

Cancer Risk Behaviors and Screening Rates Among Homeless Adults in Los Angeles County

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Abstract

The homeless encounter many barriers to health care and preventive services, while having an increased prevalence of most risk factors for cancer. A group of homeless adults (221) at nine different locations within Los Angeles County were surveyed during the summers of 1998 and 1999. A portion (71%) reported that they had had at least one rectal exam, 42% had a fecal occult blood test, 24% had a skin exam, and 23% had an endoscopy (flexible sigmoidoscopy or colonoscopy), and of the men aged 50+, only 19% had a prostate-specific antigen test in their lifetime. For women aged 40+, 55% had received a Pap smear, and 53% had a breast exam, but only 32% had a mammogram within the prior year. Among the sampled homeless population, 77% believed in the benefits of cancer screening, 79% were not fatalistic about cancer, 63% believed that early detection was efficacious, and 83% did not think it would be difficult to get screened. The majority of this population demonstrated accurate knowledge of cancer screening guidelines with the exception of endoscopy. Cancer screening rates of those surveyed were lower than the rates in California for endoscopy, prostate-specific antigen, mammography, and Pap smears. Given the lower cancer screening rates compounded by higher cancer risk factors, homeless populations need increased access to cancer screening tests, as well as education on the availability of free services. Additionally, facilities for the homeless and their staff should reinforce the purposes of cancer screening, provide more screening services, and implement institutional efforts, such as providing nutritious meals and sun protection products, to reduce high-risk behaviors and increase further access to cancer screening tests.

Introduction

An estimated 1,268,000 cases of cancer were diagnosed in the United States in 2001, with >40% of these cases resulting in death (1). Experts believe that a number of these deaths could be prevented by lifestyle changes (*e.g.*, nutrition, smoking, alcohol, and exercise) and early detection through appropriate cancer screening.^{2,3} Although numerous studies have examined cancer related risk factors and screening frequencies in a wide variety of populations, including low income and ethnic minority populations, only little is known about the homeless population in this regard.

It is estimated that on any given night, homelessness affects ≤ 3 million individuals (2), and 14% of the United States population has been homeless in their lifetime (3). The homeless represent an extremely disadvantaged population that has traditionally lagged far behind even ethnic minority groups with respect to access to health care and preventive services. It is well established that homeless individuals encounter many obstacles in obtaining health care, including cost, transportation, competing needs, mental illness, personal barriers, lack of availability of health services, and medical provider bias (4, 5). In fact, half of the homeless suffering from chronic medical problems have not visited a physician within the past year (6).

However, access to health care is not the only barrier to reducing cancer burden among the homeless. Cancer reduction is also impeded by a dearth of knowledge about current cancer prevention measures practiced among the homeless, a population which may be at greater risk for cancer than the general public. Gelberg and Linn (7) found that 17% of a Los Angeles homeless study population was seriously sunburned, thus increasing their risk for skin cancer. Other cancer risk factors occurring at an increased prevalence in the homeless population are cigarette smoking, alcoholism, and obesity (2). Additionally, homeless women, in general, have more sexual partners than the general population (8), placing them at greater risk for cervical cancer. Although several studies have reported increased incidence of cancer risk factors among the homeless population, few studies have examined cancer screening frequency in this population.

Only two previous studies have reported statistics for cancer screening among the homeless. Weinreb *et al.* (9) surveyed the frequency of Pap smears among the maternal subset of the homeless women population of Worcester, Massachusetts and compared them to low-income housed mothers. This publication examined general women's health, and the only cancer data reported were on Pap smear testing rates. Long *et al.* (8) focused their paper on cancer among homeless women in San Francisco, California and presented breast exam, mammogram, and Pap smear screening rates, as well as attitudes

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³ Internet address: http://cancernet.nci.nih.gov/pdq/pdq_screening.shtml.

toward these screening tests. This study was again limited to women and only considered breast and cervical cancer. These studies (8, 9) did not find poorer screening rates for cervical and breast cancer among homeless women. However, although a few risk factors were assessed in these studies, several risks, such as sun exposure, were not surveyed. Clearly, a more complete examination of cancer screening in the general homeless population is needed.

Given the paucity of knowledge available on cancer prevention and control among the homeless, the purpose of this pilot study was to conduct a comprehensive survey of cancer screening practices, attitudes, and lifestyle risk factors in the homeless population of Los Angeles County and to explore which health behaviors should be targeted to decrease the cancer burden in this population.

Materials and Methods

Procedure. Anonymous interviews were conducted from June to July of 1998 and 1999 at nine Los Angeles County sites, including five from downtown and four from West Los Angeles (two major congregating areas for the homeless population in Los Angeles County). Respondents were sampled from five shelters, two meal programs, and two day centers that serve the homeless population. In this convenience sample, interviewers approached individuals who appeared to be >18 years of age. Those who reported that they were ≥ 50 years of age were over-sampled because cancer incidence and mortality increase with age.

The interview started with a short screening questionnaire to determine whether subjects met the following criteria: (a) the participant had to be new to the study (to avoid repeat interviews); (b) at least 18 years of age; and (c) homeless. To meet our definition of homelessness, a person had to state that he/she did not have a regular home or apartment to stay in for at least one night of the previous 30 nights but instead had to stay in: (a) a shelter; (b) a hotel paid for with a voucher; (c) the street or other outdoor public place; (d) a church; (e) an indoor public place; (f) an abandoned building; or (g) a car or other vehicle. For those persons who were currently in a rehabilitation program, they were asked about whether they were homeless during any of the 30 nights before entering rehabilitation. Subjects who met the eligibility criteria and were willing to participate received the main interview. Participants received \$1 for completing the screening questionnaire and an additional \$5 for the main interview. Participants were given a listing of free and reduced-fee clinics in the Los Angeles area.

Of the 249 individuals screened, 27 were ineligible because they did not fulfill the homeless criteria, did not speak English, or had participated previously in the study. Everyone who passed the screener agreed to complete the main interview except 1 individual who terminated the interview prematurely because of time constraints and personal reasons.

Structured Interview. The interview questionnaire consisted of items derived from prior surveys of the 1992 National Health Interview Survey (10) and the investigators Bastani *et al.* (11, 12) and Gelberg *et al.* (13). It contained two domains: (a) the outcome variables; and (b) predictor variables. The outcome variables included the receipt of cancer screening for colorectal, skin, breast, cervical and prostate cancers, tobacco and alcohol use, and sun exposure. Predictor variables include homeless history, demographic characteristics, knowledge of guidelines, attitudes and beliefs regarding cancer screening, general risk factors, competing needs, and access to health care. Two versions of the main interview were developed based on age-

Table 1 Demographic characteristics and homeless history of homeless adults

| Characteristics | All <i>n</i> = 221 |
|---------------------------------------|-----------------------|
| Gender | |
| Males | 120 (54%) |
| Females | 101 (46%) |
| Age | |
| <40 | 50 (23%) |
| 40–49 | 79 (36%) |
| ≥ 50 | 92 (42%) |
| Ethnicity | |
| White/Caucasian | 58 (26%) |
| African-American | 126 (57%) |
| Other | 37 (17%) |
| Education | |
| Years 0–12 | 134 (60%) |
| Years 13+ | 87 (40%) |
| Marital status | |
| Never married | 89 (40%) |
| Other status | 132 (60%) |
| Income ^a | |
| <\$300/month | 125 (58%) |
| >\$300/month | 92 (42%) |
| Homeless status ^a | |
| Homeless more than once or >12 months | 92 (42%) |
| All others | 127 (59%) |
| Lived in shelter in the past 30 days | |
| <50% of time in shelter | 33 (15%) |
| $\geq 50\%$ of time in shelter | 188 (85%) |
| Sampling location | |
| Shelter | 112 (51%) |
| Meal program (lunch) | 90 (41%) |
| Day center | 19 (9%) |

^a Totals not equal to 221. Income = 217; homeless status = 219.

appropriate screening behaviors (Form V.10b.2 for those <40 years of age and Form V.10a.3 for those aged ≥ 40). The face-to-face interview lasted ~30 min. When necessary, cards with pictures of endoscopy (colonoscopy and flexible sigmoidoscopy), pap smears, or breast exams were used to educate or clarify respondents' questions about the different procedures.

Analytical Methods. To understand the association of cancer screening rates and the sociodemographic characteristics of age and gender, bivariate analyses were performed using *t* tests and χ^2 statistics. The limited sample size precluded multivariate analyses, as well as bivariate analysis by ethnicity. However, bivariate analyses were conducted by homeless history (being homeless more than once and >12 months *versus* all others), education status (\leq high school *versus* college+), and duration of living in a shelter (<50% time in shelter *versus* $\geq 50\%$ time in a shelter), but no statistical differences were found. In the tables, we present published data from general populations, which we discuss in the "Discussion" section.

Results

Characteristics of Subjects. Of the 221 individuals who completed the main interview, 120 (54%) were male, and 101 (46%) were female (Table 1). The mean age was 46.7 years, with a range of 21–78 years. A portion (78%) was ≥ 40 years of age. The majority of the participants were African-American (57%), followed by Caucasians (26%). A portion (40%) of the respondents had never been married. A portion (42%) of respondents were chronically homeless, having had more than one episode of homelessness or having been homeless for >1

Table 2a Cancer screening rates of colorectal cancer and prostate cancer, among homeless adults aged ≥ 50 , by gender

| | ≥ 50 | Males ≥ 50 | Females ≥ 50 | California average ^a 50+ |
|---|-----------|-----------------|-------------------|-------------------------------------|
| Colorectal cancer | (n = 92) | (n = 48) | (n = 44) | |
| Heard of a rectal exam | 88 (96%) | 46 (96%) | 42 (96%) | |
| Ever had a rectal exam | 65 (71%) | 36 (75%) | 29 (66%) | |
| Had a rectal exam in the past 12 months | 33 (36%) | 19 (40%) | 14 (32%) | |
| Heard of a FOBT | 73 (80%) | 39 (81%) | 34 (79%) | |
| Ever had a FOBT | 39 (42%) | 22 (46%) | 17 (39%) | |
| Had a FOBT in the past 12 months | 17 (19%) | 10 (23%) | 7 (16%) | |
| Heard of an endoscopy | 48 (53%) | 21 (44%) | 27 (63%) | |
| Ever had an endoscopy | 11 (23%) | 3 (7%) | 8 (18%) | 47.3% |
| Had an endoscopy in the past 12 months | | 0 | 4 (9%) | |
| Prostate cancer | | | | |
| Heard of a PSA exam | | 16 (34%) | | |
| Ever had a PSA exam | | 9 (19%) | | 53.8% |
| Had a PSA exam in the past 12 months | | 5 (11%) | | |

^a American Cancer Society, 1999.

Table 2b Cancer screening rates of breast cancer and cervical cancer among homeless women, by age group

| | All females | <40 | 40–49 | ≥ 50 | California average 40+ |
|---|-------------|-----------|-----------------------|-----------------------|------------------------|
| Breast cancer | (n = 101) | (n = 25) | (n = 32) | (n = 44) | |
| Heard of a breast exam | 99 (98%) | 24 (96%) | 31 (97%) | 44 (100%) | |
| Ever had a breast exam | 89 (88%) | 23 (92%) | 28 (88%) | 38 (86%) | 89.0% ^{a,b} |
| Had a breast exam in the past 12 months | 53 (53%) | 13 (52%) | 18 (56%) | 22 (50%) | 77.2% ^{a,b} |
| Heard of a mammogram | 74 (97%) | | 31 (97%) | 43 (98%) | |
| Ever had a mammogram | 51 (67%) | | 17 (53%) ^c | 34 (77%) ^c | 87.3% ^{d,e,f} |
| Had a mammogram in the past 12 months | 24 (32%) | | 9 (28%) | 15 (34%) | 72.7% ^{e,d,f} |
| Cervical cancer | (n = 100) | (n = 24) | (n = 34) | (n = 44) | |
| Heard of a Pap smear | 100 (100%) | 24 (100%) | 32 (100%) | 44 (100%) | |
| Ever had a Pap smear | 97 (97%) | 24 (100%) | 31 (97%) | 42 (96%) | 92.0% ^{d,e,f} |
| Had a Pap smear in the past 12 months | 55 (55%) | 14 (58%) | 20 (63%) | 21 (48%) | 84.4% ^{d,e,f} |

^a Behavioral risk factor surveillance system, 1997.

^b Had breast exam within the past 2 years.

^c Indicates a statistically significant difference by age ($P = 0.026$).

^d American Cancer Society, 1999.

^e Had mammogram within the past 2 years.

^f Had Pap smear within the past 3 years.

year. A portion (40%) of the sample had schooling after high school or some college education, and 58% had a monthly income of $< \$300$ /month. In addition, a majority of the respondents reported not having any kind of insurance (Medicaid, Medicare, VA, military, county, HMO, and private insurance) in the past 12 months (data not shown in table).

Utilization of Cancer Screening Procedures. Table 2, *a–c* present rates of cancer screening knowledge and rates by age groups and gender. The categories of cancer screening are presented in the following format: (*a*) heard of the exam; (*b*) ever had the exam; and (*c*) had the exam in the past year.

Colorectal Cancer. Although the majority of those interviewed (aged ≥ 50) had heard of a rectal exam and blood stool test, only half had heard of an endoscopic (colonoscopic or sigmoidoscopic) exam. About three-quarters of the respondents reported having ever had a rectal exam, but less than half reported having ever had a FOBT,⁴ and less than a quarter (23%) had ever had an endoscopic exam. In the past year, approximately a third of those interviewed had a rectal exam,

and 19% had an FOBT. No significant differences were found in screening rates by gender.

Prostate Cancer. A portion (34%) of men aged ≥ 50 had heard of a PSA test, whereas only 19% had ever had this test, and only 11% had this test within the past 12 months (Table 2a).

Breast Cancer. Almost all of the 101 females interviewed had heard of a breast exam, but only half were examined by their doctors within the past 12 months (Table 2b). In terms of mammography, 97% of women aged > 40 had heard of the exam, although only 67% had ever had a mammogram (no distinction was made between a screening and diagnostic mammogram). When further stratifying the women by age, a statistically significant difference ($P < 0.002$) was detected between those 40–49 and those ≥ 50 ; 53% of the younger women had ever had a mammogram compared with 77% in the older age group. Only 32% of women aged ≥ 40 had received a mammogram within the past year, with no significant difference being found between women aged 40–49 and those ≥ 50 years.

Cervical Cancer. As Table 2b indicates, 100% of the women had heard of a Pap smear. A portion (97%) of the women had ever had a Pap smear. However, only a little over half had

⁴ The abbreviations used are: FOBT, fecal occult blood test; PSA, prostate-specific antigen; BMI, body mass index.

Table 2c Cancer screening rates of skin cancer among homeless adults, by age and gender

| | Total | Age | | | Gender | |
|--|-----------|-----------------------|-----------------------|-----------------------|-----------|-----------|
| | | <40 | 40–49 | >50 | Males | Females |
| Skin cancer | (n = 221) | (n = 50) | (n = 79) | (n = 92) | (n = 120) | (n = 101) |
| Heard of a skin exam | 145 (66%) | 23 (46%) ^a | 54 (69%) ^a | 68 (74%) ^a | 77 (65%) | 68 (67%) |
| Ever had a skin exam | 53 (24%) | 10 (20%) | 14 (18%) ^a | 29 (32%) | 24 (26%) | 29 (38%) |
| Had a skin exam in the past 12 months | 33 (15%) | 8 (16%) | 6 (8%) | 19 (21%) | 13 (11%) | 20 (20%) |
| Willing to use free sun screen or a free hat | 194 (88%) | 46 (92%) | 65 (83%) | 83 (90%) | 100 (83%) | 94 (94%) |

^a Indicates a statistically significant difference by age ($P = 0.002$).

received a Pap smear within the past 12 months; 63% of women aged 40–49 received a Pap smear compared with 48% of women aged ≥ 50 .

Skin Cancer. Although two-thirds of our subjects had heard of a skin exam for skin cancer screening (66%), only 24% had ever had one, and 15% had received a skin exam in the past 12 months (Table 2c). A statistically significant difference by age was noted ($P = 0.002$). Subjects <40 were least likely to have heard of a skin exam (46%), compared with those 40–49 years of age (69%) and those aged ≥ 50 (74%). No gender differences were found. A majority percentage of the respondents indicated that they would be willing to use sunscreen or wear a hat if provided to them free of charge.

Cancer-related Knowledge, Attitudes, and Beliefs. As shown in Table 3, over three-quarters of the respondents believed in the benefits of screening and did not have fatalistic views toward cancer. A majority of the respondents (63%) also believed that if a cancer is detected early, it is very likely to be cured. Only one-third thought that their chances of developing cancer were higher than that of their peers. Over 80% did not think it would be difficult to be screened for cancer and felt that they could ask their doctors for a “cancer checkup.” However, most respondents reported that none or very few of their family and friends received routine screening, and a large percentage did not have family or friends who encouraged them to seek screening. Some of the repeated themes mentioned by homeless persons for either not ever receiving a certain procedure or not having recently obtained cancer screening test were: (a) money; (b) access; (c) discomfort (especially for colorectal cancer); (d) “not feeling sick so I don’t need it;” and (e) “no particular reason” (data not shown in table).

With the exception of endoscopy (only 8% had correct knowledge), the majority of respondents had correct knowledge on cancer screening frequency guidelines. In addition, well over half demonstrated accurate knowledge of early warning signs for cancer. No significant differences were noted based on gender.

Cancer Risk Factors. Although approximately half of the respondents reported exercising daily (exercise was defined as engaging in some physical activity for >20 min without stopping), about a third of respondents were overweight (BMI 25–29.9), and a quarter was obese or extremely obese (BMI 30+; Table 4). In the previous day, over three-quarters of those interviewed reported eating vegetables, and 91% reported that they had eaten meat, beans, or eggs, but only 62% had eaten fruits. In a typical week, most respondents either ate fast food only some days (51%) or not at all (39%).

About three-quarters of the respondents reported that they are current smokers (Table 4). Almost half thought that they were excessive drinkers, around half reported that they drank a fifth of a liquor in 1 day, and 40% reported that they were drinking seven or more glasses of alcohol every day in a 2-week

period. Although there was no statistically significant differences found between the genders, males were more likely than females to be heavy alcohol drinkers.

As for skin cancer risk factors, about three-fourths of the respondents reported that they never use sunscreen, and more than one-third said that they never wear a hat to prevent skin cancer (Table 4). However, a majority of the respondents (93%) preferred sitting in the shade. More men (83%) reported that they never use sunscreen compared with 59% of women. Conversely, more women (52%) reported that they never wear a hat compared with 25% of men.

Discussion

Several patterns in the data were noted for all of the cancer screening tests. As expected, the proportion of respondents who had heard of each an exam was greater than the proportion that had ever received the exam, and the proportion who had the exam within the past year was the smallest. In general, cancer screening rates in the sample of homeless persons were higher than expected, although generally much lower than those reported for the general population in California. Despite having greater risks for cancer, only one-third of our respondents thought they were at more risk than the general population. More education on cancer-related risk factors is needed among the homeless.

Regarding the FOBT, the 19% rate in the past year for the homeless sample is comparable with the 16% rate found for the general population in California (14). We had thought that being homeless would be a barrier to obtain a FOBT. This test requires that patients avoid certain foods (e.g., red meat) and collect stool for 2 days, and being homeless may be a barrier to obtaining a proper diet or finding a public restroom. However, the homeless we sampled were able to obtain and complete the screening at rates comparable with the general population, both of which were very low.

Regarding endoscopy, homeless adults were unlikely to have had this exam. Only 23% of respondents 50+ years old had ever had an endoscopic exam (flexible sigmoidoscopy or colonoscopy), compared with 47% of the California general population (15). Endoscopic rates may be low among homeless adults because of cost, access, and test preparation requirements. A lack of accessible restroom facilities may make the enema preparation or the resultant diarrhea difficult (16). The homeless population may lack certain factors found to increase endoscopic rates among the general population, such as higher income, knowledge of disease, and a medical visit within the past 2 years (17). Physician or nurse practitioner recommendation for endoscopy, which has been shown to increase screening rates (17), may also be less likely to occur in a clinician-patient encounter with a homeless person. Most of the respondents thought it was not difficult to get screening. However, it is

Table 3 Cancer-related knowledge, attitudes, and beliefs among homeless adults, by gender (n = 221)^a

| | Males | Females | Total |
|---|-----------|--------------|--------------|
| Belief in benefits | | | |
| Screening is too much trouble for what I get out of it | | | |
| Agree | 21 (18%) | 8 (8%) | 29 (13%) |
| Disagree | 84 (70%) | 85 (84%) | 169 (77%) |
| No opinion/DK | 15 (12%) | 8 (8%) | 23 (11%) |
| Fatalism | | | |
| Nothing can be done about whether you get cancer or not | | | |
| Agree | 22 (18%) | 11 (11%) | 33 (15%) |
| Disagree | 89 (74%) | 85 (84%) | 174 (79%) |
| No opinion/DK | 9 (8%) | 5 (5%) | 14 (6%) |
| Efficacy of early detection | | | |
| How likely to be cured if detected early | | | |
| Very likely | 79 (66%) | 60 (59%) | 139 (63%) |
| Somewhat likely | 31 (26%) | 37 (37%) | 68 (31%) |
| Not at all likely | 6 (5%) | 1 (1%) | 7 (3%) |
| DK | 4 (3%) | 3 (3%) | 7 (3%) |
| Perceived susceptibility | | | |
| How likely to get cancer compared with others same age | | | |
| More likely | 36 (30%) | 34 (34%) | 70 (32%) |
| No different | 50 (42%) | 45 (45%) | 95 (43%) |
| Less likely | 31 (26%) | 20 (20%) | 51 (23%) |
| DK | 3 (3%) | 2 (2%) | 5 (2%) |
| Self-efficacy | | | |
| Difficult to get screening | | | |
| Yes | 23 (19%) | 13 (13%) | 36 (16%) |
| No | 96 (80%) | 88 (89%) | 184 (83%) |
| DK | 1 (1%) | 0 | 1 (1%) |
| Could ask Dr. for a check-up | | | |
| Yes | 101 (84%) | 91 (90%) | 192 (87%) |
| No | 17 (14%) | 9 (9%) | 26 (12%) |
| DK | 2 (2%) | 1 (1%) | 3 (1%) |
| Social Support | | | |
| Family or friends encourage to get screening | | | |
| Yes | 22 (32%) | 35 (35%) | 57 (26%) |
| No | 98 (82%) | 65 (64%) | 163 (74%) |
| DK | 0 | 1 (1%) | 1 (1%) |
| Subjective Norms | | | |
| Family and friends have routine screening | | | |
| None | 38 (32%) | 22 (22%) | 60 (27%) |
| Very few | 48 (40%) | 31 (31%) | 79 (36%) |
| About half | 9 (8%) | 18 (18%) | 27 (12%) |
| All or most | 6 (5%) | 16 (16%) | 22 (10%) |
| DK | 19 (16%) | 14 (14%) | 33 (15%) |
| Knowledge | | | |
| Demonstrated accurate knowledge of screening guideline | | | |
| Rectal exam | 56 (60%) | 54 (70%) | 110 (64%) |
| Stool exam | 50 (53%) | 50 (65%) | 100 (59%) |
| Skin exam | 64 (53%) | 70 (69%) | 134 (61%) |
| Endoscopy | 10 (11%) | 3 (4%) | 13 (8%) |
| Mammogram | | 67/76 (88%) | 67/76 (88%) |
| Pap smear | | 91/100 (91%) | 91/100 (91%) |
| Demonstrated accurate knowledge of warning signs for cancer | | | |
| Constipation, diarrhea | 92 (77%) | 86 (85%) | 178 (81%) |
| Sore not heal | 97 (81%) | 84 (83%) | 181 (82%) |
| Change in a wart | 90 (75%) | 88 (87%) | 178 (81%) |
| Cough not go away | 85 (71%) | 77 (76%) | 162 (73%) |
| Inability to urinate | 84 (70%) | 70 (69%) | 154 (70%) |
| Vaginal bleeding | | 87/99 (88%) | 87/99 (88%) |
| Vaginal discharge | | 83/99 (84%) | 83/99 (84%) |

^a All findings nonsignificant.

likely that endoscopy is not readily available or offered to homeless persons.

As for the PSA exam, only 34% of men aged ≥ 50 years had heard of it, which is the lowest percentage for all of the cancer screening tests in this age group. The 1997 California

rate for men aged ≥ 50 having a PSA in the past year is 54%, nearly five times that of the homeless population (11%; Ref. 15). The respondents' doctors may have screened for prostate cancer with PSA without explicitly informing their patients, and this could result in self-reporting bias; however, it is un-

Table 4 Cancer risk factors among homeless adults, by gender^a

| | All (n = 221) | Gender | |
|--|------------------|-------------------|---------------------|
| | | Male (n = 120) | Female (n = 101) |
| Exercise | | | |
| Daily | 125 (56%) | 76 (63%) | 49 (48%) |
| Sometimes | 86 (39%) | 40 (33%) | 46 (46%) |
| Never | 10 (5%) | 4 (3%) | 6 (6%) |
| BMI^b | | | |
| Underweight (<18.5 BMI) | 5 (2.3%) | 1 (1%) | 4 (4%) |
| Normal (18.5–24.9) | 89 (40%) | 53 (44%) | 36 (36%) |
| Overweight (25.0–29.9) | 70 (32%) | 43 (36%) | 27 (27%) |
| Obesity (30.0–39.9) | 50 (23%) | 22 (18%) | 28 (28%) |
| Extreme obesity (40+) | 6 (2.7%) | 1 (1%) | 5 (5%) |
| Eating habits | | | |
| Eats vegetables yesterday | 171 (77%) | 93 (78%) | 78 (77%) |
| Eats fruits yesterday | 137 (62%) | 69 (58%) | 68 (67%) |
| Eats meat, beans, or eggs yesterday | 201 (91%) | 110 (92%) | 91 (90%) |
| Eat fast food in a typical week | | | |
| Every day | 8 (4%) | 5 (4%) | 4 (4%) |
| Most days | 13 (6%) | 9 (8%) | 3 (3%) |
| Some days | 113 (51%) | 66 (55%) | 47 (47%) |
| Not at all | 87 (39%) | 40 (33%) | 47 (47%) |
| Current smoker | 157 (71%) | 89 (74%) | 69 (68%) |
| Alcohol | | | |
| Excessive drinker | 102 (46%) | 64 (53%) | 38 (38%) |
| Drink a fifth of liquor in a day | 100 (45%) | 70 (58%) | 30 (30%) |
| Drink every day in 2-week period | 89 (40%) | 59 (49%) | 30 (30%) |
| Skin factors | | | |
| Never uses sunscreen | 159 (72%) | 99 (83%) | 60 (59%) |
| Never wears a hat | 82 (37%) | 30 (25%) | 52 (52%) |
| Sits in the shade | 205 (93%) | 113 (95%) | 92 (91%) |

^a All findings nonsignificant.

^b The BMI of the 220 participants ranged from 14.6–50 with an average of 26.98. BMI = (weight in pounds) × 704.5/(height in inches)². "Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults," NIH and National Heart, Lung, and Blood Institute, June 1998.

likely that this lack of informing the patient would have occurred at higher rates with the homeless than the general populations. Dunn *et al.* (18) found that a substantial number of physicians decide whether to screen patients for prostate without sufficiently involving patients in the decision, and Federman *et al.* (19) found that 31% of the VA patient population were unaware that their physician had ordered a PSA test. Secondly, because of the controversy surrounding the PSA exam and the fact that treatment options currently available for prostate cancer may have detrimental side effects, some physicians feel that measuring a PSA is actually a disservice to the patient (18),⁵ and yet, the homeless populations are at an even higher risk for prostate cancer, *e.g.*, >50% of the homeless respondents were African-Americans, who have almost twice the incidence of prostate cancer compared with Caucasian men (1, 20). In addition, research has shown that stage at diagnosis for prostate cancer is inversely correlated with health insurance and income among African-Americans (20). The majority of the sampled population did not have insurance, and they reported a monthly income of <\$300. Therefore, if future studies can demonstrate the benefit of prostate cancer screening, the homeless population should be among the highly targeted group. In an overall effort to improve the understanding of the

barriers to health care faced by the homeless population, the findings in the present study, as well as studies of housed low-income people (21) and the general United States population (22), suggest that insurance may be the primary issue, although poverty and the lack of an address may influence the homeless access to care.

Although the rates of clinical breast exam for homeless women approached general population rates, mammography rates were substantially lower and far from optimal (23). Only 34% of the homeless sample aged ≥50 reported having a mammogram within the past year, compared with 60% of Californians (24) and 63% of Americans in 1997 (25). Several contributing factors for the low mammography rates may be because of a lack of knowledge about access to (or lack of availability of) free or low-cost clinics where mammograms were performed, about the necessity for the screening, or the disease of breast cancer.

Women 40–49 were much less likely than women aged >50 to have ever received a mammogram (53 *versus* 77%). One plausible explanation may be that older homeless women have Medicare to cover the cost. Although mammograms for women aged ≥50 years is generally accepted, it is greatly debated for women between the ages of 40 and 49 (26). The differences between age groups may therefore be because of provider uncertainty or patient confusion.

The cervical cancer screening rate within the past year among the respondents was 55%, only 12% lower than California's rate of 67% (24). Coincidentally, Long *et al.* (8) also found that 54% of homeless women living in shelters in San Francisco had current Pap smears. The relatively comparable rates of homeless cervical cancer screening to the California average are thought to be because of the California Center for Disease Control and Prevention (CDC) funding and the free or low cost clinics visited in this study. In addition, the relative ease of performing Pap smears, compared with other complicated screening tests, such as endoscopy, may contribute to the high rates of screening. Furthermore, tremendous public health efforts to increase Pap smear screening rates have filtered down to even the poorest of the poor, the homeless population. This trend is particularly promising, given that women of low socioeconomic status are at a higher than average risk for cervical cancer and a lower than average participation in Pap smear screening (27).

Although skin cancer screening rates among the homeless population were extremely low, especially when compared with the rates of other studied cancer types, no comparison can be made with the general population, as these numbers are generally unreported. The screening procedures for skin cancer are noninvasive and involve a superficial inspection of the skin. The skin exam could range from virtually free of cost to low cost depending on the type of examiners (primary care physicians *versus* dermatologists) and whether a total body skin examination, as opposed to a partial examination or an examination that focused on a lesion the patient identified, is used (28). The simple nature of the exam, however, may help explain the low reported rates; the respondents may have been unaware that clinicians had performed this exam, especially if it was a partial examination that was done during the physical exam. The homeless are at high risk for developing skin cancer for several reasons. The interviewed subjects had high levels of sun exposure because of their lack of shelter and increased time spent outdoors. The majority do not protect themselves against sun exposure, and finally, they have low rates of skin cancer screening. These factors would suggest that primary preventive efforts to reduce sun exposure would be essential in this pop-

⁵ Internet address: http://www3.cancer.org/cancerinfo/main_cont.asp?st=ds&ct=36.

ulation, especially because an overwhelming majority of the respondents said that they would be willing to use sunscreen or wear a hat, if these items were provided to them free of charge (Table 2c).

There were several limitations to the study that should be considered: (a) self-report bias may have affected the data. There are, however, recent studies reporting accuracies as high as 83% for self-reported mammograms within the past year (29). Bowman *et al.* (30) found that the sensitivity for accuracy of self-reported Pap smear within 1 year is 88.8%, and the specificity is 63.7%. Another study (31) demonstrated that self-reports of colon cancer screening behavior could have high percentages of validity when carefully phrased questionnaires were used. In addition, all subjects were informed at the beginning of the main interview that there were no right or wrong answers to any of the questions and that the interview was strictly confidential; (b) a random sample of homeless persons in Los Angeles was not collected. Participants were paid volunteers selected from a limited number of sites, which may have influenced the demographics of the sample, as well as the findings on cancer screening. In addition, paid volunteers may be more eager to give answers perceived as desirable compared with unpaid volunteers; and (c) subjects were mainly shelter dwellers. This study may accurately represent this population, but homeless individuals on the streets were not approached. Shelter dwellers may be at higher functioning levels than their nonshelter dwelling counterparts. Thus, results may not be representative of cancer screening rates, attitudes, and behaviors of all homeless adults. This study may not be generalized to other cities because of differing demographics and different resources for cancer screening, as well as various educational and medical programs aimed at the homeless. Other limitations include the exclusion of non-English speakers, as well as the categories of cancer screening that have been asked in such a specific format (heard of the exam, ever had the exam, and had the exam in the past year) that do not correlate with the current recommendation for cancer screening (≤ 3 years for Pap smears, 5 years for sigmoidoscopy, and 10 years for colonoscopy). Furthermore, the data were collected during summer months; therefore, responses about summer exposure and precautions taken to avoid sun exposure might be seasonally elevated. Finally, the sample size for the study was small, which likely limited the ability to detect statistically significant differences among the various subgroups.

Despite appropriate attitudes and beliefs regarding cancer screening among homeless adults, all current screening rates (with the exception of the FOBT) were below the statewide averages. Although improving access to screening exams is often suggested, it may not always be the most appropriate means of achieving better health for the homeless. Even if access to endoscopies were increased, the preparation required for this exam is incompatible with the homeless lifestyle, making its administration impractical. Furthermore, the lack of consensus regarding positive PSA screening renders promoting PSA exams among the homeless controversial. In addition, because cervical screening rates are already comparable with California rates, limited resources for homeless healthcare may be better allocated elsewhere, possibly toward mammography. Given the widely accepted benefits of mammography, the simple nature of the exam, and the low screening rates found in this study, increasing access to mammography may benefit homeless women's health.

The homeless situation presents barriers to cancer screening, including a lack of an address, phone number, and follow-up contact. Therefore, facilities that are able to provide

cancer screening should be done at a shelter that can provide a temporary residence, long-term rehabilitation, or job training. Other examples include existing social service sites that allow medical services to collocate within the facilities to provide basic medical care to those who use the resources there.

Money, access, discomfort (especially for colorectal cancer), "not feeling sick so I don't need it," and "no particular reason" were repeated themes mentioned by homeless persons for either never receiving a certain procedure or not having recently obtained a cancer screening test. Therefore, because of the limited practicality of secondary prevention, focusing on education and primary prevention also appear to be key. Although the homeless need to take an individual, active role in their own health, institutional policies must complement their efforts. Education (especially on access to free services), and emphasizing that the purpose of screening tests is to detect cancers at asymptomatic stages, may be beneficial. In addition, alerting the homeless about high-risk behaviors related to cancer may serve to empower them in making better-informed lifestyle choices. High prevalence of addiction and mental illness in the homeless population may reduce their ability and/or willingness to adhere to health promotion activities. This study did not survey the rate of mental health care in the respondents. However, the homeless smoking and alcohol rates are very high, which are comparable with other studies (8, 21). Encouraging the homeless to significantly reduce their consumption of alcohol and tobacco, two highly addictive coping mechanisms, may be unrealistic given their great life stress and social norms. Instead, by offering free treatment programs and repeated access to treatment may be a more powerful policy alternative in helping the homeless combat their addictive behaviors. In addition, institutional efforts to serve nutritious food at meal programs and provide free sunscreen and hats may be more feasible alternatives, enabling the homeless to direct their own individual lifestyle choices. Furthermore, clinicians could be educated to increase recommendations for cancer screening tests for homeless persons and remove barriers to colon cancer screening by allowing FOBT and preparation for endoscopy to be in the office. Efforts to increase mammography rates are also likely to be beneficial. Not only would these preventive measures decrease their chances of developing cancer, these modifications would promote their general health.

Future studies should examine larger, more representative samples of homeless persons and explore acceptable, feasible interventions to increase healthy lifestyle behaviors, such as sun protection, diet and exercise, and abstinence from tobacco and alcohol. Cancer screening and prevention are critical in the homeless population, but such programs should also have priorities that focus on issues of life-preserving stability, such as food, clothing, and shelter.

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