# CANCER PATIENTS' WILLINGNESS TO ROUTINELY COMPLETE THE EQ-5D INSTRUMENT AT CLINIC VISITS

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## ABSTRACT

### Background
Health utility (HU) scores play an essential role in pharmacoeconomic analyses. Routine clinical administration of the EuroQol-5 Dimensions (EQ-5D) can allow for HU and health related quality of life (HRQOL) assessments in the real world setting.

### Objectives
The primary goals of this study were to evaluate whether patients were willing to complete the EQ-5D instrument on a routine basis and which clinical or demographic factors influence this willingness.

### Methods
618 adult cancer survivors across multiple cancer disease sites at the Princess Margaret Cancer Centre completed an acceptability survey after completing the EQ-5D instrument. Results were analyzed using descriptive statistics and multivariable logistic regression.

### Results
The mean (SD) EQ-5D score was 0.81 (0.15). Among those surveyed, 88% reported that the EQ-5D was easy to complete. 91% took under 5 minutes and 88% were satisfied with its length. 85% were satisfied with the types of questions asked on the EQ-5D. Importantly, 92% reported that they would complete the EQ-5D, even if it were used solely for research purposes and 73% agreed with the notion of completing it regularly at their clinic visits. Patients with lower EQ-5D scores ($p$=0.0006), and non-Caucasians ($p$=0.0024; 60% willing) were less willing to complete the instrument on a regular basis. Curability of tumour, disease site, age, and gender did not influence willingness.

### Conclusions
The majority of cancer patients across disease sites are willing to complete the EQ-5D instrument regularly, even if it were solely for research purposes, but up to 39% declined participation in the first place.

**Key Words:** *EQ-5D, health utilities, cancer, quality of life, ethnicity, policy*

## INTRODUCTION

Given the growing number of cancer survivors,[1] the advent of new therapies, and rising costs of care per patient,[2] health economic assessments are being conducted widely in oncology. Health utility (HU) scores play an essential role in representing health related quality of life (HRQOL) in these analyses, and can be used to calculate quality-adjusted life years (QALYs) when evaluating disease burden and the cost effectiveness of health technologies and interventions, including pharmacotherapies.[3] A common means to measure HU indirectly in cancer

patients is through the Euroqol-5 Dimensions (EQ-5D), a generic HRQOL survey instrument.[4,5] The EQ-5D is one of the most commonly used instruments to measure HU in oncology and is formally recommended by the National Institute of Health and Care Excellence (NICE) in the UK.[6] It is relatively short, is available in over a hundred languages with country specific weighting, and can be administered by paper or computer adaptive technology.

Currently, the quality of the economic assessments that can be conducted in oncology are limited by the availability of robust HU data in the literature.[4] Among EQ-5D studies in oncology, variable methodology and populations render meta-analyses difficult and there is limited data in the area of change in HU longitudinally.[4]

One innovation would be to capture HU/HRQOL data on a regular, longitudinal basis from cancer patients, as part of clinical practice. The EQ-5D is a patient-reported outcome (PRO) measure that includes five clinically relevant questions, and thus could be embedded as a screening tool in cancer patients. In Ontario, all regional cancer programs are already mandated to regularly screen for pertinent symptoms experienced by patients using the Edmonton Symptom Assessment System (ESAS),[7] and adding the EQ-5D to capture HU/HRQOL could be an appropriate addition. However, there is limited research on whether patients are willing to complete additional survey questions, particularly when there might be no immediate benefit to their clinical care. Although the reliability, discriminative and responsive properties of the EQ-5D have been validated,[8] no studies have specifically examined its acceptability or collection burden to the patient.

As such, the purpose of this study was to examine the acceptability of the EQ-5D to cancer patients and to determine if there are particular socio-demographic or clinical factors that influence patient willingness to complete the tool routinely at clinic visits.

## METHODS

This cross-sectional study (approved by the University Health Network Research Ethics Board) captured survey data from a diverse population of cancer patients using convenience sampling. Eligible patients at the Princess Margaret Cancer Centre (PM) in Toronto were over 18 years old, able to communicate in English, and had no significant cognitive impairment. Patients were approached to complete the EQ-5D for research purposes in the waiting room at their clinic visit. Typically, patients were approached after they had completed their mandatory ESAS survey. The questionnaire contained three sets of questions: (1) clinico-demographic information including gender, age, marital status, education, occupation, income, language, and ethnicity as well as Eastern Cooperative Oncology Group performance status; (2) the EQ-5D-3L instrument with both descriptive and visual analogue scale[4]; and (3) Likert-based questionnaire regarding a set of six statements asking (a) willingness to complete EQ-5D regularly, (b) ease of completion, (c) completion in under 5 minutes, (d) completion for research-only purposes, (e) satisfaction with length, and (f) satisfaction with types of questions. Participants indicated their level of agreement where "1" represented strong disagreement and "5" indicated strong agreement with the statement. Health records were reviewed for specific disease site, extent of disease among solid malignancies (local/regional versus distant metastatic spread), and other clinical variables.

The analyses were primarily restricted to individuals who completed the EQ-5D instrument and responded to the statement, "I would complete the EQ-5D regularly (not more than once a month) at my clinic visits." The outcome variables were dichotomized into strongly agree/agree vs neutral/disagree/strongly disagree. Univariable and multivariable logistic regression evaluated associations between clinic-demographic variables and willingness to complete the EQ-5D regularly. A multivariable backwards elimination model was generated starting with variables that were $p<0.10$ in the univariable analyses. Multivariable covariates that resulted in a $p\leq0.05$ were retained in the final model. Comparisons between respondents that returned complete versus incomplete questionnaires was conducted using *t*-tests for continuous variables

and Fisher's exact test for categorical variables. Analyses were carried out using SAS 9.4 (SAS institute, Cary, NC, USA) or GraphPad Prism 7 (GraphPad Software Inc., Le Jolla, CA, USA). HU values were calculated from scores on the EQ-5D descriptive system using Canadian preference weights.[9]

## RESULTS

Recruitment statistics are outlined in Figure 1. Study population ($n$=618) and health utility characteristics are described in Table 1. Comparisons between patients who returned completed and incomplete questionnaires are assessed in Supplementary Tables 1 and 2. The median health utility derived from Canadian valuations was 0.82 (range: 0.12–1.0). Participant responses to statements about the EQ-5D are represented graphically in Figure 2. Cancer patients had favourable opinions with respect to the EQ-5D, whereby 73% agreed/strongly agreed with completing EQ-5D regularly at their clinic visits, while only 9% disagreed/strongly disagreed. Furthermore, 88% reported that the EQ-5D was easy to complete, 92% took less than 5 minutes, 88% were satisfied with the length, 86% were satisfied with the question types, and 94% were willing to complete the EQ-5D solely for research purposes.

As outlined in Table 2, >50% of patients from each subgroup were willing to complete the EQ-5D on a regular basis. The least willing subgroup of patients were non-English speakers at home (52% willing) while the most willing subgroup were patients with a household income ranging between $60,000–$99,999 (80% willing).

Univariable logistic regression analyses (Table 2) showed that higher household income, Caucasian ethnicity, being English speakers at home, being Canadian born, treated with surgery, greater time since diagnosis, better performance status, and scoring a higher HU and VAS score were each associated with a greater willingness to complete the EQ-5D regularly (each $p<0.05$).

Multivariable analyses (Table 3) identified Caucasians (aOR: 1.96 [1.27–3.03]; $p$=0.002), those who spoke English at home (aOR: 2.02 [1.14–3.59]; $p$=0.02), those who have survived cancer longer ($aOR_{\text{per 3 month increase}}$: 1.01 [1.00–1.02]; $p$=0.05), and those with higher health utility scores were more willing to complete the EQ-5D questionnaire on a regular basis.

**FIG. 1** CONSORT diagram illustrating recruitment statistics. Patients that returned the questionnaire and completed the EQ-5D and related questions were included in the analysis.

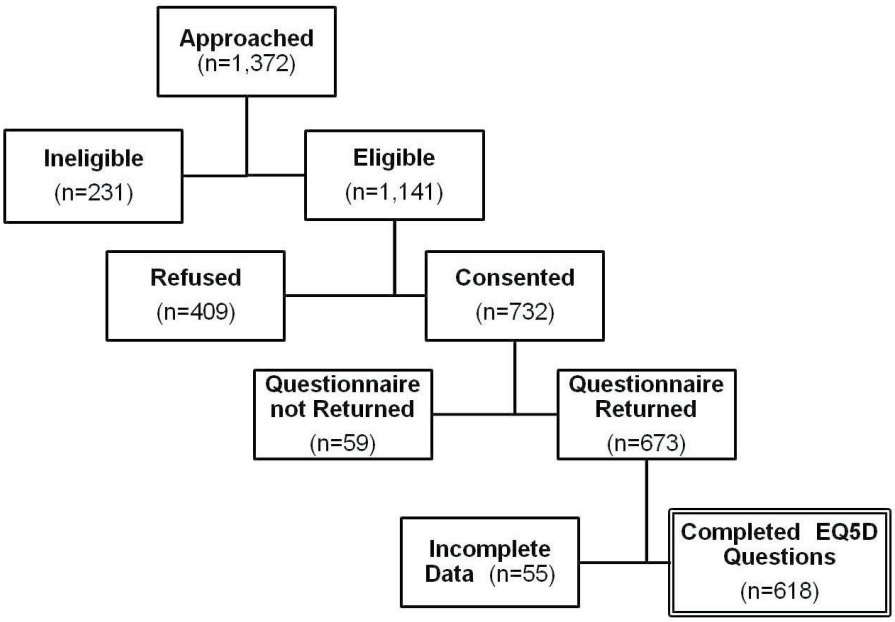

**FIG. 2** Level of patient agreement with statements regarding the EQ-5D questionnaire. The responses to the statement in panel A were used as the primary outcome in subsequent analyses.

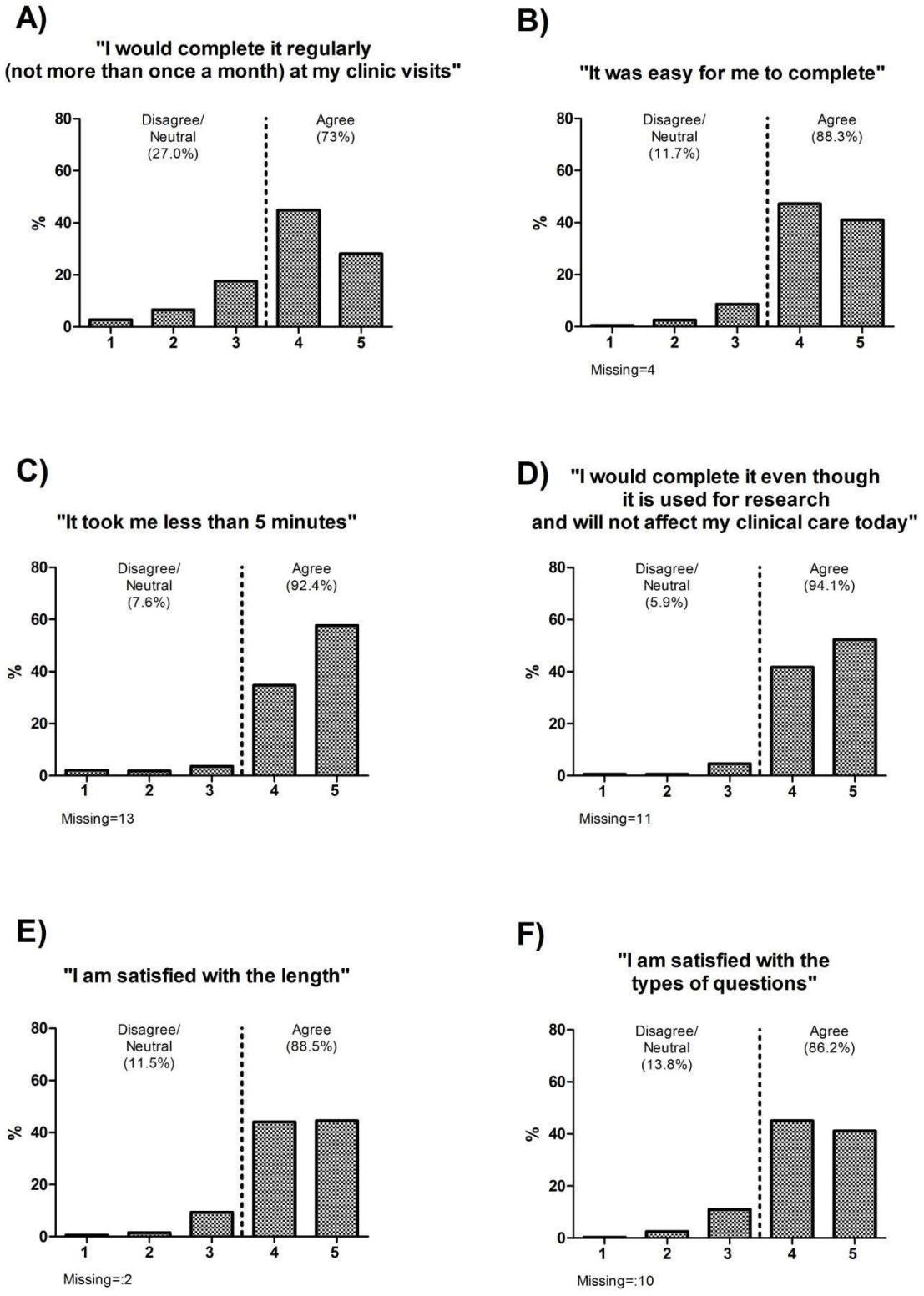

**TABLE 1** Socio-demographic, Clinical, and EQ-5D Data for Patients Included (*n*=618).

| Variables | | Median (Range) | % | Missing (*n*) |
|---|---|---|---|---|
| **Socio-demographic Variables** | | | | |
| **Sex** | Female | | 53.1 | 0 |
| **Age (years)** | | 58.5 (18–98) | | 0 |
| **Marital status** | Married or live with partner | | 71.2 | 7 |
| **Ethnicity** | Caucasian | | 79.6 | 5 |
| **Language spoken at home** | English | | 90.4 | 2 |
| **Born in Canada** | Yes | | 60.5 | 1 |
| **Education** | University or college | | 60.8 | 5 |
| **Household income** | ≥ $100,000 | | 28.3 | 18 |
| | $60,000–99,999 | | 20.5 | |
| | <$59,999 | | 24.3 | |
| | Prefer not to answer | | 26.8 | |
| **Clinical Variables** | | | | |
| **Months since diagnosis** | | 24.9 (0–426) | | |
| **Cancer site** | Hematologic | | 16.6 | 4 |
| | Breast | | 16.1 | |
| | Head, Neck, and Thyroid | | 13.7 | |
| | Genitourinary | | 12.7 | |
| | Gynecological | | 12.4 | |
| | Gastrointestinal | | 10.4 | |
| | Skin and other Cancers | | 9.6 | |
| | Lung | | 8.5 | |
| **Received surgery** | | | 63.8 | 0 |
| **Received chemotherapy** | | | 59.4 | 0 |
| **Received radiation** | | | 42.1 | 0 |
| **Cancer extent at diagnosis** | Local (Solid tumour) | | 73.5 | 37 |
| | Distant metastatic (Solid tumour) | | 9.0 | |
| | Hematologic | | 17.6 | |
| **ECOG Performance status** | 0 | | 47.5 | 9 |
| | 1 | | 37.6 | |
| | 2 or 3 | | 14.9 | |
| **Completed ESAS on same day** | | | 67.5 | |
| **EQ-5D Scores (100% completed)** | | | | |
| **Health Utility** | | 0.82 (0.12–1.0) | | 0 |
| **Visual Analogue Scale** | | 80 (0-100) | | 0 |

**TABLE 2** Factors Associated with the Willingness to Complete the EQ-5D Questionnaire (Univariable Analyses) .

| | | % Willing | OR (95% CI) | *p* |
|---|---|---|---|---|
| **Socio-demographic Variables** | | | | |
| **Sex** | Male | 72.8 | Ref | 0.91 |
| | Female | 73.2 | 1.02(0.72,1.46) | |
| **Age** *(per 1 year)* | | | 0.99(0.98,1.01) | 0.33 |
| **Marital Status** | Married or with partner | 74.5 | Ref | 0.31 |
| | Not married or with partner | 70.5 | 0.82(0.55,1.21) | |
| **Ethnicity** | Not Caucasian | 58.4 | Ref | **<0.0001** |
| | Caucasian | 76.8 | 2.36(1.56,3.57) | |
| **Language spoken at home** | English | 75.2 | 2.74(1.59,4.73) | **<0.0001** |
| | Not English | 52.5 | Ref | |
| **Birthplace** | Not born in Canada | 66.4 | Ref | **0.003** |
| | Born in Canada | 77.2 | 1.72(1.2,2.46) | |
| **Education** | University or college education | 73.7 | Ref | 0.58 |
| | No university or college | 71.7 | 0.9(0.63,1.3) | |
| **Household Income** | >$100,000 | 77.1 | Ref | 0.02 |
| | $60,000–$99,999 | 80.5 | 1.23(0.69,2.17) | |
| | <$59,999 | 70.6 | 0.71(0.43,1.18) | |
| | Prefer not to answer | 65.2 | 0.56(0.34,0.9) | |
| **Clinical Variables** | | | | |
| **Months since diagnosis** *(per 3 months)* | | | 1.01(1.00,1.02) | **0.01** |
| **Cancer site** | Hematologic | 68.6 | Ref | 0.59 |
| | Breast | 74.8 | 1.35(0.73,2.51) | |
| | Gastrointestinal | 64.1 | 0.81(0.42,1.58) | |
| | Genitourinary | 74.4 | 1.33(0.69,2.56) | |
| | Gynecological | 76.3 | 1.47(0.75,2.89) | |
| | Head, neck and thyroid | 78.6 | 1.68(0.86,3.27) | |
| | Lung | 75.0 | 1.37(0.65,2.92) | |
| | Skin and other cancers | 72.9 | 1.23(0.60,2.50) | |
| **Surgery** | Yes | 76.1 | Ref | **0.02** |
| | No | 67.4 | 0.65(0.45,0.93) | |
| **Chemotherapy** | Yes | 72.2 | Ref | 0.60 |
| | No | 74.1 | 1.10(0.77,1.58) | |
| **Radiation** | Yes | 71.2 | Ref | 0.38 |
| | No | 74.3 | 1.17(0.82,1.68) | |
| **Cancer extent at Diagnosis** | Local (Solid tumour) | 75.2 | Ref | 0.24 |
| | Distant metastatic (Solid tumour) | 67.3 | 0.68(0.37,1.26) | |
| | Hematologic | 68.6 | 0.72(0.45,1.16) | |
| **ECOG Performance Status** | 0 | 80.6 | Ref | **0.0003** |
| | 1 | 69.0 | 0.53(0.36,0.80) | |
| | 2 or 3 | 61.5 | 0.38(0.23,0.64) | |
| **Completed ESAS Same day** | Yes | 73.9 | Ref | 0.48 |
| | No | 71.1 | 0.87(0.6,1.27) | |
| **EQ-5D Scores (100% completed)** | | | | |
| **Health Utility** *(per 0.05 unit)* | | | 1.13(1.06,1.2) | **<0.0001** |
| **Visual Analogue Scale** *(per 1 unit)* | | | 1.08(1.03,1.14) | **0.003** |

**TABLE 3** Factors Associated with the Willingness to Complete the EQ-5D Questionnaire (Multivariable Analyses)**.**

| Variables | aOR (95% CI) | *p* |
|---|---|---|
| **Caucasian** *(vs. Not Caucasian)* | 1.96 (1.27–3.03) | 0.002 |
| **Speaks English** *(vs. Does not speak English)* | 2.02 (1.14–3.59) | 0.02 |
| **Months since diagnosis** *(per 3 months)* | 1.01 (1.00–1.02) | 0.05 |
| **EQ-5D Health Utility** *(per 0.05 unit)* | 1.11 (1.05–1.18) | 0.0006 |

## DISCUSSION

Finding efficient methods of collecting research data that can impact on policy decisions in cancer care is important. This need could be addressed by administering a generic instrument such as the EQ-5D to cancer patients on a regular basis at their clinic visits. Our cross-sectional results suggest that a majority of cancer patients are satisfied with the EQ-5D instrument. Most participants endorsed regular completion, were satisfied with the ease of completing it, the length, time to completion and the types of questions. The fact, 94% of patients reported that they "would complete it even though it is used for research and would not affect their clinical care," suggests that even if EQ-5D data was used solely for research purposes, this would unlikely to be a major barrier towards its integration into a clinical setting.

Routine collection of PRO measures such as HRQOL is becoming increasingly common at large cancer centres.[10] Although past studies have examined the burden of questionnaire length[11] and the acceptability including epidemiological questionnaires in clinical trials,[12] our report is the first to explore whether patients are willing to complete surveys routinely during clinic appointments. Further, HRQOL assessment in a clinical setting could also improve communication with health care providers and overall patient well being.[13]

The most important socio-demographic factors affecting patient willingness to complete the EQ-5D were English language spoken at home and Caucasian ethnicity. Although these two factors are likely related, they were found to be independently significant in the multivariable model. It is worth exploring whether the language issue may be addressed by providing multiple language options for patients in the clinic waiting rooms and tablet/ smart phone applications, as the EQ-5D is available in over a hundred different languages. Culturally, Caucasians may perceive research participation in a more favourable light, as corroborated by previous studies which examined clinical trial demographics.[14,15] Participants who were more distant in time from their diagnosis were more likely to be willing to complete the EQ-5D on a regular basis. This may either reflect a survivor bias or increased comfort level with cancer centre procedures and research over time. Participants in better health states were also more willing to complete the instrument regularly, confirming other studies suggesting potential biases and possible overestimation of HU results.[16]

A major concern is that participants may have voted with their choice to participate in the study, as close to 40% declined to complete the EQ-5D in the first place. Although it was not possible to collect reliable or comprehensive data on non-responders, the demographic and clinical characteristics of our study population appear skewed towards Caucasians, English speakers, and individuals with a higher health utility, and these were all factors that were found to be associated with patient willingness. As a surrogate, we compared these characteristics between respondents who returned complete vs. incomplete questionnaires, and no statistically significant differences were identified (Supplementary Tables 1 and 2).

In conclusion, our study suggests that routine collection of HU/ HRQOL data at the cancer clinic is feasible using the EQ-5D, but a potential bias is the underrepresentation of non-Caucasians and patients with lower scores on the instrument. For the purpose of collecting data to best inform policy and clinical decision-making and because of its

importance to economic analyses, inclusion of a HRQOL instrument as regularly collected patient reported outcome measure should be considered.

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**Supplementary Table 1** Comparison of EQ-5D HU and VAS Scores between Respondents Who Returned Complete vs. Incomplete Questionnaires. Statistical Significance Assessed using Two-Tailed t-Test.

| | **Returned Complete Questionnaires** | | **Returned Incomplete Questionnaires** | | |
|---|---|---|---|---|---|
| | ***N*** | **Mean±SEM** | ***N*** | **Mean±SEM** | ***P*** |
| **HU** | 615 | 0.81±0.006 | 35 | 0.78±0.03 | 0.347 |
| **VAS** | 587 | 74.1±0.77 | 32 | 70.5±3.79 | 0.352 |

**Supplementary Table 2** Comparison of ECOG, Ethnicity and Language Characteristics between Respondents who Returned Complete vs. Incomplete Questionnaires. Statistical Significance Assessed using Fisher's Exact Test.

| | | Returned Complete Questionnaires | Returned Incomplete Questionnaires | *P* |
|---|---|---|---|---|
| **ECOG** | 0 | 289 | 15 | 0.198 |
| | ≥1 | 229 | 26 | |
| **Ethnicity** | Caucasian | 488 | 38 | 0.205 |
| | Not Caucasian | 117 | 14 | |
| **Language** | English | 557 | 46 | 0.234 |
| | Other | 59 | 8 | |