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Cancer patients' trade-offs among efficacy, toxicity and out-of-pocket cost in the curative and non-curative setting

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Abstract

Background—When making treatment decisions, cancer patients must make trade-offs among efficacy, toxicity and cost. However little is known about what patient characteristics may influence these trade-offs.

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Methods—400 cancer patients reviewed two of three stylized curative and non-curative scenarios that asked them to choose between two treatments of varying levels of efficacy, toxicity and cost. Each scenario which included nine choice sets. Demographics, cost concerns, numeracy and optimism were assessed. Within each scenario, we used latent class methods to distinguish groups with discrete preferences. We then used regressions with group membership probabilities as covariates to identify associations.

Results—Median age was 61 years (range 27-90). 25% were enrolled at a community hospital. and 99% were insured. Three latent classes were identified that demonstrated 1) Preference for survival or aversion to 2) high cost or 3) toxicity. Across all scenarios, patients with higher income were more likely to be in the class that favored survival. Lower income patients were more likely to be in the class that was averse to high cost ($p < .05$). Similar associations were found between education, employment status, numeracy, cost concerns and latent class.

Conclusions—Even in these stylized scenarios, socioeconomic status (SES) predicted treatment choice. Higher income patients may be more likely to focus on survival while those of lower SES may be more likely to avoid expensive treatment, regardless of survival or toxicity. This raises the possibility that insurance plans with greater cost-sharing may have the unintended consequence of increasing disparities in cancer care.

Introduction

Many new drugs offer promise for cancer patients. Although some increase cure rates(1, 2), many recently approved drugs only increase survival by several months(3, 4). Treatment decisions for patients can be difficult as these therapies are often associated with toxicities. Acquisition costs for new drugs exceed \$5,000 per month, making the decision more complex since even patients with comprehensive insurance coverage can face high out-of-pocket costs(5). The American Society of Clinical Oncology recommends that physicians discuss out-of-pocket costs with their patients(6). However, many oncologists find these conversations difficult to initiate(7).

There is little information about how patients make tradeoffs when choosing among treatments of differing efficacy, toxicity and out-of-pocket cost. By giving patients “skin in the game,” cost sharing is intended to reduce unnecessary utilization of medical services(8). However, these cost-sharing models assume patients can make informed decisions about whether the treatment is worth the out-of-pocket cost. Furthermore, in many cases cost-sharing is based on the cost of the drug, not its clinical indication or value.

Preferences can be defined as the value a patient places on the outcome (both good and bad) of each treatment alternative(9) and may differ based on the clinical setting. For example, it is not known if patients are willing to tolerate higher cost in the curative setting than in the non-curative setting.

Discrete-choice experiments (DCEs) may be helpful in understanding decision tradeoffs by clarifying the value an individual places on a treatment based on its particular characteristics. DCEs are frequently used in marketing studies, but have also been used in health care policy based on the premise that a service can be described by its attributes, and the extent to which a patient values a service depends on the perceived relative strength of these characteristics.(10, 11) Each attribute, such as co-payment, is assigned a level (for example, \$10, \$50 or \$100). Participants choose between different services (e.g., treatments) that vary in the levels of the attributes of interest (e.g., cost, efficacy, toxicity). They are presented multiple scenarios with treatments having different combinations of attribute levels. The preference for each attribute can be determined as well as the individual characteristics that are associated with placing more or less weight on a given attribute.

In this study, we conducted DCEs to understand how patients choose among cancer treatments of varying efficacy, toxicity and out-of-pocket cost. We then used latent class analysis to identify subgroups of patients with specific preferences. The goal of this study was to understand if patient characteristics affect these preferences, as well as whether the clinical setting (curative vs. non-curative) itself influenced choice.

Materials and Methods

Patients

Patients were recruited from Fox Chase Cancer Center, a National Cancer Institute designated Comprehensive Cancer Center in Philadelphia, PA and South Jersey Healthcare in Vineland, NJ, a community hospital serving rural Southern New Jersey. Patients were at least 18 years of age and diagnosed with cancer at least 6 months prior to initial contact. Those with metastatic disease were required to have a performance status of zero or one (asymptomatic or minimally symptomatic). There were no restrictions on disease site, stage, time from original diagnosis or prior treatment.

Potential participants were initially contacted by mail with a letter that described the study. They were given a response card in which they could 1) express interest in participating 2) decline further contact or 3) request further information. They were told that if they did not return the card they might be contacted about the study in person at the time of their next appointment. Patients were approached in person by trained research assistants. Those that provided written informed consent completed the study on a computer. They received a \$20 gift card after completing the study. Patients were recruited between 01/05/2010 and 09/01/2011. Institutional Review Boards at both sites approved the study.

Survey instrument

Patients provided demographic data including age, education, annual household income and employment status. They also provided cancer history including year of diagnosis, primary site and presence of metastases.

We assessed numeracy using the Subjective Numeracy Scale(12) and optimism using the Life Orientation Test-Revised (LOT-R)(13). We asked patients to describe their health care cost concerns (using a five point Likert scale):

1. My current insurance coverage adequately covers my healthcare costs,
2. “I have concerns about paying for my cancer treatment”
3. “I am confident that my insurance will cover my healthcare costs in the future.”
4. My family has made financial sacrifices to pay for my medical care

Discrete Choice Experiment

To determine whether clinical context affects patient preferences, we developed three scenarios that were loosely based on “real-life” treatment decisions. Patients were told that the scenarios were hypothetical and did not relate to their care. Disease sites, medications and clinical setting were not identified.

1. Adjuvant therapy scenario 1 describes a potentially curative therapy that reduces the absolute risk of recurrence of cancer recurrence after surgery by 13%. This treatment carries a risk of both heart failure and severe heart failure (as in adjuvant treatment for breast cancer(2)).

2. Adjuvant scenario 2 describes a potentially curative therapy that lowers the absolute recurrence risk of cancer recurrence by 7% but is associated with risks of severe neuropathy and nausea (as in adjuvant treatment for localized colorectal cancer(14)).
3. The palliative scenario describes a treatment for metastatic cancer that improves median survival by 2 month. It is associated with an increased risk of severe fatigue and bleeding (as in treatment for metastatic lung cancer(3)).

(see Figure, Supplemental Digital Content 1, which demonstrates an example of a discrete choice experiment)

Attribute Levels—Attribute levels are shown in Table 1. Within each scenario, there were two levels for efficacy and toxicity, and four levels of potential out-of-pocket costs. Since the magnitudes of cost levels varied between scenarios, we reported cost level differences. For example, patients who were presented with the highest (level 4) and lowest (level 1) choices had a 3-level difference. Patients who were presented with level 4 and level 2 (or levels 3 and 1) choices had a 2-level difference.

Scenarios were pilot tested in 24 patients and refined. In the final study, each patient received 2 of the 3 scenarios. They were given 9 discrete choice pairs within each scenario. Sawtooth software (Orem, UT) was used to generate the choice pairs.

Data analyses

We analyzed this study in two parts. First, we sought to understand what influenced a patient to pick once treatment over the other. We used a Bradley-Terry logistic model to investigate the characteristics that drove decisions about choosing a scenario (15). To account for correlated data, we estimated the models using Generalized Estimating Equations (GEE) (16). The correlated data resulted from individuals making repeated choices concerning scenarios. In these models, positive (greater than zero) regression coefficients indicated a preference for higher levels of specific attributes (i.e. greater survival). A negative coefficient indicated preference for the lower level (i.e. lower toxicity).

We then sought to understand if there were specific patient characteristics that predicted preferences for treatment attributes within individual scenarios. For example, we sought to understand what characteristics would predict a preference for low out-of-pocket cost treatments in the metastatic scenario. We used latent class analysis (LCA) to investigate whether groups of individuals based on response patterns could be identified (17-22). This is similar to cluster analytic methods, but more suited for binary data. LCA assumes that the population from which the sample is drawn consists of underlying classes of individuals who can be grouped according to their choice patterns. The model estimates the proportion of patients within each class, and then, within each class, it estimates the proportion of patients choosing a scenario with a certain characteristic (e.g., higher survival).

According to likelihood ratio tests, the three class model provided the best fit in adjuvant scenario 1 and the palliative scenario. In adjuvant scenario 2, a four class model slightly outperformed a three class model. However, the fit for the three class model was close and more easily interpretable.

Finally, after estimating our latent class models, we estimated the probabilities of class membership for patients. We used logistic regression of the patients' characteristics (e.g., education) with each patient's probabilities of belonging to the respective classes as covariates to investigate whether differences in characteristics among the three classes were statistically significant

We used STATA 12.0 and its glamm macro (StataCorp, College Station, Texas) for all analyses.

Results

We approached 584 patients in person. 400 signed informed consent and completed the main study. Fourteen agreed to participate but did not have time to complete the study. 167 declined. Three could not read English and were not enrolled. In total, 2374, 2392 and **2364** choice pairs were completed for scenarios 1, 2 and 3.

Patient characteristics and responses to the cost concern questions are shown in Table 2. The median age was 61 (range 27-90). Less than half of the group had a college education. Forty-four percent reported an annual household income of less than \$60,000 per year. The most common primary sites of disease reported by participants were breast (35%) and genitourinary (16.5%) cancers. Twenty-seven percent reported having metastatic disease. Fifty percent were diagnosed in 2006 or later. Twenty-five percent were recruited from the community site.

Patients recruited from the academic center reported a higher educational level and household income than patients at the community hospital. In addition, they had greater numeracy skills ($p<.05$). However, there was no difference between recruitment sites in the percentage of patients reporting concerns about the present or future treatment costs or levels of optimism (data not shown).

Patient preferences

In all three scenarios, patients were more likely to choose the option that included the higher survival. In each scenario, patients expressed a strong preference to avoid one of the two toxicities (severe heart failure, neuropathy and bleeding, respectively) and a less pronounced, but statistically significant preference to avoid the other toxicity (any heart failure, nausea, and fatigue respectively).

In addition, in all three scenarios patients were less likely to choose the most expensive treatment (3-level difference in cost). However, the strength of this preference was lower than the preference for survival or **lower** toxicity. With the exception of adjuvant scenario 2, they were also less likely to choose a 2-level difference in cost. (See Figure, Supplemental Digital Content 2, which demonstrates the results of our multivariable analysis including all the treatment variables)

Latent class assignment

If a patient were choosing randomly, he or she would have a 50% chance of choosing one of the two options. However, we identified three “latent classes” (Table 3) of patients who appeared to demonstrate dominant preferences for either: A. low out-of-pocket cost, B. longer survival or C. low toxicity. For the survival and toxicity attributes, the each row represents the percentage of patients who would choose an attribute level (**e.g.**, high vs low toxicity). The cost level rows demonstrate the distribution of responses. For example a 3-level cost difference represents a choice between level 4 and 1 costs. The rows indicate the distribution of patients who would choose the higher (vs lower) cost treatment.

In adjuvant scenario 1, 99.8% of patients in Class A would choose the lower cost treatment when offered a choice between two treatments with a large cost difference (3-level), **even if** the alternative offered improved survival or toxicity. Class A was also sensitive to more modest cost differences; even if the cost difference was only 1-level, 89.6% would still choose the lowest cost treatment. This demonstrates that preference for low out-of-pocket

cost was the dominant preference within this latent class. However the distribution of choices for the survival and toxicity attributes were approximately 50%/50%, consistent with being chosen randomly. Conversely, in Class B, the latent class that favors survival, 98.3% would choose the treatment with greater survival..

Within each scenario, Class A favored low out-of-pocket cost treatments when presented with a 2-level cost difference. Across all three scenarios, over 94% would choose the lower cost treatment even if the more costly treatment offered improved survival or toxicity.

Other patients had similarly strong preferences for improved survival; in Class B, over 92% of patients would choose the treatment with the longer survival, even if it was more costly or toxic.

Class C in each scenario favored low toxicity. In this class, 70-80% of patients chose the treatment with the low toxicity, regardless of whether the alternative treatment offered greater survival and/or lower cost.

Association between latent class and patient characteristics

Within each scenario, we then measured association between patient characteristics and latent class (Table 4). These are divided into sections, which evaluate individual characteristics within scenarios.

We found statistically significant associations between certain sociodemographic characteristics and latent class. In all scenarios, patients with lower income were less likely than those with higher income to be in the class that focused on survival. For example, in adjuvant scenario 1, patients with an annual household income less than \$60,000 were less likely to be in the class that favored survival (Class B) than those with the higher income (10.7% vs. 24.4%), but were more likely to be in the class (Class A) that favored low out-of-pocket cost (33.6 vs. 23.1%). In adjuvant scenario 1, patients who were not working (compared to employed, homemaker or retired) were less likely to be in the class that favored survival (Class B) (3.9% vs. 17.7%). Education was predictive of class assignment in adjuvant scenario 2 and the palliative scenario. (p-value <.05 for all comparisons)

We also identified other patient characteristics associated with latent class (Table 5). In all three scenarios, greater numeracy was associated with being in the class that favored survival (Class B). In the palliative scenario, greater optimism and younger age was also associated with being in the class that favored survival (Class B). Cost concerns were associated with class assignment in Adjuvant Scenario 2 and the palliative scenario. For example, in the palliative scenario, patients who disagreed with the statement “I am confident that my insurance will cover health care costs in the future” were more likely to be in the class that was preferred low out-of-pocket cost (Class A). There was no association between cost concerns, optimism or age and class in adjuvant scenario 1.

There was no association between year of diagnosis, site of primary tumor, presence of metastatic disease or hospital sites and latent class assignment.

Discussion

In this study, we used DCE in a heterogeneous group of cancer patients to understand the trade-offs patients may make when considering choices among treatments with varying efficacy, toxicity and out-of-pocket cost in both the curative and non-curative setting. We found that patients expressed specific preferences for survival and low toxicity, and preference to avoid very large (3-level) cost differences. They appeared to be less averse to

moderate (2-level) differences in cost. Patient characteristics also predicted preference for treatment efficacy, toxicity and out-of-pocket cost. In all three scenarios, patients of higher socioeconomic status (SES) were more likely to focus on survival, while others appeared more willing to trade off survival for decreased out-of-pocket cost and toxicity. In the palliative scenario and adjuvant scenario 2, patients who expressed concerns about cost were more likely to choose the treatment with lower out-of-pocket costs, even if it came at the expense of worse survival or higher toxicity.

These findings are important for several reasons. Patients are frequently faced with complex treatment choices. While physicians may provide guidance, there are some decisions which are preference sensitive. For example, a patient with young children may be more willing to tolerate toxic treatment(23), while a patient with competing comorbidities may be more averse to toxicity, particularly for a non-curative therapy.

Decisions are made more complicated by high out-of-pocket costs. Many prescription plans place oral anticancer medications on the “top tier,” which can result in high co-payments. How these costs influence patients' treatment decisions and subsequent clinical outcomes is not known. A study of commercial claims found cancer patients to be “cost-insensitive,” and not decrease their utilization in response to higher out-of-pocket cost.(24) This could be due to the “hope” that patients assign to novel therapies for advanced cancer, for which many patients are willing to pay high costs.(25) However, other studies have demonstrated that patients may be cost-sensitive. An analysis of a commercially insured population found that patients with early stage breast cancer who face high co-payments for adjuvant hormonal therapy are less likely to be compliant with therapy(26). Other studies have found similar inverse relationships between cost sharing and cancer medication adherence(27). In a study of 254 cancer patients of which 75% applied to a national co-payment assistance foundation, 20% took less than the prescribed amount, 19% partially filled prescriptions, and 24% avoided filling them (28).

The greater sensitivity to treatment out-of-pocket cost among patients of lower SES (income, education, employment status) is especially concerning given the fact that almost all of these patients were insured and had already established care with a medical or surgical oncologist. Although we do not have data about the extent of out-of-pocket costs they have already faced, 22% reported that their family had already made a sacrifice to pay for their care, suggesting that they felt some level of distress. In a previous study that measured willingness-to-pay of cancer patients in the adjuvant and palliative setting, those who reported making sacrifices were less likely to be willing to pay high co-payments for palliative treatment(29). In this study, patients who reported concerns about present and future costs were more likely to be in the group that favored low out-of-pocket cost.

Relationships between cost concerns and latent class were only present in adjuvant scenario 2 and the palliative scenario. It is possible that in adjuvant scenario 1, the survival benefit (13%) was significant enough to outweigh other concerns. However, when the benefit was more modest (in adjuvant scenario 2 and the palliative scenario), patients were more likely to weigh other factors (such as cost concerns) against the smaller benefit.

Our results should be evaluated within the context of several study limitations. We used hypothetical scenarios that did not identify the drug or disease. We do not know if patients would respond in the same way when facing real life decisions. However, DCE and other conjoint analysis methods have been used to identify preferences for health care(10, 11) and understand clinical decision-making in other cancer settings.(30, 31) In addition, even in the hypothetical scenarios that did not require patients to actually spend their own money, SES and self-reported concerns about treatment costs were predictive of patient preferences. This

also suggests that patients were answering in a manner consistent with their true concerns, preferences and ability to pay.

Also, 75% of our patients were enrolled from an academic hospital. We attempted to increase the generalizability by enrolling patients from a community hospital. Since the patients at the academic hospital were more affluent and well educated than the patients in the community hospital, if we increased the number of patients accrued from the community hospital, we might have observed even more pronounced differences based on SES. Another limitation is that our study was cross-sectional. Clinical status might affect preferences. It is possible that patients who were diagnosed a longer time ago may have different preferences than someone who is currently undergoing treatment. However, we found no difference in preferences when controlling for presence of metastatic disease or year of diagnosis. This should be studied in greater detail, particularly as patients may be treated with multiple lines of therapy, which may further strain family resources. In addition, we used a convenience sample of patients. It is possible that patients who agreed to participate may have had different preferences than those who declined.

Our findings may have clinical and policy implications. As increased emphasis is placed on preference sensitive decisions and patient centered outcomes(32, 33), it is important to recognize that out-of-pocket costs may be an important component of patients' preferences. Physicians and other health care providers need to become more adept at discussing these cost-related concerns with patients and their families. They should be encouraged to refer them to appropriate resources including social workers and financial counselors. Since patients who decline adjuvant therapy are at greater risk of relapse and incurring further treatment costs for metastatic disease, payors may want to consider programs that reduce or eliminate out-of-pocket costs that serve as a barrier to care to high value treatment.(34)

In summary, even among insured patients, SES was highly predictive of treatment preference, with patients of **higher** SES being more likely to focus on survival when making decisions. Patients of lower SES may be more likely to avoid high out-of-pocket cost treatments regardless of efficacy or toxicity. Patients who already cite concerns about costs may be more likely to decline treatment that is more effective but have higher out-of-pocket costs. As payors increasingly shift costs to patients, the benefits of cost sharing in reducing unnecessary utilization of health care services needs to be balanced against the unintended consequence of potentially increasing disparities in care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Attribute levels for hypothetical scenarios. These attributes are varied within each discrete choice experiment.

	Attribute Level	Adjuvant Scenario 1		Adjuvant Scenario 2		Palliative scenario	
		4 year disease free survival	73% 86%	5 year relapse free survival	67% 73%	Median life expectancy	10 months 12 months
Survival	1						
	2						
Toxicity 1	1	Any heart failure	10%	Severe neuropathy	0%	Severe Bleeding	2%
	2		19%		12%		8%
Toxicity 2	1	Severe heart failure	1%	Severe nausea	0%	Severe Fatigue	13%
	2		4%		6%		20%
Out of pocket costs	1	Total out of pocket costs for course of treatment	\$500	Total out of pocket costs for course of treatment	\$250	Cost every three weeks.	\$60
	2		\$2,500		\$1,000		\$200
	3		\$5,000		\$3,000		\$400
	4		\$10,000		\$6,000		\$800

Table 2
Patient characteristics

		N	%
Gender	Male	149	37.25
	Female	250	62.50
	Missing	1	0.25
Age	Mean	61.1	Range 27-90
Race	Caucasian	345	86.25
	Other	55	13.75
Marital Status	Married/Partnered	268	67.00
	Other	131	32.75
	Missing	1	0.25
Education	Less than college degree	236	59.00
	College degree and greater	163	40.75
	Missing	1	0.25
Employment Status	Full Time/Part time	180	45.00
	Homemaker	13	3.25
	Retired	165	41.25
	Out of Work	41	10.25
Annual Household Income	<\$60,000	177	44.25
	>\$60,000	184	46.00
	Missing	39	9.75
Primary site	Breast	140	35.00
	Prostate/GU	66	16.50
	GI	41	10.25
	Lung/Head and Neck	27	6.75
	Blood Cancer	27	6.75
	Gynecological	12	3.00
	Skin Cancer	12	3.00
	Other	73	18.25
	Missing	2	0.50
Known metastatic disease	Yes	108	27.00
	No	266	66.50
	Don't know/Missing	26	6.50
Diagnosis Year	1999 and older	52	13.00
	2000-2005	114	28.50
	2006-2010	201	50.25
	Missing	33	8.25
No Insurance/Charity Care	Yes	4	1
Subjective Numeracy Score Range 1-6	Mean	4.16	

		N	%
Life Orientation Test Scores Range 1-24	Mean	17	
Cost Concerns Questions			
“My current insurance coverage adequately covers my healthcare costs.”	Agree a lot/little	342	85.5
	Neutral	21	5.25
	Disagree a little	33	8.25
	Missing	4	1.00
“I have concerns about paying for my cancer treatment”	Agree a lot/little	121	30.25
	Neutral	60	15.00
	Disagree a lot/little	217	54.25
	Missing	2	0.50
“I am confident that my insurance will cover my healthcare costs in the future”	Agree a lot/little	237	59.25
	Neutral	74	18.50
	Disagree a lot/little	69	17.25
	Missing	20	5.00
“My family has made financial sacrifices to pay for my medical care	Agree a lot/little	89	22.25
	Neutral	43	10.75
	Disagree a lot/little	249	62.25
	Missing	19	4.75

Table 3

Latent class assignment. Shaded areas indicated strong preferences A 50% choice rate indicates that the item did not affect preferences in binary choices.

Adjuvant Scenario 1			Class A Prefers low out-of-pocket cost	Class B Prefers high survival	Class C Prefers low toxicity
Survival	4 year RFS	73%	47.0%	1.7%	40.9%
		86%	53.0%	98.3%	59.1%
Toxicity	Any heart failure	10%	52.9%	50.5%	59.1%
		19%	47.1%	49.5%	40.9%
Toxicity	Severe heart failure	1%	52.2%	50.6%	68.5%
		4%	47.8%	49.4%	31.5%
Cost difference	1-level	Lower cost	89.6%	48.4%	53.1%
		Higher cost	10.4%	51.6%	46.9%
Cost difference	2-level	Lower cost	94.3%	53.5%	55.1%
		Higher cost	5.7%	46.5%	44.9%
Cost difference	3-level	Lower cost	99.8%	51.2%	61.7%
		Higher cost	0.2%	48.8%	38.3%
Proportion in each class		Row = 100%	30.0%	16.0%	54.0%
Adjuvant Scenario 2					
Survival	5 year RFS	67%	45.0%	6.8%	44.1%
		73%	55.0%	93.2%	55.9%
Toxicity	Severe neuropathy	0%	52.4%	52.6%	79.1%
		12%	47.6%	47.4%	20.9%
Toxicity	Severe nausea	0%	54.2%	53.0%	57.6%
		6%	45.8%	47.0%	42.4%
Cost difference	1-level	Lower cost	87.1%	54.6%	56.6%
		Higher cost	12.9%	45.4%	43.4%
Cost difference	2-level	Lower cost	97.7%	55.9%	58.4%
		Higher cost	2.3%	44.1%	41.6%
Cost difference	3-level	Lower cost	97.9%	45.7%	63.6%
		Higher cost	2.1%	54.3%	36.4%
Proportion in each class		Row = 100%	36.5%	17.7%	45.8%

Adjuvant Scenario 1			Class A Prefers low out-of-pocket cost	Class B Prefers high survival	Class C Prefers low toxicity
Palliative Scenario					
Survival	2 year OS	10 months	46.1%	6.9%	43.2%
		12 months	53.9%	93.1%	56.8%
Toxicity	Severe Bleeding	2%	54.0%	51.1%	70.3%
		8%	46.0%	48.9%	29.7%
Toxicity	Severe Fatigue	13%	51.5%	52.0%	58.5%
		20%	48.5%	48.0%	41.5%
Cost difference	1-level	Lower cost	83.8%	51.1%	52.0%
		Higher cost	16.2%	48.9%	48.0%
Cost difference	2-level	Lower cost	96.3%	50.3%	52.3%
		Higher cost	3.7%	49.7%	47.7%
Cost difference	3-level	Lower cost	96.0%	54.2%	52.1%
		Higher cost	4.0%	45.8%	47.9%
Proportion in each class		Row = 100%	29.9%	27.3%	42.8%

Table 4
Statistically significant associations between latent class assignment and patient characteristics

	Latent class distribution (%)		P value for comparisons
Adjuvant scenario 1			
Annual Household Income	<\$60,000	>\$60,000	
Class A: Prefers low out-of-pocket cost	33.6	23.1	0.007
Class B: Prefers high survival	10.7	24.4	
Class C: Prefers low toxicity	55.7	52.5	
Adjuvant Scenario 1			
Employment	Out of work *	Not out of work	
Class A: Prefers low out-of-pocket cost	37.7	28.9	0.04
Class B: Prefers high survival	3.9	17.7	
Class C: Prefers low toxicity	58.3	53.4	
Adjuvant Scenario 2			
Annual Household Income	<\$60,000	>\$60,000	
Class A: Prefers low out-of-pocket cost	46.6	29.1	0.001
Class B: Prefers high survival	10	25.5	
Class C: Prefers low toxicity	43.5	45.3	
Adjuvant Scenario 2			
Education	No college degree	College degree	
Class A: Prefers low out-of-pocket cost	42.1	29.1	0.04
Class B: Prefers high survival	14.3	22.1	
Class C: Prefers low toxicity	43.5	48.8	
Palliative Scenario			
Annual Household Income	<\$60,000	>\$60,000	
Class A: Prefers low out-of-pocket cost	35.9	22.8	0.0005
Class B: Prefers high survival	18.8	38.4	
Class C: Prefers low toxicity	45.3	38.8	
Palliative Scenario			
Education	No college degree	College degree	
Class A: Prefers low out-of-pocket cost	34.3	23.2	.016
Class B: Prefers high survival	22.0	35.4	
Class C: Prefers low toxicity	43.7	41.4	

* Reflects patients self report of unemployed vs employed, homemaker, student, retired May not total 100% due to rounding. The columns represent indicate patient characteristics (i.e. less than and greater than \$60,000 per year). The rows indicate latent class assignment by income. Within each income category, columns total 100%.

Table 5
Association between patient characteristics and latent class assignments

Patient characteristic	Latent class (preference)	Adjuvant Scenario 1 (p-value)	Adjuvant Scenario 2 (p-value)	Palliative therapy (p-value)
Younger age	Class B: Prefers high survival	NS	NS	0.002
Greater numeracy	Class B: Prefers high survival	0.04	0.0004	0.0008
Greater optimism	Class B: Prefers high survival	NS	NS	0.0047
Disagree with				
"My current insurance adequately covers my health care costs"	Class A: Prefers low out-of-pocket cost	NS	NS	0.03
"I am confident that my insurance will cover my health care costs in the future"	Class A: Prefers low out-of-pocket cost	NS	0.04	<.05
Agree with				
I have concerns about paying for my health care costs	Class A: Prefers low out-of-pocket cost	NS	0.04	0.03
"My family has made financial sacrifices to pay for my care"	Class A: Prefers low out-of-pocket cost	NS	NS	NS