

## Background

**Colorectal cancer (CRC)** is the third most common malignancy among both men and women in the US.

Due to the growing number of long-term CRC survivors, investigation of **quality of life (QoL), perceived stress, and sleep quality** is important in evaluating effects of disease and treatment.

CRC survivors have reported altered:

- Overall QoL
- Physical well-being
- Social well-being
- Functional well-being
- Bowel problems and distress
- Depressive symptoms
- Cancer-related pain

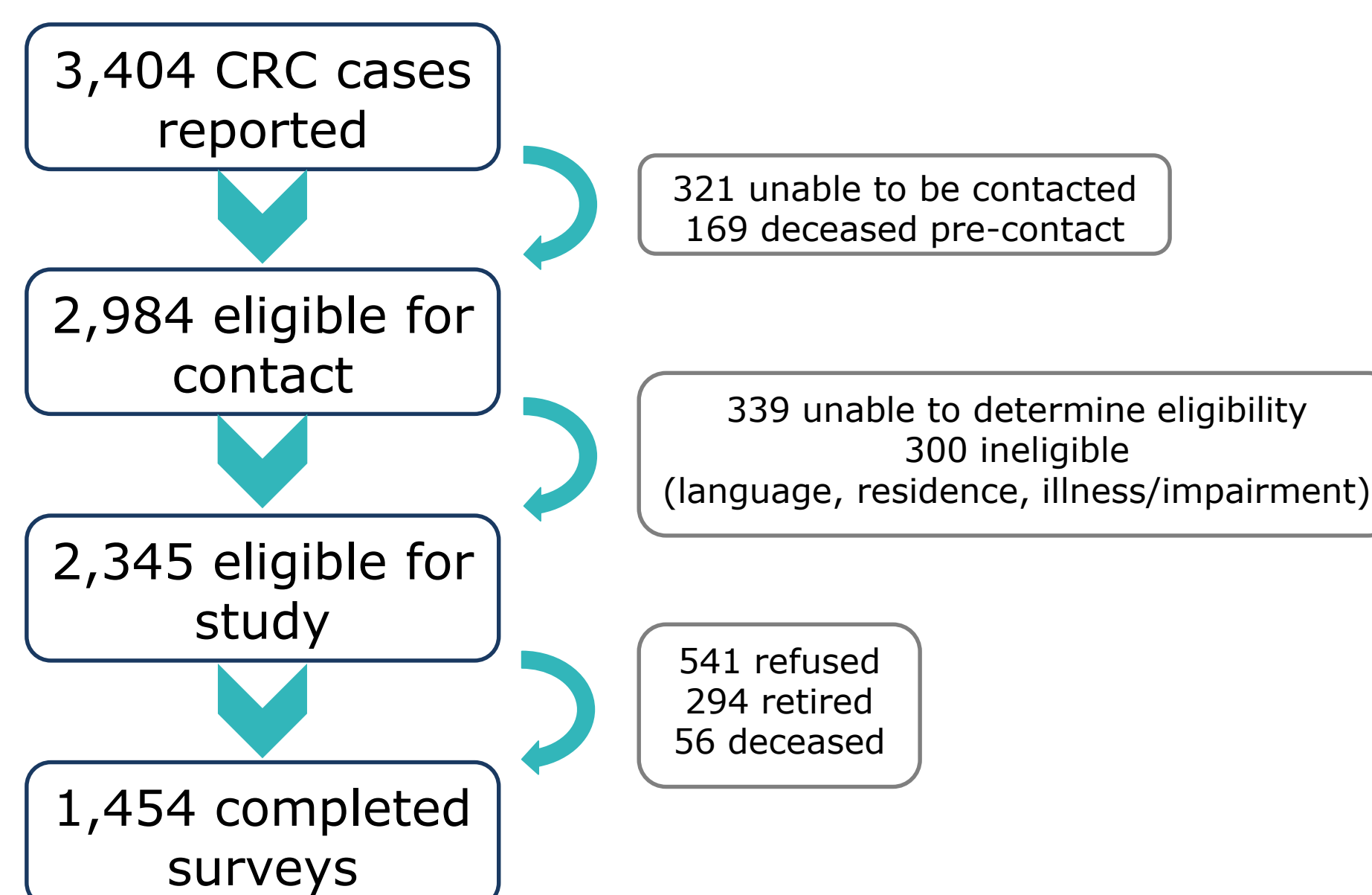
Cumulative epidemiologic evidence suggests CRC is related to poorer QoL. Yet, whether stress, QoL, or sleep quality varies between rectal and colon cancer remains largely **unknown**.

## Objective

To measure the differences in stress, quality of life, and sleep quality among colon and rectal cancer patients. Understanding these characteristics could contribute to improved survivorship care.

## Study Population

ACCESS is a population-based study that identified participants through the Puget-Sound SEER Cancer Registry. Study participants were adults, ages 20-74, diagnosed with invasive CRC between 2016 and 2018.



## Exposure Ascertainment

ACCESS patients were diagnosed with either primary incident:

- colon cancer [ICD0-9 C18.0, C18.2-.9]
- rectal cancer [ICD0-9 C19.9, C20.9]

SEER registry provided information on **cancer characteristics**.

ACCESS questionnaire elicited **lifestyle, dietary, and demographic questions**.

## Outcome Ascertainment

ACCESS questionnaire assessed QoL, perceived stress, and sleep quality with the following validated tools:

| Outcome          | Assessment Tool   |
|------------------|---|
| Perceived Stress | Perceived Stress Score (PSS-10)                                     |
| QoL              | Functional Assessment of Cancer Therapy: Colorectal Cancer (FACT-C) |
| Sleep Quality    | Components of Pittsburg Sleep Quality Index                         |

### PSS-10

- Most widely used psychological instrument measuring stress
- Degree to which situations in one's life are appraised as stressful
- Ranges from 0-40

### FACT-C

- 5 quality of life domains
  - Physical well-being
  - Social/family well-being
  - Emotional well-being
  - Functional well-being
  - Additional concerns [specific to CRC]

- Ranges from 0-50

- FACT-G measures first 4 domains

### Pittsburg Sleep Quality Index [partial]

- Assesses sleep quality in the past month

## Statistical Analysis

Differences in stress, QoL, and sleep quality by CRC site were analyzed using **chi-square** and **ANOVA** tests.

Univariate & multivariate **logistic regression** was used to estimate odds ratios (ORs) and 95% confidence intervals (CIs).

- **Exposure:** primary tumor site (rectal vs. colon)
- **Outcome:**
  - Stress (moderate/high vs. low)
  - QoL (higher vs. lowest quartile)
  - Sleep quality (yes/no)
- **Covariates:**
  - Sex
  - Age at diagnosis
  - Education level
  - Cancer stage

Statistical analyses were performed on SAS software (version 9.4). All P-values were 2-sided.

## Funding

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## Results

**Table 1. Baseline characteristics of CRC patients by cancer site**

|                             | Rectal Cancer<br>N = 543<br>N (%) | Colon Cancer<br>N=911<br>N (%) |
|-----------------------------|-----------------------------------|--------------------------------|
| <b>Age (years)</b>          | 55.6 ± 10.2                       | 58.8 ± 10.7                    |
| <b>Sex</b>                  |                                   |                                |
| Male                        | 305 (56.2)                        | 485 (53.2)                     |
| Female                      | 236 (43.5)                        | 425 (46.7)                     |
| <b>Race</b>                 |                                   |                                |
| Caucasian/White             | 450 (82.9)                        | 755 (82.9)                     |
| Non-White                   | 74 (13.6)                         | 117 (12.8)                     |
| <b>Education</b>            |                                   |                                |
| Less than HS or HS graduate | 124 (22.8)                        | 171 (18.8)                     |
| Some college                | 183 (33.7)                        | 311 (34.1)                     |
| College graduate or higher  | 229 (42.2)                        | 421 (46.2)                     |
| <b>Income</b>               |                                   |                                |
| Less than \$30,000          | 134 (24.7)                        | 182 (20.0)                     |
| \$30,000-\$69,000           | 99 (18.2)                         | 247 (27.1)                     |
| \$70,000+                   | 276 (50.8)                        | 406 (44.6)                     |
| <b>SEER Stage</b>           |                                   |                                |
| Localized                   | 173 (31.9)                        | 359 (39.4)                     |
| Regional                    | 261 (48.1)                        | 361 (39.6)                     |
| Distant                     | 93 (17.1)                         | 174 (19.1)                     |
| <b>Ostomy</b>               |                                   |                                |
| Yes                         | 210 (38.7)                        | 80 (8.8)                       |
| No                          | 330 (60.8)                        | 827 (90.8)                     |

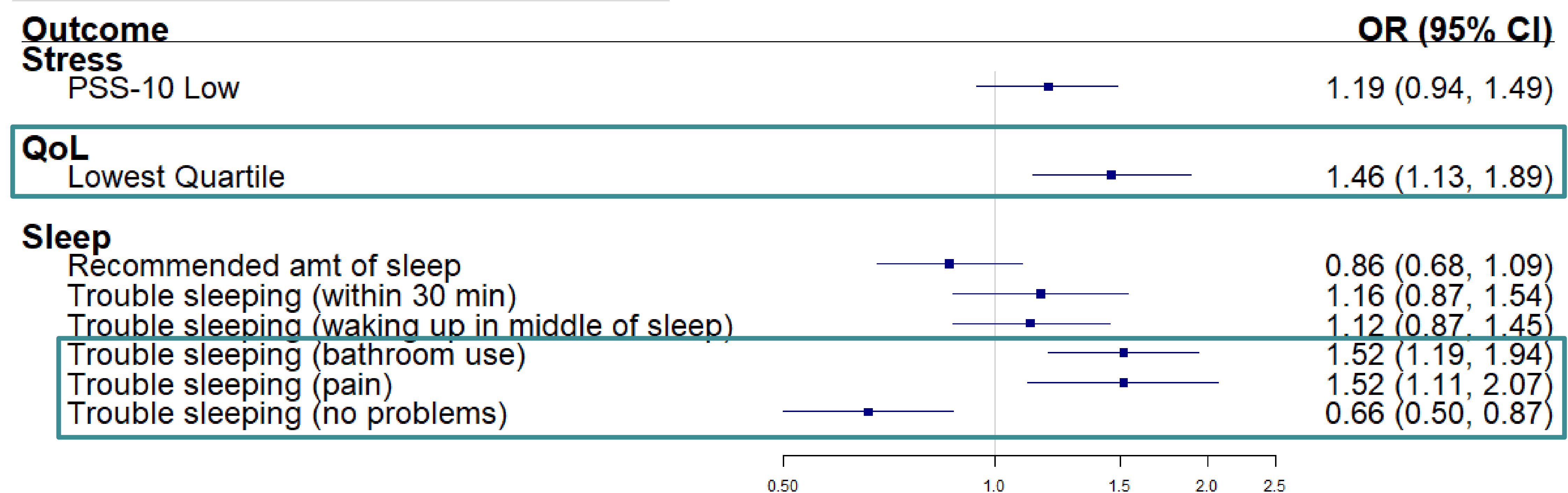
**NOTE:** Some percentages do not sum to 100 due to missing data and rounding.

**Table 2. Differences in stress, QoL, and sleep quality among CRC patients by cancer site**

|                                 | Rectal Cancer<br>N = 543<br>N (%) | Colon Cancer<br>N=911<br>N (%) | p-value          |
|---------------------------------|-----------------------------------|--------------------------------|------------------|
| <b>PSS-10</b>                   | 12.6 ± 6.8                        | 11.8 ± 6.8                     | <b>0.028</b>     |
| <b>PSS-10 Categories</b>        |                                   |                                | <b>0.023</b>     |
| Low stress (0-13)               | 305 (56.3)                        | 560 (61.4)                     |                  |
| Moderate/high stress (14-40)    | 218 (40.0)                        | 309 (33.6)                     |                  |
| <b>FACT-C</b>                   | 100.7 ± 19.2                      | 105.3 ± 18.8                   | <b>&lt;0.001</b> |
| Physical well-being             | 20.5 ± 5.8                        | 21.4 ± 5.6                     | <b>0.003</b>     |
| Social well-being               | 22.1 ± 5.2                        | 22.6 ± 5.1                     | <b>0.039</b>     |
| Emotional well-being            | 19.1 ± 4.3                        | 19.7 ± 4.0                     | <b>0.008</b>     |
| Functional well-being           | 18.5 ± 6.3                        | 20.0 ± 6.0                     | <b>&lt;0.001</b> |
| Additional concerns             | 20.7 ± 4.8                        | 21.5 ± 4.6                     | <b>0.002</b>     |
| <b>FACT-C Quartiles</b>         |                                   |                                | <b>&lt;0.001</b> |
| Q1 (lowest)                     | 160 (30.1)                        | 188 (21.2)                     |                  |
| Q2-4                            | 372 (69.9)                        | 701 (78.9)                     |                  |
| <b>FACT-G</b>                   | 80.0 ± 16.5                       | 83.6 ± 16.2                    | <b>&lt;0.001</b> |
| <b>Sleep Amount</b>             |                                   |                                | 0.112            |
| Less than 7 hours               | 137 (29.9)                        | 196 (24.9)                     |                  |
| 7-8 hours                       | 232 (50.5)                        | 442 (56.1)                     |                  |
| 8+ hours                        | 90 (19.6)                         | 150 (19.0)                     |                  |
| <b>Recommended Sleep Amount</b> |                                   |                                | 0.058            |
| 7-8 hours                       | 227 (49.5)                        | 346 (43.9)                     |                  |
| Other                           | 232 (50.5)                        | 442 (56.1)                     |                  |
| <b>Trouble Sleeping Issues</b>  |                                   |                                |                  |
| No sleep within 30 minutes      | 107 (21.6)                        | 154 (18.2)                     | 0.125            |
| Wake up in middle of sleep      | 152 (30.7)                        | 229 (27.0)                     | 0.150            |
| Use the bathroom                | 189 (38.2)                        | 249 (29.4)                     | <b>&lt;0.001</b> |
| Pain                            | 96 (19.4)                         | 113 (13.3)                     | <b>0.003</b>     |
| No problems                     | 90 (18.2)                         | 233 (27.5)                     | <b>&lt;0.001</b> |

**NOTE:** Some percentages do not sum to 100 due to missing data and rounding.

**Figure 1. Association of stress, QoL, and sleep among rectal cancer patients compared to colon cancer**



**Note:** Adjusted for age (years), sex (male, female), education (less than HS or HS graduate, some college, college graduate or higher), and cancer stage (localized, regional, distant)

## Acknowledgements

We would like to thank the ACCESS participants as well as the Puget Sound SEER Program. We would also like to thank the University of Washington, Department of Epidemiology for a travel grant for ASPO 2020.

## Conclusion

In this population-based study, **rectal cancer** patients had **poorer QoL and sleep quality, and higher perceived stress** compared to colon cancer patients. This suggests that survivorship care may be adapted according to CRC site to ensure patients receive appropriate support.