

Preferences for colorectal cancer screening: A latent class analysis

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BACKGROUND

It is important to understand the trade-offs patients make when evaluating screening tests for colorectal cancer (CRC).

- CRC is the second leading cause of cancer-related deaths in the United States, causing more than 50,000 deaths annually [1].
- The U.S. Preventive Services Task Force recommends routine screenings for CRC for average risk individuals aged 50 to 75 years.
- The Healthy People 2020 target for CRC screening is 70.5% [2] and the National Colorectal Cancer Roundtable has a goal of 80% screening by 2018 [3], but survey data suggest that only 58.2% of the screening recommended population are up-to-date with CRC screening [4].
- A number of researchers have used stated-preference surveys, such as conjoint analysis or discrete-choice experiments (DCEs) to study preferences for CRC screening tests [5-7].
 - None of the studies investigated whether groups of respondents had differing preference patterns outside subgroup analysis based on single, observable characteristics such as race, gender, or age.

OBJECTIVE

To analyze preferences for the features of CRC screening tests and understand sources of heterogeneity in preferences, the effect of test attributes and personal characteristics on preferences, and the implications for CRC screening.

METHODS

Survey Development

- Online DCE survey comprised the following sections:
 - background questions on CRC risk factors and respondent's subjective estimate of CRC risk relative to others of the same age
 - description of and questions about each test attribute used in the DCE
 - DCE questions (each respondent answered 5 DCE questions)
 - history with CRC screening and perceptions about CRC screening tests
 - general questions on health and health behaviors
- DCE questions:
 - Table 1 lists the attributes and levels and how they match to existing CRC screening tests
 - DCE questions presented a choice between pairs of hypothetical CRC screening tests
 - The profiles in the DCE questions were based on an experimental design with known statistical properties
 - Survey instrument was pretested in 9 face-to-face interviews to ensure that the survey questions were relevant, appropriate, and understandable.

Table 1. Attributes and Levels

Attributes	Levels	Levels mapped to existing CRC screening tests
What can the test find and how often do you take the test?	1. Most colorectal cancer (90%–95%) / Most pre-cancerous polyps (90%–95%) / once every 10 years 2. Some colorectal cancer (50%–70%) / Some pre-cancerous polyps (50%–70%) / once every 5 years 3. Some colorectal cancer (50%–70%) / Very few pre-cancerous polyps (10%–25%) / once every year	Colonoscopy: 1 FlexSig: 2 FOBT: 3 FIT: 3
Can the test remove cancer and polyps?	1. Yes 2. No	Colonoscopy: 1 FlexSig: 2 FOBT: 2 FIT: 2
Preparation before the test	1. No preparation 2. 2 days diet restrictions 3. 2 days diet restrictions and laxative use	Colonoscopy: 3 FlexSig: 3 FOBT: 2 FIT: 1
Discomfort and activity limitations during and after the test	1. No pain or discomfort during the test / All activities as usual after the test. 2. Discomfort like intense cramps during the test. / All activities as usual after the test. 3. During test, sedative so no discomfort / After test, no driving and limited activity rest of day	Colonoscopy: 3 FlexSig: 2 FOBT: 1 FIT: 1
Out-of-pocket cost to you per test	1. \$0 (no cost to you) 2. \$10 3. \$50 4. \$200 5. \$500	

Data Sources: Online Survey

- The survey was administered online to a sample of US adults aged 50 to 75 years drawn from the GfK KnowledgePanel®. Panel members are recruited through address-based sampling to create a probability-based panel, and GfK provides computer and internet access to households that do not have it.
- The project was reviewed and approved by RTI International's Institutional Review Board.

Data Analysis

DCE Analysis

- Latent class logit model was estimated to identify distinct classes of preferences among respondents and calculated willingness-to-pay (WTP) for changes in test attributes to assess their relative importance across subgroups.
 - Personal characteristics were included in the latent class analysis to predict class membership.
- Analyses were conducted using SAS version 9.3 (SAS Institute Inc) for the descriptive statistics and NLOGIT 5 (Econometric Software, Inc) for DCE analysis.
- Responses to all questions in the survey were summarized using descriptive statistics.

RESULTS

Sample

A total of 2,073 respondents completed surveys. Table 2 presents a summary of respondents' demographic characteristics.

Table 2. Sample Characteristics and Experience with Cancer Screening Tests, Unweighted (N = 2,073)

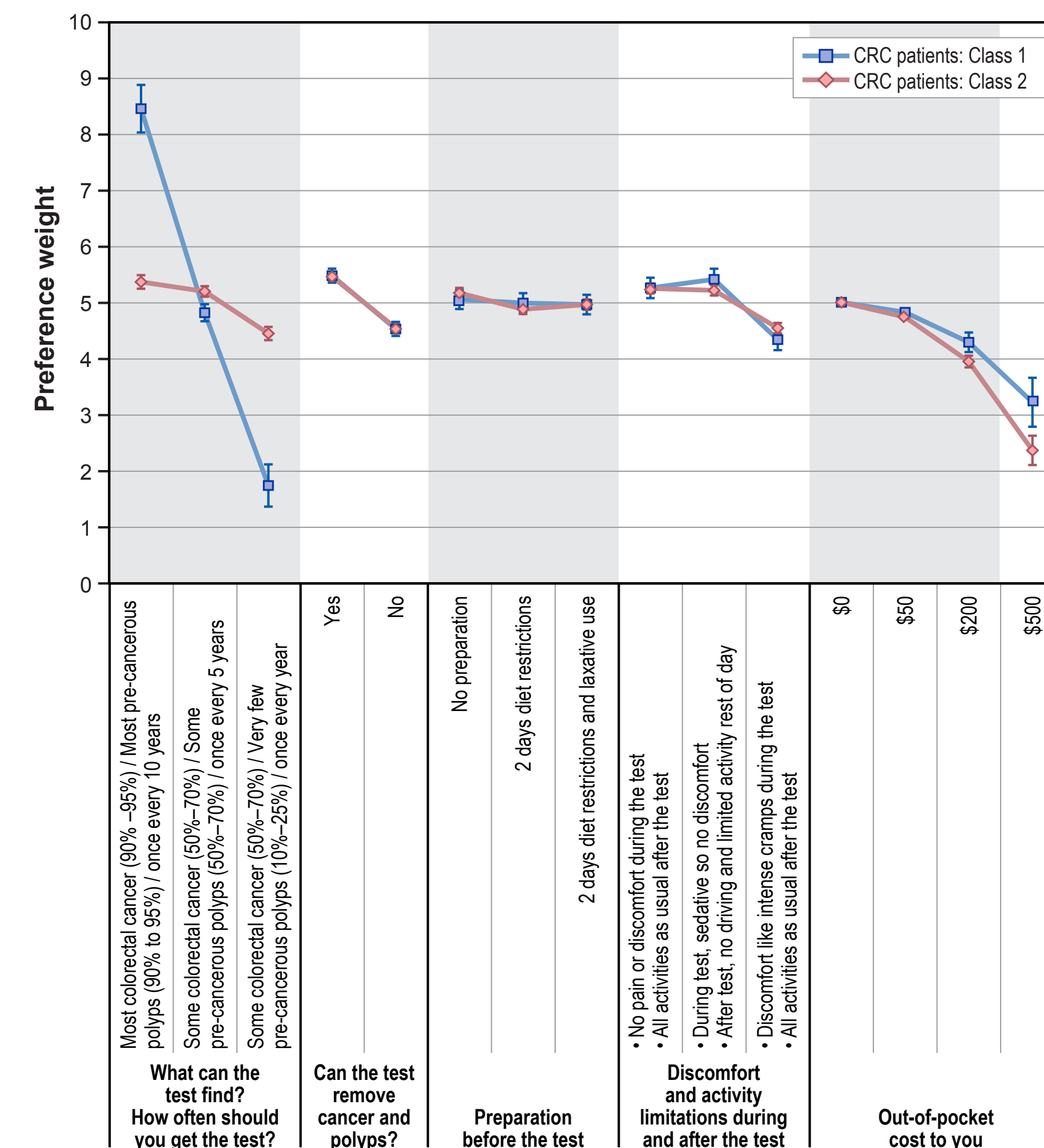
Characteristic	Value
Age, years	
Mean	61.2
Education (highest degree received)	
Less than high school	6.2%
High school graduate—high school diploma or equivalent	30.2%
Some college, no degree	29.2%
Bachelors' degree or higher	34.3%
Race/ethnicity	
White, non-Hispanic	80.0%
Black, non-Hispanic	8.2%
Other, non-Hispanic	2.9%
Hispanic	6.0%
2+ races, non-Hispanic	2.8%
Gender	
Male	48.0%
Female	52.0%
Household income	
Under \$25,000	14.9%
\$25,000–\$49,999	21.2%
\$50,000–\$74,999	20.5%
\$75,000 and above	43.4%
Marital status	
Married	66.7%
Widowed	5.4%
Divorced	13.2%
Separated	1.6%
Never married	9.2%
Living with partner	3.8%
Experience with CRC Screening Tests	
Has a doctor or other health professional ever recommended that you get a test for colorectal cancer?	
Yes	70.0%
No	27.4%
I don't know	2.7%
Missing (n)	1
Have you ever had a colonoscopy?	
Yes	69.8%
No	29.2%
I don't know	1.1%
Missing (n)	0
There are other tests besides colonoscopies that look for colorectal cancer. Please check off all the other tests that you have had for colorectal cancer.	
Stool blood or fecal occult blood test (FOBT)	35.0%
Fecal immunochemical test (FIT)	6.2%
Flexible sigmoidoscopy	12.0%
CT colonography or virtual colonoscopy	4.5%
Stool DNA test	2.5%
Other	1.3%
I have never had any of these tests for colorectal cancer	46.5%
I don't know	8.7%
Missing (n)	1
In the future, how likely are you to get a colonoscopy if you have never had one or get another colonoscopy if you have had one?	
Very likely	51.7%
Somewhat likely	28.7%
Somewhat unlikely	8.0%
Very unlikely	4.5%
I'm not sure	7.1%
Missing (n)	1

Results from Latent Class Analysis

Latent class analysis identified two types of respondents. Figure 1 presents the normalized coefficients from the latent class analysis.

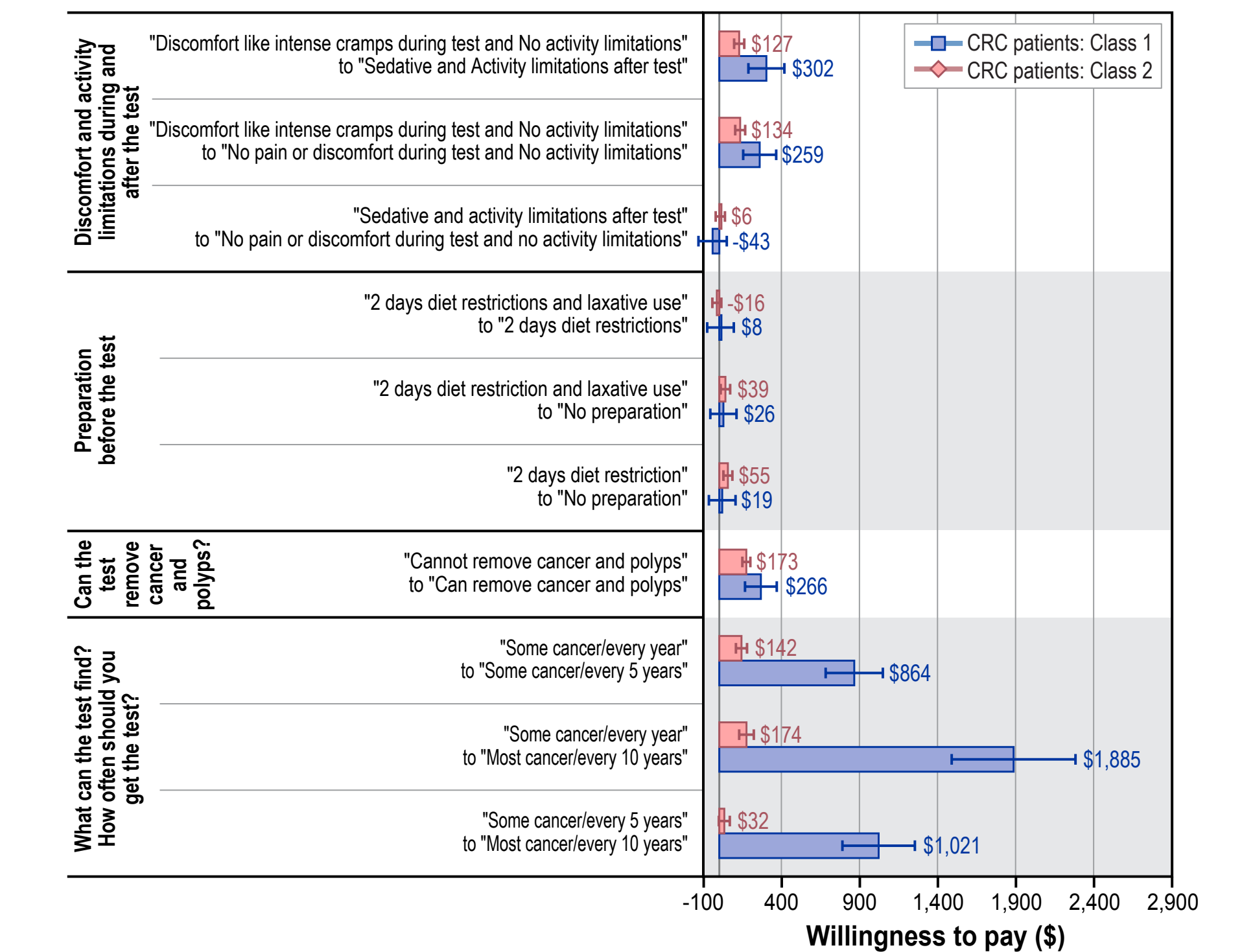
- Class 1 placed the most weight on test efficacy, valuing efficacy much more than any other attribute. Class 1 had much higher WTP for higher levels of efficacy.
 - Class 2 was more influenced by cost, and less influenced by efficacy.
 - Significant predictors of membership in class 1 were being white, college educated, married, and having a colonoscopy previously.
- Figure 2 presents the WTP for changes in attribute levels.
- Class 1 had much higher WTP for higher levels of efficacy than class 2.
 - Both classes had similar WTP for tests that could remove polyps. Both classes had positive and statistically significant WTP to avoid "discomfort like intense cramps during test and no activity limitations."

Figure 1. Normalized DCE Preference Weights from Latent Class Logit Model (with 95% Confidence Intervals)



Note: Class 1 and 2 are the predicted classes from the latent class analysis. The vertical bars surrounding each mean preference weight denote the 95% confidence interval about the point estimate. CRC = colorectal cancer; DCE = discrete-choice experiment.

Figure 2. Willingness-to-Pay for Changes in Attribute Levels Comparing Class 1 and Class 2 (with 95% Confidence Intervals)



CRC = colorectal cancer. Note: Class 1 and 2 are the predicted classes from the latent class analysis. The horizontal bars surrounding each WTP value denote the 95% confidence interval about the point estimate.

CONCLUSIONS

Respondents have different preferences regarding the importance of efficacy, cost and other test features, and personal characteristics are related to these preferences and the likelihood of getting CRC screening tests.

IMPLICATIONS

To increase participation in CRC screening, doctors, nurses, and health systems can offer all recommended test options with advice about each, explore test preferences with patients, and match patients with the test they prefer and are most likely to complete.

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