Cancer Screening Participation: Comparative Willingness of San Juan Puerto Ricans versus New York City Puerto Ricans

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Abstract

Objectives—The specific aim of this study was to determine the self-reported likelihood of New York Puerto Ricans (NYPR) and San Juan Puerto Ricans (SJPR) to participate in: 10 site-specific cancer screenings, cancer-screenings conducted by different specific persons/agencies and cancer-screening under specific conditions of what one was asked to do as a part of cancer screening.

Methods—The Cancer Screening Questionnaire (CSQ) was administered via random-digit-dial telephone interviews to 154 adults living in San Juan, PR and 155 in New York, NY.

Results—Although the self-reported willingness to participate across the 10 site-specific cancer screening exams was consistently high in both cities, SJPR had higher rates, as compared to NYPR for all 10 site-specific cancer screening exams in the unadjusted analyses. A similar pattern was observed regarding the influence of both “who conducts the cancer-screening exam” and “what one is asked to do in a cancer-screening exam” as factors in the willingness to participate in such exams. Adjusted multivariate analysis showed that the odds of SJPR participating in skin cancer screening as compared to NYPR, were three-fold higher to participate in skin cancer screening and were two-fold higher to participate in a cancer screening where they have to be interviewed about their alcohol habits. These two observed differences might reflect the effect of acculturation in the NYPR.

Keywords
cancer; prevention; Latinos; acculturation

INTRODUCTION

Cancer, the second leading cause of death in the United States, accounts for 22.7% of all deaths. According to the Surveillance Epidemiology and End Results (SEER, 2005) Cancer Statistics, prostate and breast cancers have the highest age-adjusted (to the 2000 U.S. standard population) incidence among all cancers with a rate of 182.5 and 137.3 per 100,000 respectively, followed by lung and colorectal cancers. These latter cancers had, for both genders, an age-adjusted (to the 2000 U.S. standard population) incidence rate of 63.7 per 100,000 and 53.1 per 100,000, respectively.¹
While the scientific literature states that early detection of cancer is one of the most effective means of assuring timely treatment and survival, too few people take advantage of the available early screening tests for common cancers. For instance, in the United States, only about 40–50% of the population receives screening for colon cancer, 58% of the women ≥40 receives a mammogram and 54% of men ≥50 get a PSA test for prostate cancer. Only about 20% of the population receives an oral cancer exam despite a recent finding that oral cancer screening in high-risk subjects is effective in reducing of oral cancer mortality.

In Puerto Rico, cancer is also the second cause of death, accounting for 17% of all deaths. According to the Puerto Rico Central Cancer Registry (2006), cancers with the highest age-adjusted (to 2000 U.S. standard population) incidence are, as in the United States, breast and prostate. They have an incidence rate of 98.0 and 145.6 per 100,000, respectively, followed by colorectal cancer with 42.8 per 100,000 for both genders. These cancers are also, for both countries, the most common fatal cancers.

Lower screening rates have direct implications for the quality of cancer care since low utilization of early detection tests increases the risk of a diagnosis of late-stage cancer in populations. In Puerto Rico, for example, a study which characterized head and neck squamous cell carcinoma (HNSCC), which constitutes approximately 90% of all oral cancers, found that 61% of the patients presented stage 3–4 disease at the time of diagnosis. This late-stage diagnosis compromises not only the quality of life but also the five-year survival prognosis of the patient, even in places like the United States, where at the present time the survival rate is 65%.

Disparities in risk for cancer exist among racial and ethnic groups in the United States. It is well documented in the literature that Hispanics and blacks have lower screening rates than whites. Black and Hispanic patients, as well as others with lower levels of formal education, are less likely to have such examinations due perhaps to lack of access to medical care. Low income, poor knowledge and attitudes towards the screening process, not having a regular physician, language, cultural beliefs, and competing demands of day-to-day living are, among others, barriers that contribute to the under-utilization of cancer screening exams. Thus, it is not surprising that the burden of cancer deaths is particularly high among blacks and Hispanics, as compared to Caucasians.

In minority groups, such as Hispanics, the effect of acculturation in health-related behaviors has also been studied. Acculturation is the process by which members of a different cultural or ethnic group in a given society come to identify with or adopt the cultural changes that result from continuous contact between two cultural groups. Several factors contribute to the process of acculturation, e.g., length of residence, language proficiency, ethnic/national attitudes of the individual, social support, discrimination, a reciprocal interaction between the individual and the environment, cultural beliefs and so forth.

The effect of acculturation on Hispanics’ health in the United States is inconsistent due perhaps to the multidimensional factors involved in the acculturation process. Although several studies have found that acculturation negatively affects the health practices of Hispanics and other minority groups, other studies concluded that high levels of acculturation are associated with better self-reported measures of general health, better oral health status index score (OSHI), influenced care-seeking behaviors and increased health preventive behaviors such as clinical breast exams and mammograms.

Since Puerto Ricans are recognized as minorities on the U.S. mainland but not on the island of Puerto Rico, they face many challenges involved in the process of acculturation, i.e., new language, different customs and norms for social interactions, unfamiliar rules and lifestyle changes. Consequently, it can be hypothesized that since Puerto Ricans in New York City have
undergone a process of change and adaptation, they will behave differently than those Puerto Ricans that have lived life long in Puerto Rico, especially regarding their cancer screening participation/behavior. This being the situation, the strategies used to motivate this population to participate in cancer screening exams, for example, tailored-made cancer screening campaigns, should acknowledge these changes.

The specific purpose of this analysis of the Cancer-Screening Questionnaire (CSQ) Study was to determine whether—and if so, the extent to which—Puerto Ricans living in New York, NY (NYPR), as compared to Puerto Ricans living life long in San Juan, Puerto Rico (SJPR), differed in their willingness to participate in cancer screening exams. Specifically, this analysis aimed to determine the comparative likelihood of NYPR and SJPR to participate in: 1) 10 different site-specific type of cancer screening exams, 2) cancer screenings conducted by different specific persons/agencies, and 3) cancer screenings under specific conditions of what one was asked to do as a part of the cancer screening exams. The CSQ Study was approved by the University of Puerto Rico, Medical Sciences Campus institutional review board (IRB) and the IRB of New York University (NYU).

**METHODS**

**The Cancer Screening Questionnaire**

The instrument used for this study was the CSQ, which was developed in 2001–2002 within the NYU Oral Cancer Research on Adolescent and Adult Health Promotion Center, an NIDCR/National Institutes of Health Oral Health Disparities Center. The English and Spanish versions of the questionnaire were developed by a multidisciplinary and multiuniversity research team. The Spanish version was validated through pilot studies in San Juan, Puerto Rico. The CSQ addresses a range of issues related to the willingness of minorities to participate in cancer screening examinations. This instrument has 60 questions, eight of which obtained demographic information. It is divided into nine topics, including willingness to participate in different site-specific cancer screening exams, the influence of “who conducts the cancer screening exam” and of “what one is asked to do in a cancer-screening exam” as key factors in the subject’s willingness to participate in cancer screening exams. These latter topics are discussed in this report.

The Spanish version used in San Juan had additional eligibility questions that asked subjects if they had lived all their life in Puerto Rico. Those who had not and had lived on the U.S. mainland for longer than two years in a row were not eligible for the study. However, no eligibility question regarding length of time living in the United States was used for the NYC subjects because of the possibility that it could be threatening to Hispanics in the United States regardless of their legal or illegal status.

The Spanish version was administered to San Juan subjects, while the NYPR subjects could decide whether they preferred to be interviewed in English or Spanish.

A five-point Likert scale was utilized as response choices for subjects on the CSQ. The scale consists of very likely (VL), somewhat likely (SL), not quite sure (NQS), somewhat unlikely (SU) and very unlikely (VU) for the questions analyzed in this report. To create a dichotomous response for certain analyses, VL + SL were combined to create the positive response of “willingness to participate” used in this report.

To gather the demographic information, the following variables were used: the “date of birth” variable was used to calculate the subjects’ ages; the level of education and level of income variables were collected in an ordinal listings of nine ascending categories of educational level.

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and of 10 ascending categories of income level. These variables were then each collapsed into three categories for the demographic table and the multivariate analyses.

**Study Population**

The sample for this study is composed of 309 Puerto Ricans: 154 SJPR and 155 NYPR. It was drawn from the total noninstitutionalized adult population (≥18 year) residing in telephone-equipped dwelling units in New York City and San Juan. This study provided for a disproportionally allocated, stratified random-digit sample of telephone-equipped residential households in both cities. The percentage of households with telephone service for NYPR was 97.6% and 84% for SJPR. Each city was sampled independently, with a target number of 150 completed interviews within each city. The NYPR population includes both Puerto Ricans who where born in NYC and persons of Puerto-Rican descent.

ORC Macro, an opinion research corporation, administered the CSQ to adults living in these two cities in 2003. The instrument was administered via random-digit dial using a computer-assisted telephone interview (CATI) system for data collection. The telephone survey followed a 10-attempt dialing protocol in which up to 10 attempts were made unless a final disposition was obtained. The response rates (number interviewed / number of phone numbers contacted) for San Juan and New York were 57.9% and 45.1%, respectively. The completion rate (number of completed interviews / total number of interviews initiated) was 84% for San Juan and 83% for New York City.

**Statistical Analysis**

The aim of the statistical analysis performed for this study was to determine if SJPR and NYPR differed in their willingness to participate in cancer screenings. In addition, statistical analysis was performed by gender to determine if there were significant sex differences between SJPR’s and NYPR’s willingness to participate in 10 site- and sex-specific cancer exams. Unadjusted analysis was used as a pathway leading to adjusted multivariate analyses. Statistical significance in cross-tabulations was evaluated by means of Chi-squared tests with the significance level set at p≤0.05. Multivariate logistic regression analysis adjusted for gender, education, age and income was also performed at 0.05 level of significance.

**RESULTS**

Table 1 shows the composition of the sample by gender, age, education and income level. NYPR had slightly higher percentage of females (72% vs. 67%) and had slightly higher income than SJPR; these differences were not statistically significant. SJPR, however, did report significantly higher levels of education than NYPR, i.e., 74.5% with some college or higher educational level versus 40% in NYPR (Pearson χ²=37.0, df=2, p≤0.001), and were significantly older than NYPR (50 years vs. 44 years), (t (307)=3.47, p=0.001).

Figure 1 shows the comparative rank order of the 10 site-specific cancer screening exams for SJPR (n=154) and NYPR (n=155) listed in order based upon the descending rank order of SJPR. It also shows that while overall self-reported willingness to participate across the 10 site-specific cancer screening exams was consistently high in both cities (ranging from 70% to a high of 95%) SJPR had higher rates, as compared to NYPR for all 10 site-specific cancer screening exams. As shown in Figure 1, subjects within each city placed the sex-specific cancers screenings (i.e., breast cancer and prostate cancer) and blood cancer screening exams in the top tercile, while placing liver and oral cancer screenings in the lowest tercile. The only significant difference between SJPR and NYPR in willingness to participate was evidenced for skin cancer screening exams. This significant difference was observed in both the
unadjusted and the multivariate analysis adjusted for demographics ($\chi^2=12.51$, df=1, $p\leq0.05$; OR=3.33, 95% CI: 1.40–7.71, respectively).

Unadjusted analysis by gender (Table 2) shows differences in willingness to participate between SJPR and NYPR for the nine site- and sex-specific cancer screenings. For males, SJPR were consistently more willing to participate in all nine site- and sex-specific cancer-screenings (mean of 16% with a range from a high difference of 24.9% to a low of 6.8%). Significant differences were observed in both unadjusted and adjusted multivariate analysis controlling for demographics, for skin ($\chi^2=7.763$, df=1, $p\leq0.05$; OR=3.84, 95% CI: 1.28–11.49), rectal ($\chi^2=8.032$, df=1 $p\leq0.05$; OR=4.10, 95% CI: 1.38–12.17) and blood ($\chi^2=8.383$, df=1, $p\leq0.05$; OR=4.79, 95% CI: 1.46–15.70) screenings. For females, although the same direction of findings was observed in the unadjusted analyses (i.e., generally albeit not consistently higher willingness to participate in SJPR females, as compared to NYPR females), the magnitude of the difference in willingness to participate was much reduced in the females (mean=4%, ranging from −3.6%–13.4%) as compared to the males. Statistically significant differences were only found between SJPR and NYPR females in their willingness to participate in skin cancer-screening exams ($\chi^2=5.904$, df=1, $p\leq0.05$). This difference remained significant when the multivariate analysis controlling for demographic characteristics was performed (OR=2.64, 95% CI: 1.20–5.80).

Subjects were also asked about their likelihood to participate in cancer screening exams depending upon who was providing the cancer screening, i.e., different agencies/persons. As shown in Figure 2, for all 10 specific agencies/person who might provide the cancer-screenings, SJPR were consistently more willing to participate than were the NYPR.

Unadjusted analysis showed statistically significant differences between SJPR and NYPR in their willingness to participate if the exams were provided by: own physician, university dental school and by a drug company ($\chi^2=3.992$, df=1, $p\leq0.05$; $\chi^2=10.825$, df=1, $p\leq0.05$; $\chi^2=15.74$, df=1, $p\leq0.05$, respectively). In a multivariate analysis adjusting for age, education, income and gender, only the drug company remained significant (OR=3.21, 95% CI: 1.63–6.34).

Besides exploring the influence of “who was providing the cancer screening,” the study also explored the influence of “what they would be asked to do” as a factor in the willingness of SJPR and NYPR to participate in cancer screenings. Figure 3 shows that “what the subject is asked to do” resulted in consistent smaller differences between SJPR and NYPR as compared to the factor of who was conducting the screening (Figure 2). This figure also shows that SJPR self-reported a greater willingness to participate in cancer screening for 10 of the 11 specific “what one was asked to do” conditions (mean=7.5%, range 2.3–12.7 %). The sole exception in direction of findings was for the circumstance of “having a nurse examine you” for which the NYPR self-reported a higher willingness to participate. Unadjusted analysis showed that statistically significant differences were found between SJPR and NYPR in their willingness to participate in cancer screenings when they were asked to: have a piece of skin removed and a physician examining them ($\chi^2=5.49$, df=1, $p\leq0.05$ and $\chi^2=9.04$, df=1, $p\leq0.05$). The multivariate analysis adjusting for demographics, however, revealed that the odds of SJPR participating in a cancer screening in which they are interviewed about their alcohol drinking habits were twofold higher as compared to NYPR (OR=2.11, 95% CI: 1.09–4.08) as the only statistically significant finding.

**DISCUSSION**

Findings of this study show more similarities than differences in the willingness of SJPR and NYPR to participate in 10 site-specific cancer screening exams regardless of the influence of “who was conducting the exam” or “what they are asked to do” factor. SJPR and NYPR, for
example, self-reported more willingness to participate in the site-specific cancer-screening exams of breast and prostate than in oral cancer screening exam. Findings reveal that these sex-specific cancer screening exams obtained the highest percentage of willingness to participate within each gender. The high willingness to participate in the sex-specific cancer screening exams likely reflects the considerable efforts that public and private agencies, such as the American Cancer Society and the Government Health Department among others, are carrying out to develop awareness and knowledge in the population regarding these diseases. These agencies emphasize not only the importance of the early detection of these diseases through periodic screening exams but also the relationship between early diagnosis and treatment with its prognosis and quality of life. Contrasting with the above-mentioned findings for the sex-specific cancer sites are those related to oral cancer for which SJPR and NYPR self-reported willingness to participate was among the lowest. Conversely, the lack of exposure of information regarding oral cancer, the risks of developing it, its symptoms, diagnosis and treatment as well as the lack of knowledge regarding the availability of screening exams might explain the lower willingness of SJPR and NYPR to participate in oral cancer screening exams. People are unlikely to consider or obtain screening without this information.\(^{33}\)

Similarities were also observed between SJPR and NYPR in their willingness to participate in cancer screenings conducted by own physicians, a medical school or own dentists as well as their unwillingness to participate in cancer screenings conducted by a tobacco company. This willingness to participate in cancer screenings conducted by different healthcare professionals stresses how much the primary care provider can do to increase the participation in cancer screening exams of this Puerto-Rican population. Thus, the incorporation of different healthcare providers in the development of educational programs tailored to increase knowledge and to modify health preventive behaviors such as cancer screening exams should be considered as an adequate strategy for both populations.

On the other hand, a few statistically significant differences emerged as well. SJPR and NYPR differed significantly in their willingness to participate in skin cancer screening, screening exams conducted by drug companies and screening exams where they have to be interviewed about their alcohol drinking habits. As the results showed that the odds of SJPR participating in skin cancer-screening were three-fold higher than for NYPR, this willingness to participate in skin cancer screening exams might be due to their perception of having a lower risk of developing skin cancer. According to Pipitone (2002), Hispanics on the mainland perceive that they have less skin sensitivity and tendency to sunburn than their white counterparts. This belief could have being reinforced by multimedia messages that link skin cancer and early detection strategies with having sun-sensitive skin.\(^{34}\) On the other hand, SJPR as tropical islanders are constantly exposed to sun, the major environmental risk for skin cancer. This fact makes them more aware of their potential high risk of developing skin cancer.

Similarly, when the 10 types of cancer screenings were analyzed by gender, SJPR and NYPR were generally found to be very similar on willingness to participate for most types of cancer screenings; however, a few statistically significant differences were detected. The odds of SJPR males as compared to NYPR males were 4–5-fold higher for self-reported willingness to participate in cancer screening exams for skin, rectal and blood cancer, while the odds of SJPR females were almost three-fold higher for self-reported willingness to participate in skin cancer screening exams, as compared to NYPR females. This comparative lack of willingness of NYPR males to participate in rectal cancer screening is congruent with previous studies conducted with Puerto-Rican males on the U.S. mainland.\(^{35,36}\) According to these studies, Puerto-Rican men indicated that it would be too embarrassing for them to get a rectal exam, and they felt that others would disapprove of them getting such an exam. Another study that compared differences in screening exams, such as the digital rectal exam and prostate-specific antigen tests, among men of seven ethnic groups, including Puerto Ricans, found that fear was

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among the key psychological determinants that negatively influence male screening behavior.

In regards to the influence of the factor “who is conducting the exam,” the results showed that the odds of SJPR participating in cancer screening conducted by a drug company were almost three-fold higher than for NYPR. The extent of influence of drug companies is particularly high in Puerto Rico due to the fact that the pharmaceutical industry constitutes one of the leading industries in the country. It provides and promotes a diversity of health information and services, individually or in alliances with other health organizations, thus increasing SJPR exposure to activities sponsored by those companies. Cultural diversity in NYC, language barriers or promotional strategies may contribute to the minimal exposure of NYPR to the outreach services of these organizations.

In a similar fashion, for the “what they are asked to do” factor, the findings that show that the odds of SJPR as compared to NYPR are two-fold higher to participate in a screening where they have to be interviewed about their alcohol habits has clear implications for screening programs related to cancers associated with alcohol consumption, e.g., oral cancer screenings. Thus, to be effective and successful in the development and implementation of preventive programs geared to increase cancer screening participation, this barrier should be addressed and overcome.

Data gathered in this study provide information that is of paramount importance in the development and implementation of cancer screening campaigns for the Puerto-Rican population. As stated earlier, NYPR appear to be less responsive to cancer screening exams for skin cancer, where there are inquiries about their alcohol drinking habits or when the cancer screenings are conducted by drug companies.

In conclusion, the development of tailor-made cancer screening campaigns that are responsive to these observed differences between SJPR and immigrant NYPR in self-reported willingness to participate in cancer screenings could be a fundamental and critical step in the process of increasing cancer screening participation in Puerto-Rican populations.

Acknowledgements

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References


Figure 1.
Comparison between san Juan Puerto Ricans’ and New York Puerto Ricans’ willingness to participate in cancer screenings for the 10 site-specific cancer screenings
* Significant difference $p \leq 0.05$, unadjusted analysis; ‡ Significant difference $p \leq 0.05$, multivariate analysis
Figure 2.
Comparison between San Juan Puerto Ricans and New York Puerto Ricans on willingness to participate in cancer screening based on what agency/person conducts the screening
* Significant difference $p \leq 0.05$, unadjusted analysis; ‡ Significant difference $p \leq 0.05$, multivariate analysis
Figure 3.
Comparison between San Juan Puerto Ricans’ and New York Puerto Ricans’ willingness to participate in cancer screenings based on what they are asked to do
* Significant difference \( p \leq 0.05 \), unadjusted analysis; ‡ Significant difference \( p \leq 0.05 \), multivariate analysis
### Table 1
Demographics of San Juan and New York Puerto Ricans

<table>
<thead>
<tr>
<th></th>
<th>sJPr n=154</th>
<th>nYPr n=155</th>
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<tbody>
<tr>
<td>% Female</td>
<td>67 %</td>
<td>72 %</td>
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<tr>
<td>Mean Age (± SD)</td>
<td>50 ± 16.5</td>
<td>44 ± 14.8</td>
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<tr>
<td>Income Level</td>
<td></td>
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<tr>
<td>&lt;$20,000</td>
<td>42.6%</td>
<td>36.2%</td>
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<tr>
<td>$20,000–34,999</td>
<td>23.4%</td>
<td>28.4%</td>
</tr>
<tr>
<td>≥$35,000</td>
<td>34%</td>
<td>35.5%</td>
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<tr>
<td>Educational Level</td>
<td></td>
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<tr>
<td>&lt; High school</td>
<td>11.7%</td>
<td>27.7%</td>
</tr>
<tr>
<td>High-school graduate</td>
<td>13.0%</td>
<td>31.0%</td>
</tr>
<tr>
<td>Some college or higher</td>
<td>74.7%</td>
<td>40.6%</td>
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### Table 2
Percent difference between San Juan Puerto Ricans and New York Puerto Ricans in willingness to participate in nine site-specific cancer screening exams

<table>
<thead>
<tr>
<th>Site-specific Cancer Screening</th>
<th>Males</th>
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<th></th>
<th></th>
<th>Females</th>
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<th></th>
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<td></td>
<td>SJPR</td>
<td>NYPR</td>
<td>% Difference</td>
<td>SJPR</td>
<td>NYPR</td>
<td>% Difference</td>
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<tr>
<td></td>
<td>N=51</td>
<td>N=44</td>
<td>(SJPR-NYPR)</td>
<td>N=103</td>
<td>N=111</td>
<td>(SJPR-NYPR)</td>
<td></td>
</tr>
<tr>
<td>% Willing</td>
<td>% Willing</td>
<td>% Willing</td>
<td>% Willing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin</td>
<td>86.3</td>
<td>61.4</td>
<td>24.9 *‡</td>
<td>86.4</td>
<td>73</td>
<td>13.4 *‡</td>
<td></td>
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<tr>
<td>Rectal</td>
<td>88.2</td>
<td>63.6</td>
<td>24.6 *‡</td>
<td>77.5</td>
<td>81.1</td>
<td>-3.6</td>
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<tr>
<td>Blood</td>
<td>90.2</td>
<td>65.9</td>
<td>24.3 *‡</td>
<td>86.4</td>
<td>87.4</td>
<td>-1</td>
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<tr>
<td>Liver</td>
<td>84.3</td>
<td>68.2</td>
<td>16.1</td>
<td>76.7</td>
<td>74.8</td>
<td>1.9</td>
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<tr>
<td>Oral</td>
<td>82.4</td>
<td>68.2</td>
<td>14.2</td>
<td>81.6</td>
<td>75.7</td>
<td>5.9</td>
<td></td>
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<tr>
<td>Colon</td>
<td>88</td>
<td>74.4</td>
<td>13.6</td>
<td>82.4</td>
<td>79.1</td>
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<td>Stomach</td>
<td>86.3</td>
<td>75</td>
<td>11.3</td>
<td>82.5</td>
<td>79.1</td>
<td>3.4</td>
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<td>Lung</td>
<td>88.2</td>
<td>77.3</td>
<td>10.9</td>
<td>85.4</td>
<td>74.8</td>
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<tr>
<td>Prostate</td>
<td>88.2</td>
<td>81.4</td>
<td>6.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Breast</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>95.1</td>
<td>93.7</td>
<td>1.4</td>
<td></td>
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* Significant difference, p<0.05, unadjusted analysis;
‡ Significant difference, p<0.05, multivariate analysis, controlling for age, sex, income and education;
- The question was not asked to these subjects