Lack of appetite[a]	100	0.73	1.17	0.00 – 4.00	1.19	-0.13	.73
Anxiety[b]	101	7.57	3.37	4.00 – 17.00	0.80	-0.23	.88
Depression[b]	101	6.94	3.26	4.00 – 16.00	0.99	-0.03	.88

Note. [a]MSAS (Memorial Symptom Assessment Scale). [b]PROMIS (Patient Reported Outcomes Measurement Information System).

Table 5

Correlations Between PCOQ Symptom Severity and Standardized Assessments of the Same Symptoms (ns = 97 – 102)

	Breathlessness[a]	Cough[a]	Fatigue[b]	Sleep problems[b]	Pain[b]	Nausea[a]	Lack of appetite[a]	Anxiety[b]	Depression[b]
1. PCOQ Breathlessness	0.72*	0.24	0.45*	0.17	0.36*	0.16	0.21	0.31*	0.27*
2. PCOQ Cough	0.39*	0.87*	0.34*	0.27*	0.19	0.22	0.34*	0.26*	0.20
3. PCOQ Fatigue	0.50*	0.25	0.81*	0.37*	0.48*	0.36*	0.35*	0.46*	0.50*
4. PCOQ Sleep problems	0.25	0.18	0.43*	0.76*	0.33*	0.01	0.26*	0.33*	0.30*
5. PCOQ Pain	0.39*	0.07	0.52*	0.33*	0.84*	0.14	0.15	0.29*	0.24
6. PCOQ Nausea	0.17	0.13	0.34*	0.03	0.25	0.91*	0.46*	0.30*	0.30*
7. PCOQ Lack of appetite	0.29*	0.27*	0.44*	0.31*	0.29*	0.47*	0.80*	0.28*	0.34*
8. PCOQ Emotional distress	0.21	0.07	0.41*	0.20	0.24	0.13	0.11	0.69*	0.69*

Note. Pairwise correlations. PCOQ = Patient Centered Outcomes Questionnaire.
[a]MSAS (Memorial Symptom Assessment Scale). [b]PROMIS (Patient Reported Outcomes Measurement Information System).
*Correlation is significant at the 0.01 level (two-tailed).

Table 6

Correlations Between Usual Symptom Severity on the PCOQ and Functional Status, Medical Comorbidities, and Quality of Life (ns = 97 – 102)

	Medical Comorbidities	Functional Status	Quality of Life
1. Breathlessness	.31*	.54*	-.34*
2. Cough	.16	.36*	-.25
3. Fatigue	.29*	.62*	-.44*
4. Sleep problems	.29*	.40*	-.31*
5. Pain	.15	.45*	-.39*
6. Nausea	.07	.50*	-.26
7. Lack of appetite	.29*	.56*	-.38*
8. Emotional distress	.20	.41*	-.48*

Note. Pairwise correlations. PCOQ = Patient Centered Outcomes Questionnaire.
*Correlation is significant at the 0.01 level (two-tailed).

Table 7

Correlations Between PCOQ Usual Symptom Severity and Symptom Importance Ratings (ns = 29 – 90)

	Breathless-ness importance	Cough importance	Fatigue importance	Sleep problems importance	Pain importance	Nausea importance	Lack of appetite importance	Emotional distress importance
1. Breathlessness severity	.30	.22	.28*	.28	.24	.29	.01	.09
2. Cough severity	.15	.58*	.12	.13	-.04	.10	.08	-.01
3. Fatigue severity	.11	.11	.46*	.28	.27	.46	.18	.13
4. Sleep problems severity	.00	.24	.20	.57*	.39*	.16	.02	.17
5. Pain severity	.17	.07	.21	.18	.49*	.36	.05	.24
6. Nausea severity	-.08	.14	.10	-.02	.11	.39	.23	.19
7. Lack of appetite severity	-.23	.16	.06	.07	.18	.50*	.26	.01
8. Emotional distress severity	.01	-.10	.20	.06	.17	.12	.22	.30

Note. Pairwise correlations. PCOQ = Patient Centered Outcomes Questionnaire.
*Correlation is significant at the 0.01 level (two-tailed).

Table 8

Results of Linear Mixed Models Comparing Acceptable Levels of Symptom Severity (n = 97)

	Estimated Marginal Mean	Mean Difference in Acceptable Severity	SE	df	*p*-value
Symptoms					
Breathlessness	2.28		.24	299.45	
Cough	2.01		.25	343.30	
Fatigue	2.62		.22	248.75	
Sleep problems	2.48		.23	290.02	
Pain	2.52		.24	313.06	
Nausea	1.73		.33	464.23	
Lack of appetite	2.71		.29	421.00	
Emotional distress	2.37		.25	343.28	
Breathlessness					
Cough		.27	.27	391.43	1.00
Fatigue		-.35	.24	392.69	1.00
Sleep problems		-.21	.26	396.60	1.00
Pain		-.24	.26	392.51	1.00
Nausea		.55	.34	395.64	1.00
Lack of appetite		-.43	.31	395.40	1.00
Emotional distress		-.09	.27	392.72	1.00
Cough					
Breathlessness		-.27	.27	391.43	1.00
Fatigue		-.61	.26	395.04	.54
Sleep problems		-.47	.27	400.31	1.00
Pain		-.51	.28	394.43	1.00
Nausea		.29	.35	397.16	1.00
Lack of appetite		-.70	.32	396.48	.82
Emotional distress		-.35	.29	396.24	1.00
Fatigue					
Breathlessness		.35	.24	392.69	1.00
Cough		.61	.26	395.04	.54
Sleep problems		.14	.24	395.40	1.00
Pain		.10	.25	396.04	1.00
Nausea		.90	.33	398.34	.21
Lack of appetite		-.09	.30	398.02	1.00
Emotional distress		.26	.26	395.90	1.00

Sleep problems				
Breathlessness	.21	.26	396.60	1.00
Cough	.47	.27	400.31	1.00
Fatigue	-.14	.24	395.40	1.00
Pain	-.04	.26	392.24	1.00
Nausea	.76	.34	400.46	.80
Lack of appetite	-.23	.31	399.00	1.00
Emotional distress	.12	.27	395.99	1.00
Pain				
Breathlessness	.24	.26	392.51	1.00
Cough	.51	.28	394.43	1.00
Fatigue	-.10	.25	396.04	1.00
Sleep problems	.04	.26	392.24	1.00
Nausea	.79	.35	397.53	.64
Lack of appetite	-.19	.31	398.19	1.00
Emotional distress	.15	.28	396.17	1.00
Nausea				
Breathlessness	-.55	.34	395.64	1.00
Cough	-.29	.35	397.16	1.00
Fatigue	-.90	.33	398.34	.21
Sleep problems	-.76	.34	400.46	.80
Pain	-.79	.35	397.53	.64
Lack of appetite	-.98	.37	388.79	.24
Emotional distress	-.64	.35	396.75	1.00
Lack of appetite				
Breathlessness	.43	.31	395.40	1.00
Cough	.70	.32	396.48	.82
Fatigue	.09	.30	398.02	1.00
Sleep problems	.23	.31	399.00	1.00
Pain	.19	.31	398.19	1.00
Nausea	.98	.37	388.79	.24
Emotional distress	.34	.32	393.21	1.00
Emotional distress				
Breathlessness	.09	.27	392.72	1.00
Cough	.35	.29	396.24	1.00
Fatigue	-.26	.26	395.90	1.00
Sleep problems	-.12	.27	395.99	1.00
Pain	-.15	.28	396.17	1.00
Nausea	.64	.35	396.75	1.00
Lack of appetite	-.34	.32	393.21	1.00

Table 9

Measures of Model Fit for Latent Profile Analysis

Classes	LL	BIC	AIC	CAIC	ssBIC	E	BLRT
1	-1280.99	2607.72	2581.97	2617.72	2576.14	N/A	N/A
2	-1133.18	2380.72	2316.36	2405.72	2301.78	0.88	$p < .01$
3	-1106.20	2367.93	2280.39	2401.93	2260.57	0.80	$p < .01$
4	-1080.99	2358.69	2247.97	2401.68	2222.91	0.83	$p < .01$
5	-1063.77	2365.43	2231.55	2417.43	2201.23	0.85	$p = .03$
6	-1044.72	2368.50	2211.44	2429.50	2175.89	0.88	$p = .01$

Note. LL = Log Likelihood. BIC = Bayesian Information Criterion. AIC = Akaike Information Criterion. CAIC = Consistent Akaike Information Criterion. ssBIC = Sample Sized Adjusted Bayesian Information Criterion. E = Entropy. BLRT = Bootstrap Likelihood Ratio Test.

Table 10

Descriptive Statistics for Classes Based on Symptom Importance

	Class 1		Class 2		Class 3		Class 4	
	Estimated Marginal Means (SE)	Range	Estimated Marginal Means (SE)	Range	Estimated Marginal Means (SE)	Range	Estimated Marginal Means (SE)	Range
Symptom Importance								
Breathlessness	2.70 (0.72)	0-5	3.94 (0.50)	0-7	6.74 (0.51)	2-10	9.27 (0.39)	5-10
Cough	1.39 (0.57)	0-4	2.30 (0.35)	0-5	6.92 (0.48)	3-10	9.23 (0.37)	8-10
Fatigue	1.73 (0.69)	0-5	6.73 (0.45)	1-10	6.60 (0.50)	4-9	8.31 (0.41)	1-10
Sleep problems	2.49 (0.77)	0-5	3.78 (0.50)	0-9	6.14 (0.56)	3-10	8.39 (0.49)	3-10
Pain	1.92 (0.74)	0-6	6.34 (0.46)	3-10	5.54 (0.49)	1-9	9.52 (0.37)	8-10
Nausea	1.51 (0.89)	0-4	4.48 (0.58)	1-8	3.76 (0.67)	0-5	9.25 (0.59)	5-10
Lack of appetite	0.97 (1.35)	0-1	4.44 (0.66)	0-7	4.54 (0.67)	1-9	7.91 (0.69)	0-10
Emotional distress	1.29 (0.69)	0-2	5.90 (0.43)	3-9	3.16 (0.41)	0-6	9.47 (0.31)	8-10
	Means (SD)	Range	Means (SD)	Range	Means (SD)	Range	Means (SD)	Range
Differing Variable								
Functional status	0.58 (0.67)	0-2	1.17 (0.76)	0-3	1.48 (0.90)	0-3	1.25 (0.92)	0-3

Note. Class 1 = Low Importance, n = 12. Class 2 = Moderate Importance except for low bronchial symptoms and sleep importance, n = 29. Class 3 = Moderate Importance except for low nausea and emotional distress importance, n = 23. Class 4 = High Importance, n = 33.

Table 11

Multinomial Logistic Regression Results using Class 4 as a Reference

	Class 1 v 4		Class 2 v 4		Class 3 v 4	
	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)
Age	.00 (.03)	1.00 (.95, 1.07)	.00 (.03)	1.00 (.96, 1.05)	.00 (.03)	1.00 (.95, 1.06)
Gender (Male)	-.77 (.74)	.46 (.11, 1.96)	-.65 (.61)	.52 (.16, 1.72)	-1.12 (.68)	.33 (.09, 1.23)
Married/Living with Partner	.53 (.75)	1.71 (.40, 7.35)	1.12 (.67)	3.05 (.82, 11.36)	.47 (.67)	1.61 (.44, 5.91)
Employed	-.30 (.81)	.74 (.15, 3.63)	-.31 (.65)	.74 (.20, 2.65)	-.88 (.84)	.42 (.08, 2.16)
Education[a]						
Some College	.61 (.99)	1.84 (.27, 12.71)	1.29 (.77)	3.64 (.81, 16.44)	1.34 (.86)	3.82 (.72, 20.42)
Graduated College	1.48 (.88)	4.40 (.78, 24.77)	1.51 (.78)	4.51 (.98, 20.75)	1.46 (.87)	4.30 (.78, 23.81)
Income[b]						
$31,000 - $99,000	1.94 (1.28)	6.99 (.57, 85.17)	.38 (.82)	1.47 (.30, 7.26)	1.78 (.96)	5.92 (.90, 39.03)
$100,000 or more	2.17 (1.36)	8.77 (.61, 126.17)	.12 (1.11)	1.13 (.13, 9.99)	1.87 (1.06)	6.50 (.81, 52.24)
Time Since Diagnosis	.19 (.15)	1.20 (.89, 1.62)	.16 (.14)	1.17 (.90, 1.52)	.20 (.14)	1.22 (.92, 1.61)
Functional Status	-1.25 (.58)	.29 (.09, .89)	-.12 (.36)	.89 (.44, 1.81)	.41 (.40)	1.51 (.69, 3.28)
Number of Medical Comorbidities	-.27 (.35)	.76 (.38, 1.52)	-.22 (.28)	.80 (.46, 1.39)	-.22 (.32)	.80 (.43, 1.49)
Quality of Life	.29 (.21)	1.33 (.88, 2.02)	-.06 (.14)	.94 (.72, 1.24)	-.13 (.15)	.88 (.65, 1.19)

Cancer Treatment History[c]						
Surgery	-.42 (.81)	.66 (.14, 3.20)	-.77 (.71)	.46 (.12, 1.86)	-.12 (.69)	.89 (.23, 3.43)
Chemotherapy	-.82 (.74)	.44 (.10, 1.86)	.48 (.64)	1.62 (.47, 5.65)	.01 (.66)	1.01 (.28, 3.68)
Radiation	-1.34 (.93)	.26 (.04, 1.60)	-1.04 (.70)	.35 (.09, 1.40)	.55 (.66)	1.74 (.48, 6.31)
Chemoradiation	-.28 (.81)	.76 (.16, 3.72)	-.59 (.70)	.55 (.14, 2.19)	-.22 (.72)	.81 (.20, 3.29)
Targeted Therapy	1.45 (.79)	4.25 (.91, 19.96)	1.38 (.68)	3.98 (1.06, 14.98)	1.42 (.73)	4.12 (.98, 17.36)
Immunotherapy	-.31 (.72)	.74 (.18, 3.02)	-.45 (.59)	.64 (.20, 2.04)	.20 (.67)	1.22 (.33, 4.52)
Clinical Trial	.11 (.97)	1.12 (.17, 7.44)	-.12 (.84)	.88 (.17, 4.55)	-.21 (.95)	.81 (.13, 5.19)
Current Cancer Treatment[d]						
Chemotherapy	.95 (.92)	2.57 (.43, 15.46)	.43 (.85)	1.54 (.29, 8.15)	.47 (.92)	1.60 (.27, 9.69)
Targeted Therapy	1.06 (.99)	2.87 (.42, 19.92)	1.54 (.84)	4.67 (.90, 24.09)	1.84 (.88)	6.30 (1.12, 35.56)
Immunotherapy	-1.13 (.94)	.32 (.05, 2.04)	-.23 (.62)	.80 (.24, 2.68)	-.29 (.69)	.75 (.19, 2.90)
Usual Severity						
Breathlessness	-.27 (.18)	.76 (.54, 1.08)	-.33 (.15)	.72 (.54, .97)	-.25 (.16)	.78 (.58, 1.06)
Cough	-.22 (.19)	.80 (.55, 1.16)	-.28 (.16)	.76 (.55, 1.03)	.10 (.13)	1.11 (.85, 1.44)
Fatigue	-.41 (.17)	.67 (.48, .94)	-.10 (.12)	.90 (.72, 1.14)	-.11 (.13)	.89 (.69, 1.16)
Sleep Problems	-.33 (.16)	.72 (.53, .98)	-.20 (.11)	.82 (.66, 1.02)	-.12 (.12)	.89 (.71, 1.12)
Pain	-.41 (.19)	.66 (.45, .97)	-.13 (.11)	.88 (.71, 1.09)	-.11 (.12)	.89 (.71, 1.13)
Nausea	-.27 (.26)	.77 (.46, 1.26)	.02 (.13)	1.02 (.80, 1.32)	-.19 (.21)	.83 (.54, 1.26)
Lack of Appetite	-.24 (.22)	.79 (.51, 1.22)	.07 (.11)	1.07 (.87, 1.32)	.07 (.12)	1.07 (.85, 1.35)
Emotional Distress	-.55 (.30)	.58 (.32, 1.03)	.05 (.10)	1.05 (.86, 1.29)	-.19 (.14)	.83 (.63, 1.09)
Symptom Treatment History[e]						
Breathlessness	-1.25 (.91)	.29 (.05, 1.73)	-1.00 (.68)	.37 (.10, 1.40)	-.66 (.71)	.52 (.13, 2.06)

Fatigue	-.81 (1.46)	.45 (.03, 7.77)	1.27 (.73)	3.57 (.85, 14.98)	.78 (.83)	2.19 (.43, 11.14)
Sleep Problems	-.53 (.96)	.59 (.09, 3.90)	.43 (.65)	1.54 (.43, 5.47)	-.19 (.79)	.83 (.18, 3.88)
Pain	.23 (.73)	1.26 (.30, 5.29)	.08 (.61)	1.08 (.33, 3.55)	-.10 (.68)	.91 (.24, 3.45)
Lack of Appetite	-.47 (1.25)	.62 (.05, 7.25)	-.13 (.89)	.88 (.15, 4.99)	-1.46 (1.76)	.23 (.01, 7.26)

Note. The following variables were removed from analyses due to insufficient variance: current cancer treatment of radiation, chemoradiation, and clinical trial; symptom treatment history of cough, nausea, and emotional distress; and race/ethnicity. OR = Odds Ratio. CI = Confidence Interval. PCOQ = Patient Centered Outcomes Questionnaire. Class 1 = Low Importance, n = 12. Class 2 = Moderate Importance except for low bronchial symptoms and sleep importance, n = 29. Class 3 = Moderate Importance except for low nausea and emotional distress importance, n = 23. Class 4 = High Importance, n = 33.

[a]No college education used as the reference group.

[b]Household income less than $31,000 used as the reference group.

[c]Treatment >4 weeks before study completion.

[d]Treatment $\leq$4 weeks before study completion.

[e]Treatment in the past 3 months for a particular symptom.

*p<.01.

Table 12

Multinomial Logistic Regression Results using Class 4 as a Reference

	Class 1 v 4		Class 2 v 4		Class 3 v 4	
	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)
Age	.00 (.03)	1.00 (.95, 1.07)	.00 (.03)	1.00 (.96, 1.05)	.00 (.03)	1.00 (.95, 1.06)
Gender (Male)	-.77 (.74)	.46 (.11, 1.96)	-.65 (.61)	.52 (.16, 1.72)	-1.12 (.68)	.33 (.09, 1.23)
Married/Living with Partner	.53 (.75)	1.71 (.40, 7.35)	1.12 (.67)	3.05 (.82, 11.36)	.47 (.67)	1.61 (.44, 5.91)
Employed	-.30 (.81)	.74 (.15, 3.63)	-.31 (.65)	.74 (.20, 2.65)	-.88 (.84)	.42 (.08, 2.16)
Education[a]						
Some College	.61 (.99)	1.84 (.27, 12.71)	1.29 (.77)	3.64 (.81, 16.44)	1.34 (.86)	3.82 (.72, 20.42)
Graduated College	1.48 (.88)	4.40 (.78, 24.77)	1.51 (.78)	4.51 (.98, 20.75)	1.46 (.87)	4.30 (.78, 23.81)
Income[b]						
$31,000 - $99,000	1.94 (1.28)	6.99 (.57, 85.17)	.38 (.82)	1.47 (.30, 7.26)	1.78 (.96)	5.92 (.90, 39.03)
$100,000 or more	2.17 (1.36)	8.77 (.61, 126.17)	.12 (1.11)	1.13 (.13, 9.99)	1.87 (1.06)	6.50 (.81, 52.24)
Time Since Diagnosis	.19 (.15)	1.20 (.89, 1.62)	.16 (.14)	1.17 (.90, 1.52)	.20 (.14)	1.22 (.92, 1.61)
Functional Status	-1.25 (.58)	.29 (.09, .89)	-.12 (.36)	.89 (.44, 1.81)	.41 (.40)	1.51 (.69, 3.28)
Number of Medical Comorbidities	-.27 (.35)	.76 (.38, 1.52)	-.22 (.28)	.80 (.46, 1.39)	-.22 (.32)	.80 (.43, 1.49)
Quality of Life	.29 (.21)	1.33 (.88, 2.02)	-.06 (.14)	.94 (.72, 1.24)	-.13 (.15)	.88 (.65, 1.19)

Cancer Treatment History[c]						
Surgery	-.42 (.81)	.66 (.14, 3.20)	-.77 (.71)	.46 (.12, 1.86)	-.12 (.69)	.89 (.23, 3.43)
Chemotherapy	-.82 (.74)	.44 (.10, 1.86)	.48 (.64)	1.62 (.47, 5.65)	.01 (.66)	1.01 (.28, 3.68)
Radiation	-1.34 (.93)	.26 (.04, 1.60)	-1.04 (.70)	.35 (.09, 1.40)	.55 (.66)	1.74 (.48, 6.31)
Chemoradiation	-.28 (.81)	.76 (.16, 3.72)	-.59 (.70)	.55 (.14, 2.19)	-.22 (.72)	.81 (.20, 3.29)
Targeted Therapy	1.45 (.79)	4.25 (.91, 19.96)	1.38 (.68)	3.98 (1.06, 14.98)	1.42 (.73)	4.12 (.98, 17.36)
Immunotherapy	-.31 (.72)	.74 (.18, 3.02)	-.45 (.59)	.64 (.20, 2.04)	.20 (.67)	1.22 (.33, 4.52)
Clinical Trial	.11 (.97)	1.12 (.17, 7.44)	-.12 (.84)	.88 (.17, 4.55)	-.21 (.95)	.81 (.13, 5.19)
Current Cancer Treatment[d]						
Chemotherapy	.95 (.92)	2.57 (.43, 15.46)	.43 (.85)	1.54 (.29, 8.15)	.47 (.92)	1.60 (.27, 9.69)
Targeted Therapy	1.06 (.99)	2.87 (.42, 19.92)	1.54 (.84)	4.67 (.90, 24.09)	1.84 (.88)	6.30 (1.12, 35.56)
Immunotherapy	-1.13 (.94)	.32 (.05, 2.04)	-.23 (.62)	.80 (.24, 2.68)	-.29 (.69)	.75 (.19, 2.90)
Usual Severity						
Breathlessness	-.27 (.18)	.76 (.54, 1.08)	-.33 (.15)	.72 (.54, .97)	-.25 (.16)	.78 (.58, 1.06)
Cough	-.22 (.19)	.80 (.55, 1.16)	-.28 (.16)	.76 (.55, 1.03)	.10 (.13)	1.11 (.85, 1.44)
Fatigue	-.41 (.17)	.67 (.48, .94)	-.10 (.12)	.90 (.72, 1.14)	-.11 (.13)	.89 (.69, 1.16)
Sleep Problems	-.33 (.16)	.72 (.53, .98)	-.20 (.11)	.82 (.66, 1.02)	-.12 (.12)	.89 (.71, 1.12)
Pain	-.41 (.19)	.66 (.45, .97)	-.13 (.11)	.88 (.71, 1.09)	-.11 (.12)	.89 (.71, 1.13)
Nausea	-.27 (.26)	.77 (.46, 1.26)	.02 (.13)	1.02 (.80, 1.32)	-.19 (.21)	.83 (.54, 1.26)
Lack of Appetite	-.24 (.22)	.79 (.51, 1.22)	.07 (.11)	1.07 (.87, 1.32)	.07 (.12)	1.07 (.85, 1.35)
Emotional Distress	-.55 (.30)	.58 (.32, 1.03)	.05 (.10)	1.05 (.86, 1.29)	-.19 (.14)	.83 (.63, 1.09)
Symptom Treatment History[e]						
Breathlessness	-1.25 (.91)	.29 (.05, 1.73)	-1.00 (.68)	.37 (.10, 1.40)	-.66 (.71)	.52 (.13, 2.06)

Fatigue	-.81 (1.46)	.45 (.03, 7.77)	1.27 (.73)	3.57 (.85, 14.98)	.78 (.83)	2.19 (.43, 11.14)
Sleep Problems	-.53 (.96)	.59 (.09, 3.90)	.43 (.65)	1.54 (.43, 5.47)	-.19 (.79)	.83 (.18, 3.88)
Pain	.23 (.73)	1.26 (.30, 5.29)	.08 (.61)	1.08 (.33, 3.55)	-.10 (.68)	.91 (.24, 3.45)
Lack of Appetite	-.47 (1.25)	.62 (.05, 7.25)	-.13 (.89)	.88 (.15, 4.99)	-1.46 (1.76)	.23 (.01, 7.26)

Note. The following variables were removed from analyses due to insufficient variance: current cancer treatment of radiation, chemoradiation, and clinical trial; symptom treatment history of cough, nausea, and emotional distress; and race/ethnicity. OR = Odds Ratio. CI = Confidence Interval. PCOQ = Patient Centered Outcomes Questionnaire. Class 1 = Low Importance, n = 12. Class 2 = Moderate Importance except for low bronchial symptoms and sleep importance, n = 29. Class 3 = Moderate Importance except for low nausea and emotional distress importance, n = 23. Class 4 = High Importance, n = 33.

[a]No college education used as the reference group.

[b]Household income less than $31,000 used as the reference group.

[c]Treatment >4 weeks before study completion.

[d]Treatment ≤4 weeks before study completion.

[e]Treatment in the past 3 months for a particular symptom.

*p<.01.

Table 13 *Multinomial Logistic Regression Results using Classes 1 and 2 as Alternative References*

	Class 2 v 1		Class 3 v 1		Class 3 v 2	
	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)	B (SE)	OR (95% CI)
Age	.00 (.03)	1.00 (.94, 1.07)	-.00 (.03)	1.00 (.93, 1.07)	-.00 (.03)	1.00 (.94, 1.06)
Gender (Male)	.12 (.79)	1.12 (.24, 5.23)	-.35 (.80)	.70 (.15, 3.39)	-.47 (.73)	.63 (.15, 2.63)
Married/Living with Partner	.58 (.88)	1.79 (.32, 10.06)	-.06 (.83)	.94 (.18, 4.83)	-.64 (.82)	.53 (.11, 2.63)
Employed	-.01 (.90)	.99 (.17, 5.82)	-.58 (1.01)	.56 (.08, 4.06)	-.57 (.94)	.57 (.09, 3.55)
Education[a]						
Some College	.68 (1.11)	1.98 (.23, 17.40)	.73 (1.12)	2.08 (.23, 18.81)	.05 (1.00)	1.05 (.15, 7.46)
Graduated College	.02 (1.00)	1.03 (.15, 7.22)	-.02 (1.03)	.98 (.13, 7.30)	-.05 (1.00)	.95 (.14, 6.75)
Income[b]						
$31,000 - $99,999	-.11 (1.50)	.90 (.05, 16.88)	-.17 (1.46)	.26 (.02, 3.55)	-1.23 (1.18)	.29 (.03, 2.92)
$100,000 or more	-.23 (1.57)	.79 (.04, 17.03)	-.30 (1.53)	.17 (.01, 3.08)	-1.52 (1.33)	.22 (.02, 2.98)
Time Since Diagnosis	-.03 (.14)	.97 (.73, 1.29)	.01 (.14)	1.01 (.77, 1.33)	.04 (.13)	1.04 (.81, 1.34)
Functional Status	1.13 (.60)	3.11 (.96, 10.05)	1.66 (.63)*	5.25 (1.52, 18.07)	.52 (.43)	1.69 (.73, 3.93)
Number of Medical Comorbidities	.05 (.39)	1.05 (.49, 2.23)	.05 (.39)	1.05 (.49, 2.26)	.00 (.36)	1.00 (.50, 2.01)
Quality of Life	-.35 (.22)	.71 (.46, 1.09)	-.42 (.23)	.66 (.42, 1.03)	-.07 (.16)	.93 (.68, 1.28)

Cancer Treatment History[c]						
Surgery	-.35 (.95)	.70 (.11, 4.51)	.30 (.89)	1.35 (.24, 7.70)	.65 (.86)	1.92 (.36, 10.30)
Chemotherapy	1.31 (.84)	3.69 (.72, 18.99)	.83 (.82)	2.30 (.47, 11.35)	-.48 (.77)	.62 (.14, 2.83)
Radiation	.30 (1.07)	1.35 (.17, 10.91)	1.90 (.99)	6.67 (.96, 46.45)	1.60 (.84)	4.93 (.96, 25.41)
Chemoradiation	-.32 (.94)	.73 (.12, 4.59)	.06 (.91)	1.06 (.18, 6.28)	.38 (.87)	1.46 (.27, 7.96)
Targeted Therapy	-.07 (.79)	.94 (.20, 4.36)	-.03 (.80)	.97 (.20, 4.60)	.03 (.72)	1.04 (.25, 4.26)
Immunotherapy	-.14 (.79)	.87 (.19, 4.05)	.51 (.81)	1.66 (.34, 8.11)	.65 (.74)	1.92 (.45, 8.16)
Clinical Trial	-.24 (1.08)	.79 (.10, 6.54)	-.32 (1.12)	.72 (.08, 6.47)	-.09 (1.07)	.92 (.11, 7.48)
Current Cancer Treatment[d]						
Chemotherapy	-.52 (.96)	.60 (.09, 3.88)	-.47 (.96)	.62 (.09, 4.12)	.04 (.96)	1.04 (.16, 6.79)
Targeted Therapy	.48 (.89)	1.62 (.28, 9.27)	.79 (.88)	2.19 (.39, 12.36)	.30 (.74)	1.35 (.32, 5.79)
Immunotherapy	.90 (1.01)	2.47 (.34, 18.01)	.84 (1.02)	2.32 (.31, 17.18)	-.06 (.78)	.94 (.20, 4.33)
Usual Severity on PCOQ						
Breathlessness	-.06 (.20)	.94 (.64, 1.40)	.02 (.20)	1.02 (.69, 1.51)	.08 (.18)	1.08 (.76, 1.54)
Cough	-.06 (.22)	.94 (.62, 1.45)	.33 (.20)	1.39 (.94, 2.05)	.38 (.17)	1.47 (1.04, 2.07)
Fatigue	.30 (.18)	1.35 (.95, 1.93)	.29 (.18)	1.34 (.94, 1.92)	-.01 (.15)	.99 (.75, 1.32)
Sleep Problems	.13 (.17)	1.14 (.82, 1.58)	.22 (.17)	1.24 (.89, 1.72)	.09 (.13)	1.09 (.84, 1.41)
Pain	.28 (.20)	1.33 (.89, 1.98)	.30 (.20)	1.35 (.91, 2.00)	.02 (.13)	1.02 (.79, 1.32)
Nausea	.29 (.26)	1.34 (.80, 2.24)	.08 (.30)	1.08 (.60, 1.96)	-.21 (.22)	.81 (.52, 1.25)
Lack of Appetite	.30 (.23)	1.35 (.87, 2.11)	.31 (.23)	1.36 (.87, 2.11)	.00 (.12)	1.00 (.80, 1.26)
Emotional Distress	.61 (.31)	1.83 (1.01, 3.33)	.37 (.31)	1.44 (.79, 2.62)	-.24 (.15)	.79 (.59, 1.05)
Symptom Treatment History[e]						
Breathlessness	.24 (1.04)	1.28 (.17, 9.81)	.58 (1.01)	1.79 (.25, 13.07)	.34 (.87)	1.41 (.26, 7.68)
Fatigue	2.08 (1.46)	8.01 (.46, 139.90)	1.59 (1.47)	4.92 (.28, 87.32)	-.49 (.78)	.61 (.13, 2.84)

Sleep Problems	.96 (1.01)	2.60 (.36, 18.78)	.34 (1.07)	1.40 (.17, 11.32)	-.62 (.84)	.54 (.10, 2.77)
Pain	-.15 (.80)	.86 (.18, 4.11)	-.33 (.82)	.72 (.15, 3.60)	-.17 (.75)	.84 (.19, 3.68)
Lack of Appetite	.34 (1.36)	1.41 (.10, 20.04)	-.99 (1.99)	.37 (.01, 18.47)	-1.33 (1.86)	.27 (.01, 10.11)

Note. The following variables were removed from analyses due to insufficient variance: current cancer treatment of radiation, chemoradiation, and clinical trial; symptom treatment history of cough, nausea, and emotional distress; and race/ethnicity. OR = Odds Ratio. CI = Confidence Interval. PCOQ = Patient Centered Outcomes Questionnaire. Class 1 = Low Importance, n = 12. Class 2 = Moderate Importance except for low bronchial symptoms and sleep importance, n = 29. Class 3 = Moderate Importance except for low nausea and emotional distress importance, n = 23. Class 4 = High Importance, n = 33.

[a]No college education used as the reference group.

[b]Household income less than $31,000 used as the reference group.

[c]Treatment >4 weeks before study completion.

[d]Treatment $\leq$4 weeks before study completion.

[e]Treatment in the past 3 months for a particular symptom.

*p<.01.

FIGURES

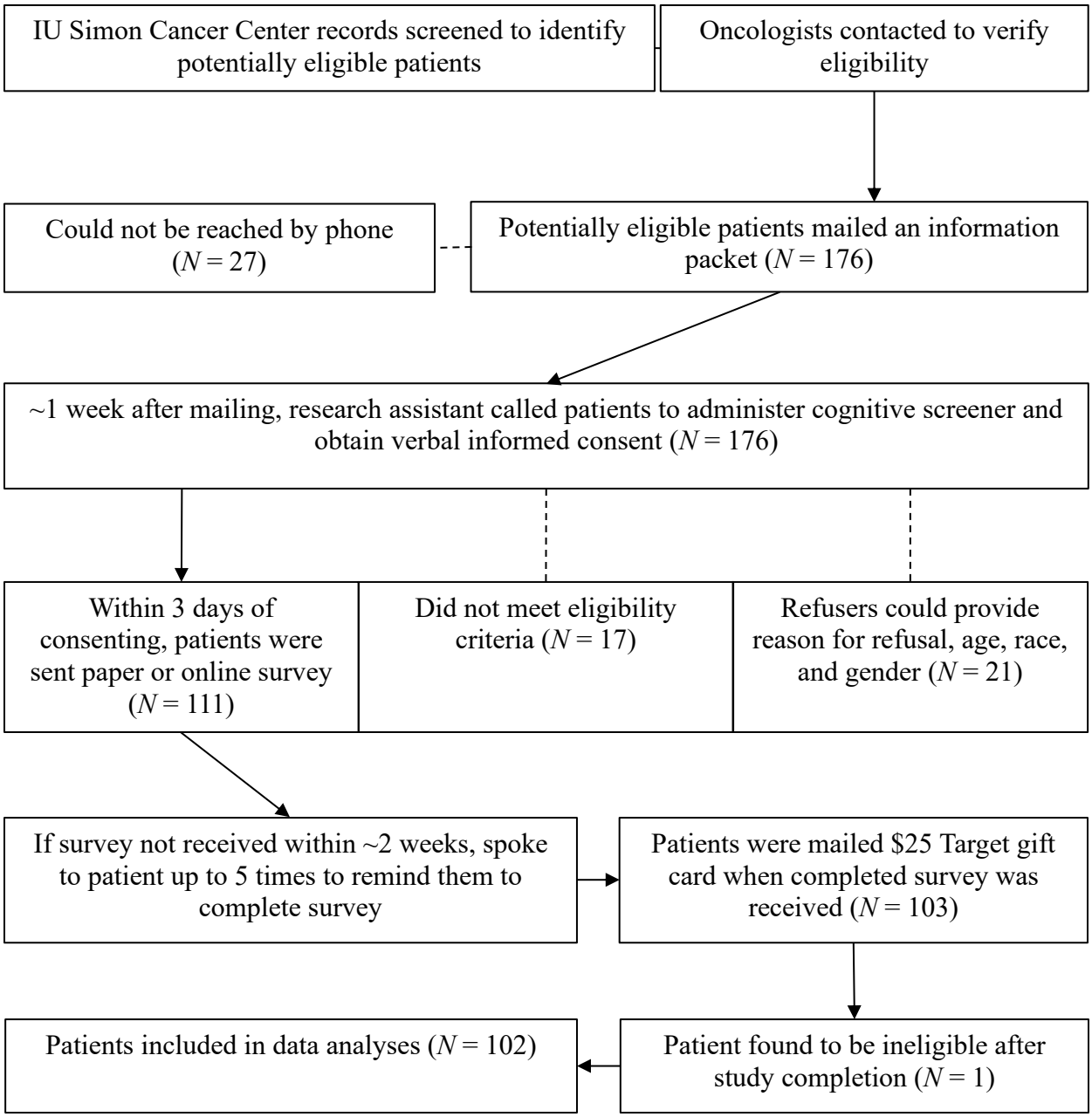

Figure 1. Study procedures flow chart.
IU = Indiana University.

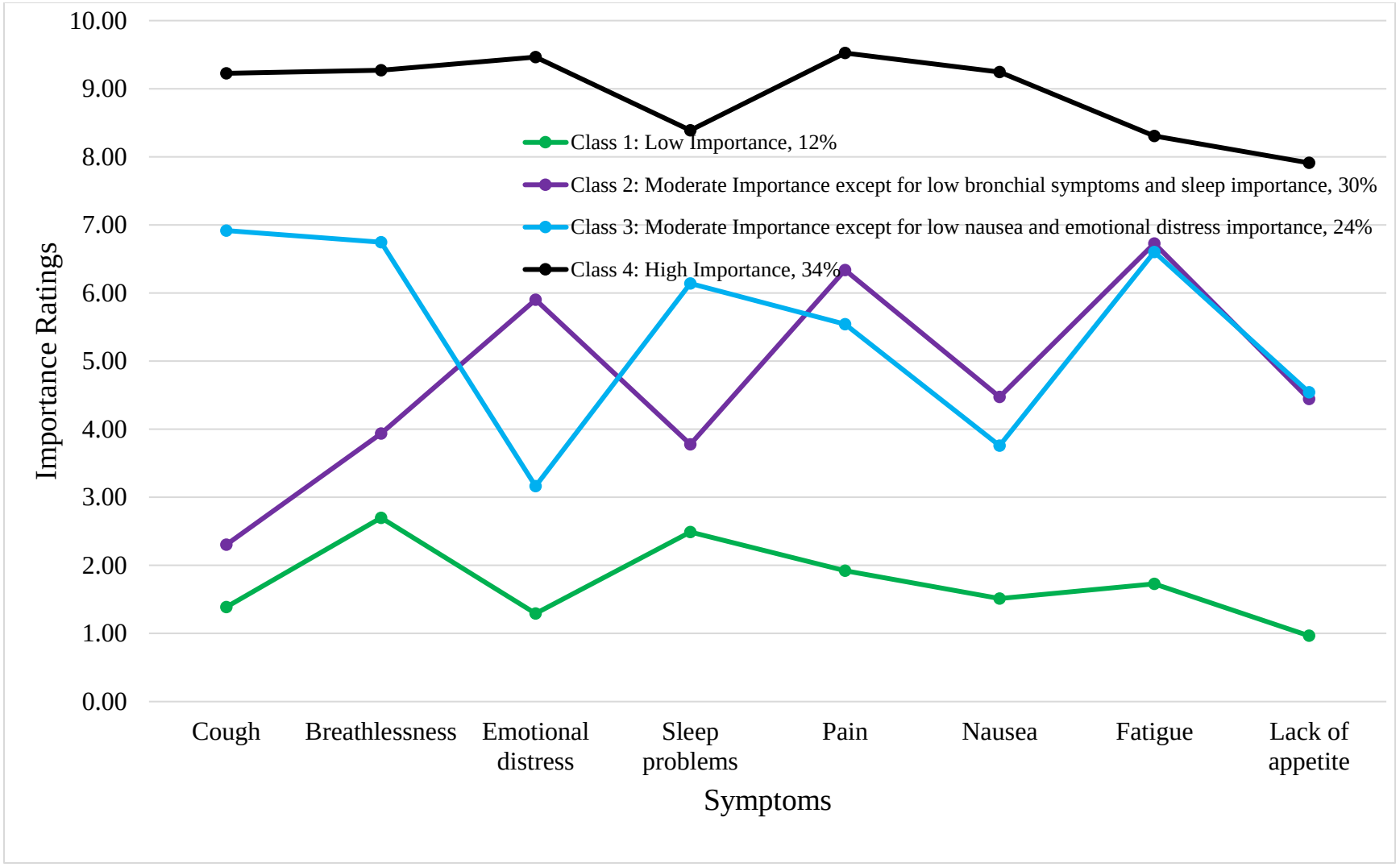

Figure 2. Patient subgroups' mean importance ratings on the Patient Centered Outcomes Questionnaire (PCOQ). $N = 97$.

APPENDIX

6-Item Cognitive Screener

I would like to ask you some questions that ask you to use your memory. I am going to name three objects. Please wait until I say all three words, then repeat them. Remember what they are because I am going to ask you to name them again in a few minutes. Please repeat these words for me: APPLE—TABLE—PENNY.
(Interviewer may repeat words up to 3 times if necessary. Repetition is not scored.)
Did patient correctly repeat all three words? YES NO

If NO, patient is INELIGIBLE.
If YES, proceed below:

	CORRECT	INCORRECT
1) What year is this?	1	0
2) What month is this?	1	0
3) What day of the week is it today?	1	0
4) What were the three objects I asked you to remember?		
4a) APPLE	1	0
4b) TABLE	1	0
4c) PENNY	1	0
Add correct answers for TOTAL score: _____ **score ≤3 = INELIGIBLE** **score ≥4 = ELIGIBLE**		

Demographic Information

1. What ethnicity do you consider yourself to be?
   ___Hispanic or Latino/a
   ___non-Hispanic or Latino/a

2. What race do you consider yourself to be? Check all that apply.
   - White
   - Black or African American

- Asian American
- Native American or Alaska Native
- Native Hawaiian or Other Pacific Islander
- Other (please specify): _____

3. What is your marital status?
   ___Living with partner
   ___Married
   ___Separated
   ___Divorced
   ___Widowed
   ___Single

4. What is your current employment status?
   ___Employed full-time
   ___Employed part-time
   ___Student
   ___Homemaker
   ___Retired
   ___Unemployed, looking for work
   ___Unemployed due to disability
   ___Other (please specify): _____

5. What is the highest grade or year of school you completed?
   ___Never attended school or only attended kindergarten
   ___Grades 1 through 8 (Elementary)
   ___Grades 9 through 11 (Some high school)
   ___Grade 12 or GED (High school graduate)
   ___College 1 year to 3 years (Some college or technical school)
   ___College 4 years or more (College graduate)
   ___Graduate school (Master's degree, Doctorate, etc.)

6. What is the annual, combined income range for all family members in your household?
   ___Less than $21,000
   ___$21,000 - $30,999
   ___$31,000 - $50,999
   ___$51,000 - $99,999
   ___$100,000 or more

Information Collected from Medical Record

Patient's Demographics:

(1) Age: _____
(2) Gender: ☐ Male ☐ Female

Patient's Cancer History:

(1) ☐ stage IIIB non-small cell lung cancer; date of Diagnosis: ____/____/_____
(2) ☐ stage IIIC non-small cell lung cancer; date of Diagnosis: ____/____/_____
(3) ☐ stage IV non-small cell lung cancer; date of Diagnosis: ____/____/_____
(4) ☐ extensive stage small cell lung cancer; date of Diagnosis: ____/____/_____

Treatments for Cancer (**check all that have been received at any time)**:

☐ Surgery
☐ Chemotherapy
☐ Radiation
☐ Chemoradiation (concurrent chemotherapy and radiation)
☐ Targeted therapy
☐ Immunotherapy
☐ Other: _____

Treatments for Cancer (**check all that are <u>current</u> treatments; last dose given <u>≤</u> 4 weeks ago)**:

☐ Chemotherapy
☐ Radiation
☐ Chemoradiation (concurrent chemotherapy and radiation)
☐ Targeted therapy
☐ Immunotherapy
☐ Other: _____

Comorbid Medical Conditions

1. Besides cancer, indicate all medical conditions that a doctor or other health care worker has diagnosed you with or treated you for during the past 3 years. Check all that apply.
   - ☐ Asthma, emphysema, or chronic bronchitis
   - ☐ High blood pressure or hypertension
   - ☐ High blood sugar or diabetes
   - ☐ Arthritis or rheumatism (inflammation of the joints)
   - ☐ Angina, heart failure, or other types of heart disease
   - ☐ Strokes, seizures, Parkinson's disease, or other neurological condition
   - ☐ Liver disease
   - ☐ Kidney or renal disease

Performance Status of the Patient Generated Subjective Global Assessment (PG-SGA)

2. Over the last month, I would generally rate my activity as:
   - ☐ Normal with no limitations
   - ☐ Not my normal self, but able to be up and about with fairly normal activities
   - ☐ Not feeling up to most things, but in bed or chair less than half the day
   - ☐ Able to do little activity and spend most of the day in bed or chair
   - ☐ Pretty much bedridden, rarely out of bed

Symptom Treatment History

Please indicate any symptoms for which you have RECEIVED TREATMENT in the **past 3 months**, including over-the-counter or prescribed medication, oxygen, psychotherapy/counseling, or other treatments. Check all that apply.

- ☐ breathlessness
- ☐ cough
- ☐ fatigue (or tiredness)
- ☐ sleep problems
- ☐ pain
- ☐ nausea
- ☐ lack of appetite
- ☐ emotional distress

PROMIS Pain Intensity

In the past 7 days…		Had no pain	Mild	Moderate	Severe	Very severe
1	How intense was your pain at its worst?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2	How intense was your average pain?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
		No pain	**Mild**	**Moderate**	**Severe**	**Very severe**
3	What is your level of pain right now?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

PROMIS Sleep Problems

In the past 7 days…		Not at all	A little bit	Somewhat	Quite a bit	Very much
1	My sleep was refreshing.	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1
2	I had a problem with my sleep.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3	I had difficulty falling asleep.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
		Very poor	**Poor**	**Fair**	**Good**	**Very good**
4	My sleep quality was . . .	☐ 5	☐ 4	☐ 3	☐ 2	☐ 1

PROMIS Fatigue

During the past 7 days…		Not at all	A little bit	Somewhat	Quite a bit	Very much
1	I felt fatigued.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
2	I had trouble starting things because I am tired.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
3	How run-down did you feel on average?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
4	How fatigued were you on average?	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

PROMIS Anxiety and Depression

In the past 7 days…	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
I felt fearful.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I found it hard to focus on anything other than my anxiety.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
My worries overwhelmed me.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I felt uneasy.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I felt worthless.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I felt helpless.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I felt depressed.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5
I felt hopeless.	☐ 1	☐ 2	☐ 3	☐ 4	☐ 5

MSAS Shortness of Breath

		YES	**NO**			
1	During the past week, did you have **shortness of breath**?	☐ 1	☐ 0			
If no, please skip questions 2-4 and go to the next set of questions.						
		Rarely	**Occasionally**	**Frequently**	**Almost constantly**	
2	How often did you have it?	☐ 1	☐ 2	☐ 3	☐ 4	
		Slight	**Moderate**	**Severe**	**Very severe**	
3	How severe was it usually?	☐ 1	☐ 2	☐ 3	☐ 4	
		Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**
4	How much did it distress or bother you?	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4

MSAS Cough

		YES		**NO**		
1	During the past week, did you have a **cough**?	□ 1		□ 0		
If no, please skip questions 2-4 and go to the next set of questions.						
		Rarely	**Occasionally**	**Frequently**	**Almost constantly**	
2	How often did you have it?	□ 1	□ 2	□ 3	□ 4	
		Slight	**Moderate**	**Severe**	**Very severe**	
3	How severe was it usually?	□ 1	□ 2	□ 3	□ 4	
		Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**
4	How much did it distress or bother you?	□ 0	□ 1	□ 2	□ 3	□ 4

MSAS Nausea

		YES		**NO**		
1	During the past week, did you have **nausea**?	□ 1		□ 0		
If no, please skip questions 2-4 and go to the next set of questions.						
		Rarely	**Occasionally**	**Frequently**	**Almost constantly**	
2	How often did you have it?	□ 1	□ 2	□ 3	□ 4	
		Slight	**Moderate**	**Severe**	**Very severe**	
3	How severe was it usually?	□ 1	□ 2	□ 3	□ 4	
		Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**
4	How much did it distress or bother you?	□ 0	□ 1	□ 2	□ 3	□ 4

MSAS Lack of Appetite

		YES		**NO**		
1	During the past week, did you have **lack of appetite**?	☐ 1		☐ 0		
If no, please skip questions 2-4 and go to the next set of questions.						
		Rarely	**Occasionally**	**Frequently**	**Almost constantly**	
2	How often did you have it?	☐ 1	☐ 2	☐ 3	☐ 4	
		Slight	**Moderate**	**Severe**	**Very severe**	
3	How severe was it usually?	☐ 1	☐ 2	☐ 3	☐ 4	
		Not at all	**A little bit**	**Somewhat**	**Quite a bit**	**Very much**
4	How much did it distress or bother you?	☐ 0	☐ 1	☐ 2	☐ 3	☐ 4

Patient Centered Outcomes Questionnaire

Please rate your **usual** level of each symptom **during the past week**, whether or not you think it was related to cancer, its treatment, or other medical conditions.

Question Set #1: Breathlessness		**None**				**Moderate**						**Worst imaginable**
1	During the past week, what was your **usual level** of **breathlessness**?	0	1	2	3	4	5	6	7	8	9	10
												If 0, please skip questions 2-3 and go to the next set of questions.
It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.		**None**				**Moderate**						**Worst imaginable**
2	What level of **breathlessness** would be **acceptable** to you if you were to receive treatment for breathlessness?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important				**Moderately important**						**Most important**
3	How **important** is it **for you** to see improvement in **your** level of **breathlessness**?	0	1	2	3	4	5	6	7	8	9	10

Question Set #2: Cough		**None**						**Moderate**				**Worst imaginable**
1	During the past week, what was your **usual level** of **cough**?	0	1	2	3	4	5	6	7	8	9	10
	If 0, please skip questions 2-3 and go to the next set of questions.											
It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.		**None**				**Moderate**			**Worst imaginable**			
2	What level of **cough** would be **acceptable** to you if you were to receive treatment for cough?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important				**Moderately important**			**Most important**			
3	How **important** is it **for you** to see improvement in **your** level of **cough**?	0	1	2	3	4	5	6	7	8	9	10

	Question Set #3: Fatigue (or tiredness)	**None**					**Moderate**					**Worst imaginable**
1	During the past week, what was your **usual level** of **fatigue (or tiredness)**?	0	1	2	3	4	5	6	7	8	9	10
	If 0, please skip questions 2-3 and go to the next set of questions.											
	It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.	**None**					**Moderate**					**Worst imaginable**
2	What level of **fatigue (or tiredness)** would be **acceptable** to you if you were to receive treatment for fatigue (or tiredness)?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important					**Moderately important**					**Most important**
3	How **important** is it **for you** to see improvement in **your** level of **fatigue (or tiredness)**?	0	1	2	3	4	5	6	7	8	9	10

Question Set #4: Sleep problems		**None**				**Moderate**			**Worst imaginable**			
1	During the past week, what was your **usual level** of **sleep problems**?	0	1	2	3	4	5	6	7	8	9	10
		If 0, please skip questions 2-3 and go to the next set of questions.										
It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.		**None**				**Moderate**			**Worst imaginable**			
2	What level of **sleep problems** would be **acceptable** to you if you were to receive treatment for sleep problems?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important				**Moderately important**			**Most important**			
3	How **important** is it **for you** to see improvement in **your** level of **sleep problems**?	0	1	2	3	4	5	6	7	8	9	10

Question Set #5: Pain		**None**										**Worst imaginable**
1	During the past week, what was your **usual level** of **pain**?	0	1	2	3	4	5	6	7	8	9	10
	If 0, please skip questions 2-3 and go to the next set of questions.											
It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.		**None**				**Moderate**						**Worst imaginable**
2	What level of **pain** would be **acceptable** to you if you were to receive treatment for pain?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important				**Moderately important**						**Most important**
3	How **important** is it **for you** to see improvement in **your** level of **pain**?	0	1	2	3	4	5	6	7	8	9	10

Question Set #6: Nausea		**None**				**Moderate**						**Worst imaginable**
1	During the past week, what was your **usual level** of **nausea**?	0	1	2	3	4	5	6	7	8	9	10
	If 0, please skip questions 2-3 and go to the next set of questions.											
It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.		**None**				**Moderate**						**Worst imaginable**
2	What level of **nausea** would be **acceptable** to you if you were to receive treatment for nausea?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important				**Moderately important**						**Most important**
3	How **important** is it **for you** to see improvement in **your** level of **nausea**?	0	1	2	3	4	5	6	7	8	9	10

Question Set #7: Lack of appetite		**None**				**Moderate**			**Worst imaginable**			
1	During the past week, what was your **usual level** of **lack of appetite**?	0	1	2	3	4	5	6	7	8	9	10
		If 0, please skip questions 2-3 and go to the next set of questions.										
It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.		**None**				**Moderate**			**Worst imaginable**			
2	What level of **lack of appetite** would be **acceptable** to you if you were to receive treatment for lack of appetite?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important				**Moderately important**			**Most important**			
3	How **important** is it **for you** to see improvement in **your** level of **lack of appetite**?	0	1	2	3	4	5	6	7	8	9	10

Question Set #8: Emotional distress		**None**				**Moderate**						**Worst imaginable**
1	During the past week, what was your **usual level** of **emotional distress**?	0	1	2	3	4	5	6	7	8	9	10
												If 0, please skip questions 2-3 and go to the next set of questions.
It makes sense that patients want their symptom treatment to result in desired or acceptable outcomes. Unfortunately, available treatments for symptoms do not always produce desired outcomes.		**None**				**Moderate**						**Worst imaginable**
2	What level of **emotional distress** would be **acceptable** to you if you were to receive treatment for emotional distress?	0	1	2	3	4	5	6	7	8	9	10
		Not at all important				**Moderately important**						**Most important**
3	How **important** is it **for you** to see improvement in **your** level of **emotional distress**?	0	1	2	3	4	5	6	7	8	9	10