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DISPARITIES IN STAGE AT DIAGNOSIS AND QUALITY OF CANCER CARE IN CALIFORNIA BY SOURCE OF HEALTH INSURANCE

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EXECUTIVE SUMMARY

Lack of adequate health insurance can be a barrier to care and can lead to delays in cancer diagnosis and treatment. Disparities in quality of cancer care by source of health insurance have been previously documented. Following the full implementation of the Affordable Care Act in 2014, more Californians acquired health insurance. With the changing insurance landscape, we assessed the impact of health insurance type on stage at diagnosis and quality of treatment based on Commission on Cancer (CoC) measures among patients diagnosed with bladder, female breast, cervical, colon, endometrial, stomach, non-small cell lung, ovarian, and rectal cancers in California from 2014 to 2021. Results were stratified by age group, 20-64 and 65+ years.

The report's main findings include the following:

General and Cross-Cutting Findings

- Generally, cancer patients with Medi-Cal coverage or no health insurance were diagnosed at a later stage compared to those covered by private insurance or Medicare, regardless of age group.
- Uninsured and Medi-Cal patients had consistently lower percentages of patients receiving recommended care adherent with quality measures compared to those with Medicare or private insurance.

Bladder Cancer

- In both age groups, higher percentages of privately insured patients were diagnosed early-stage and lower percentages were diagnosed late-stage compared to Medi-Cal and uninsured patients. In the 65+ age group, Medicare insured patients had comparable stage at diagnosis to those with private insurance.
- Privately insured patients had the highest percentage meeting the quality measure (88.9%) of at least two lymph nodes removed in patients undergoing partial or radical cystectomy while uninsured patients had the lowest (82.4% for ages 20-64, 77.8% for 65+).

Breast Cancer

- Among both age groups, more women with private insurance had early-stage diagnoses and fewer had late-stage diagnoses compared to those with Medi-Cal, other public, or no insurance.

For those aged 65 and older, Medicare insured patients had comparable stage at diagnosis to those with private insurance.

- For both age groups, privately insured patients consistently had the greatest adherence across all four CoC quality measures followed by Medicare for the older age group while Medi-Cal insured patients had the lowest adherence.
- Among the younger age group, all insurance types had similar adherence (56% to 60%) with breast-conserving surgery for women with stage 0, I, or II which was lower than the adherence range among older women (59.6% to 70%).
- Among both age groups, the measure with the greatest adherence was the percentage of women under 70 with stage-specific hormone receptor negative breast cancer receiving combination chemotherapy within four months of diagnosis (74.3% to 85.0% for ages 20-64 years, 62.4% to 74.5% for 65+ years).

Cervical Cancer

- In both younger and older age groups, privately insured individuals had higher percentages of early-stage diagnoses and lower percentages of late-stage diagnoses compared to Medi-Cal and uninsured groups. Women aged 65 and above had lower percentages of early-stage diagnoses and higher percentages of late-stage diagnoses compared to younger women.
- For the quality measure of brachytherapy use in those treated with primary radiation, there was poor adherence and little variability across insurance categories for both age groups (25.1% to 29.3% for ages 20-64 years, 21.3% to 24.2% for 65+ years).

Colon Cancer

- Among both younger and older age groups, privately insured individuals had the highest percentage of early-stage diagnoses (while uninsured individuals had the lowest. In the younger age group, privately insured individuals had the lowest percentage of late-stage diagnoses, while among those 65 years and older, individuals with other public, Medicare, and private insurance had the lowest.
- More privately insured individuals received adjuvant chemotherapy for AJCC stage III tumors and had at least 12 regional lymph nodes examined after resection compared to other insurance groups in both age categories. Medi-Cal insured individuals had the lowest chemotherapy adherence among the younger age group (47.9%), while uninsured individuals had the lowest adherence among the older age group (37.8%). Uninsured individuals across both age groups

consistently had the lowest adherence with having the recommended number of lymph nodes examined (54.9% for ages 20-64 years, 48.1% for 65+ years).

Endometrial Cancer

- Both age groups had high percentages of early-stage diagnoses; the highest percentage was among privately insured individuals of both age groups and the lowest was among Medi-Cal patients in the younger age group and uninsured patients in the older age group. Late-stage diagnoses were less common, with Medi-Cal patients having the highest percentages across both age groups.
- The percentage of stage IIIC or IV patients receiving chemotherapy and/or radiation was highest among privately insured individuals (44.1% for 20-64 years, 30.5% for 65+ years) and lowest among Medi-Cal patients (37.3% for 20-64 years, 19.8% for 65+ years).

Stomach Cancer

- Early-stage diagnoses were more common among those with private and other public insurance among the younger age group and those with Medicare and private insurance among the older age group. Late-stage diagnoses were highest among those with Medi-Cal or no insurance among the younger age group and among the uninsured for the older age group.
- Roughly half of resected stomach cancer patients had at least 15 regional nodes removed and pathologically examined. Among younger patients, privately insured individuals had the highest adherence with this quality measure at 55.9%, followed closely by Medi-Cal (54.5%) and other public (53.6%) insurance. In the older age group, Medi-Cal patients had the highest percentage adherent with the measure at 55.8%, while other public insurance patients had the lowest in adherence at 39.3%.

Non-Small Cell Lung Cancer (NSCLC)

- Other public and privately insured patients had the highest percentage of early-stage diagnoses among both age groups. Other public and privately insured also had the lowest percentage of late-stage diagnoses among both age groups while uninsured patients had the highest.
- Only about half of patients were adherent with the quality measure of at least 10 regional lymph nodes removed and pathologically examined, with greatest adherence among privately insured patients (50.2% for ages 20-64 years, 54.0% for 65+ years) followed by Medi-Cal (45.5% for ages 20-64 years, 51.9% for 65+ years) in both age groups.
- Adherence with systemic chemotherapy receipt or recommendation was highest among the younger age group with private insurance (66.9%) and lowest among Medi-Cal enrollees

(55.6%). Adherence among patients 65 or older was similar across insurance types (58.2% to 63.6%).

- Overall, the measure specifying no surgery as first course of treatment for NSCLC with lymph node metastases (cN2, M0) had high adherence. Patients with Medi-Cal (79.0% for ages 20-64 years, 82.1% for 65+ years) and other public insurance (75.8% for ages 20-64 years, 83.1% for 65+ years) had the greatest adherence across both age groups.

Ovarian Cancer

- Privately insured individuals generally had the lowest percentage of late-stage diagnoses among the younger group, while among the older group, private, Medicare, and Medi-Cal categories had similar proportions of late-stage diagnoses.
- Adherence with receiving salpingo-oophorectomy with omentectomy, debulking; cytoreductive surgery, or pelvic exenteration in Stages I-IIIC was higher among privately insured patients (68.5% for ages 20-64 years, 67.3% for 65+ years), while the uninsured had the lowest adherence among the younger age group (50.8%) and Medi-Cal had the lowest among the older age group (56.4%).

Rectal Cancer

- Among the younger age group, the privately insured had the lowest and the uninsured had the highest percentage of late-stage diagnoses. Among patients 65 and older, all categories of insurance had similar proportions of late-stage diagnoses (35.4% to 37.9%). In both age groups, the privately insured had the highest percentage of early-stage diagnoses.
- Adherence with the stage-specific chemotherapy and radiation quality measure was highest among Medi-Cal (29.0%) and other publicly insured patients (29.8%) in the younger group. Adherence with the measure among patients aged 65 and above was similar across insurance categories.

INTRODUCTION

Cancer is the second-leading cause of death in the United States and in California[1,2]; in 2021, 59,503 cancer deaths occurred in California.[3] However, there has been a steady decline in cancer mortality rates each year since the early 1990s, attributed to advances in early detection and improved treatment modalities.[4] Despite medical advancements, barriers to accessing timely and appropriate care persist, potentially leading to more advanced-stage cancer diagnoses and higher mortality among certain populations including racial/ethnic minorities and socioeconomically disadvantaged populations.[5,6]

Lack of adequate health insurance can be a barrier to care, leading to delays in diagnosis and treatment.[7-9] Prior research conducted in the United States has consistently revealed that uninsured and Medicaid-insured individuals diagnosed with cancer had poorer survival than their counterparts with private insurance or Medicare coverage, even following adjustments for various confounding factors.[10-14]

Following the enactment of the Affordable Care Act (ACA) in 2010 and the subsequent Medicaid expansion in California in 2014, there has been a noticeable decline in the number of uninsured individuals in California (10.7% decrease between 2013 and 2022), an increase in Medi-Cal enrollment (more than 5.1 million Medi-Cal expansion enrollments recorded between 2023 and 2024), and an increase in private insurance enrollment (more than 1.7 million marketplace enrollments between 2023 and 2024).[15]

Considering the changing insurance landscape since the ACA, we sought to describe the impact of health insurance type on cancer stage at diagnosis and quality of cancer treatment. We defined the quality of cancer care using Commission on Cancer (CoC) quality measures[16] and assessed the metrics for individuals diagnosed with bladder, female breast, cervical, colon, endometrial, stomach, non-small cell lung, ovarian, and rectal cancers in California from 2014 to 2021.

For this report, we utilized data from the California Cancer Registry (CCR), California's statewide cancer surveillance system which has been collecting information on all reportable cancers diagnosed among California residents since 1988. The California Department of Public Health partners with the California Cancer Reporting and Epidemiologic surveillance program, within the University of California Davis Comprehensive Cancer Center, to manage the operations of the CCR.

METHODS

This report includes cancers of the bladder, breast, cervix, colon, rectum, endometrium, stomach, non-small cell lung, and ovary diagnosed 2014 through 2021 in persons 20 years and older, and reported to the California Cancer Registry (CCR), California's population-based cancer surveillance system. Cancer site definitions were based on the National Cancer Institute's, Surveillance, Epidemiology, and End Results (SEER) site recode ICD-O-3/WHO 2008 definition (https://seer.cancer.gov/siterecode/icdo3_dwhoheme/index.html) with further subclassification for NSCLC based on World Health Organization lung tumor classification[17] and for endometrial cancer based on International Classification of Diseases for Oncology, 3rd Edition (ICD-O-3)[18] (See Appendix Table 1). Breast cancer was restricted to female cases only. Further exclusions included any cases reported through autopsy or death certificates only.

Health insurance categories used for this analysis included private (health maintenance organization, preferred provider organization, managed care, fee for service, Medicare with supplement, Tricare), Medi-Cal, Medicare (without supplement), other public (county funded, military treatment facilities, Indian Health, Veterans Affairs), and uninsured (Table 1). The health insurance categories were derived from primary payer codes based on the California Cancer Reporting System Standards, Volume I: Abstracting and Coding Procedures, 2023 Revision.[19] The source of the patient's health insurance was identified for 631,086 (97.2%) of cases. Completeness of health insurance information varied by cancer type, ranging from 95.5% for bladder cancer to 98.0% for endometrial cancer.

Site specific cancer treatments were based on CoC quality measures[16] and were evaluated across insurance categories. In instances where a specific part of a quality measure could not be evaluated due to lack of information in CCR data, that part was omitted from the measure and the wording of the measure was adjusted accordingly (Appendix Table 2). Site specific stage subcategories used in quality measures refer to TNM (tumor size, lymph node metastases, distant metastases) specifics and are briefly defined in the corresponding sections of this report. More detail on TNM subcategories can be found at *AJCC Cancer Staging Manual*.[20,21]

Cancer stage at diagnosis was assigned according to the American Joint Committee on Cancer (AJCC) rules.[20,21] Early-stage included in situ and stage I for sites where in situ was collected (bladder,

breast, colon, stomach, lung, rectum) and stages I and II for sites where in situ was not collected (cervix, endometrium, ovary). Late-stage included stages III and IV.

Results are reported by cancer site and age group, 20 to 64 years and 65 years and older. Patients 20 to 64 years with Medicare insurance were grouped with the other public category. Insurance categories with low counts (<50) were excluded from the results.

TABLE 1: CATEGORIES OF SOURCE OF HEALTH INSURANCE (PAYER SOURCE)

Major Payer Source Category	Primary Payer Codes
Private	• Medicare with supplement, NOS • Medicare with private supplement • Private insurance managed care, health maintenance organization or preferred provider organization • Private insurance fee for service • Insurance, NOS • TRICARE
Medi-Cal	• Medicaid, fee for service • Medicaid administered through managed care • Medicare with Medicaid eligibility
Medicare	• Medicare without supplement, Medicare, NOS • Medicare administered through managed care
Other Public	• County funded • Military Treatment Facilities • Indian Health • Veterans Affairs (VA)
Uninsured	• Not insured • Not insured, self-pay

NOS-Not otherwise specified.

RESULTS

BLADDER CANCER

During the study period, 54,577 people were diagnosed with bladder cancer and 2,447 were excluded due to missing insurance type resulting in 52,130 cases (95.5%) used in the analysis. One CoC performance measure was used to evaluate the quality of care: at least two lymph nodes removed in patients under 80 years who have undergone a partial or radical cystectomy.

Results were as follows:

- Among those 20-64 years, more patients with private insurance (50.4%) were diagnosed early-stage (in situ, stage I) compared to patients with Medi-Cal (41.9%), while more patients with Medi-Cal (20.3%) were diagnosed late-stage compared to those with private insurance (10.8%). Uninsured patients had similar results to those with Medi-Cal, 42.3% early-stage and 18.1% late-stage (Table 2, Figure 1).
- Among those 65 years and older, similar associations were observed with privately insured patients having more early-stage diagnoses (49.2%) compared to Medi-Cal patients (42.5%) and fewer late-stage diagnoses (11.1% private vs. 15.5% Medi-Cal) (Table 2, Figure 1). Medicare patients had similar results to privately insured patients (44.9% early-stage, 11.7% late-stage).

MEDI-CAL AND UNINSURED BLADDER CANCER PATIENTS HAD THE HIGHEST PERCENTAGES OF LATE-STAGE DIAGNOSES

Uninsured patients had the lowest percentage of early-stage (39%) and the highest percentage of late-stage diagnoses (25.1%).

- Among both age groups, privately insured patients had the greatest percentage meeting the quality measure (88.9% for both age groups) and uninsured had the lowest percentage (82.4% 20-64 years, 77.8% 65+ years) (Figure 2). For those 20-64, approximately 84% of Medi-Cal and other public patients met the quality measure while for those 65 and older, approximately 87% of Medi-Cal and Medicare patients met it.

TABLE 2. BLADDER CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

Age	Payer	In Situ n (%)	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	Private	2,513 (29.6%)	1,771 (20.8%)	747 (8.8%)	385 (4.5%)	539 (6.3%)	2,540 (29.9%)	8,495
	Medi-Cal	473 (20.4%)	498 (21.5%)	251 (10.8%)	157 (6.8%)	313 (13.5%)	624 (26.9%)	2,316
	Other Public	262 (24.7%)	260 (24.5%)	122 (11.5%)	58 (5.5%)	107 (10.1%)	253 (23.8%)	1,062
	Uninsured	34 (22.8%)	29 (19.5%)	17 (11.4%)	9 (6%)	18 (12.1%)	42 (28.2%)	149
	Total	3,282 (27.3%)	2,558 (21.3%)	1,137 (9.5%)	609 (5.1%)	977 (8.1%)	3,459 (28.8%)	12,022
65+	Private	4,894 (24.9%)	4,770 (24.3%)	2,410 (12.3%)	1,000 (5.1%)	1,172 (6%)	5,379 (27.4%)	19,625
	Medi-Cal	594 (19.5%)	703 (23%)	472 (15.5%)	171 (5.6%)	301 (9.9%)	809 (26.5%)	3,050
	Medicare	3,393 (20.4%)	4,073 (24.5%)	2,189 (13.2%)	816 (4.9%)	1,127 (6.8%)	5,043 (30.3%)	16,641
	Other Public	174 (27.5%)	117 (18.5%)	99 (15.6%)	27 (4.3%)	53 (8.4%)	163 (25.8%)	633
	Uninsured	23 (14.5%)	39 (24.5%)	15 (9.4%)	12 (7.5%)	28 (17.6%)	42 (26.4%)	159
	Total	9,078 (22.6%)	9,702 (24.2%)	5,185 (12.9%)	2,026 (5.1%)	2,681 (6.7%)	11,436 (28.5%)	40,108

FIGURE 1. PERCENTAGE OF BLADDER CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA, 2014-2021

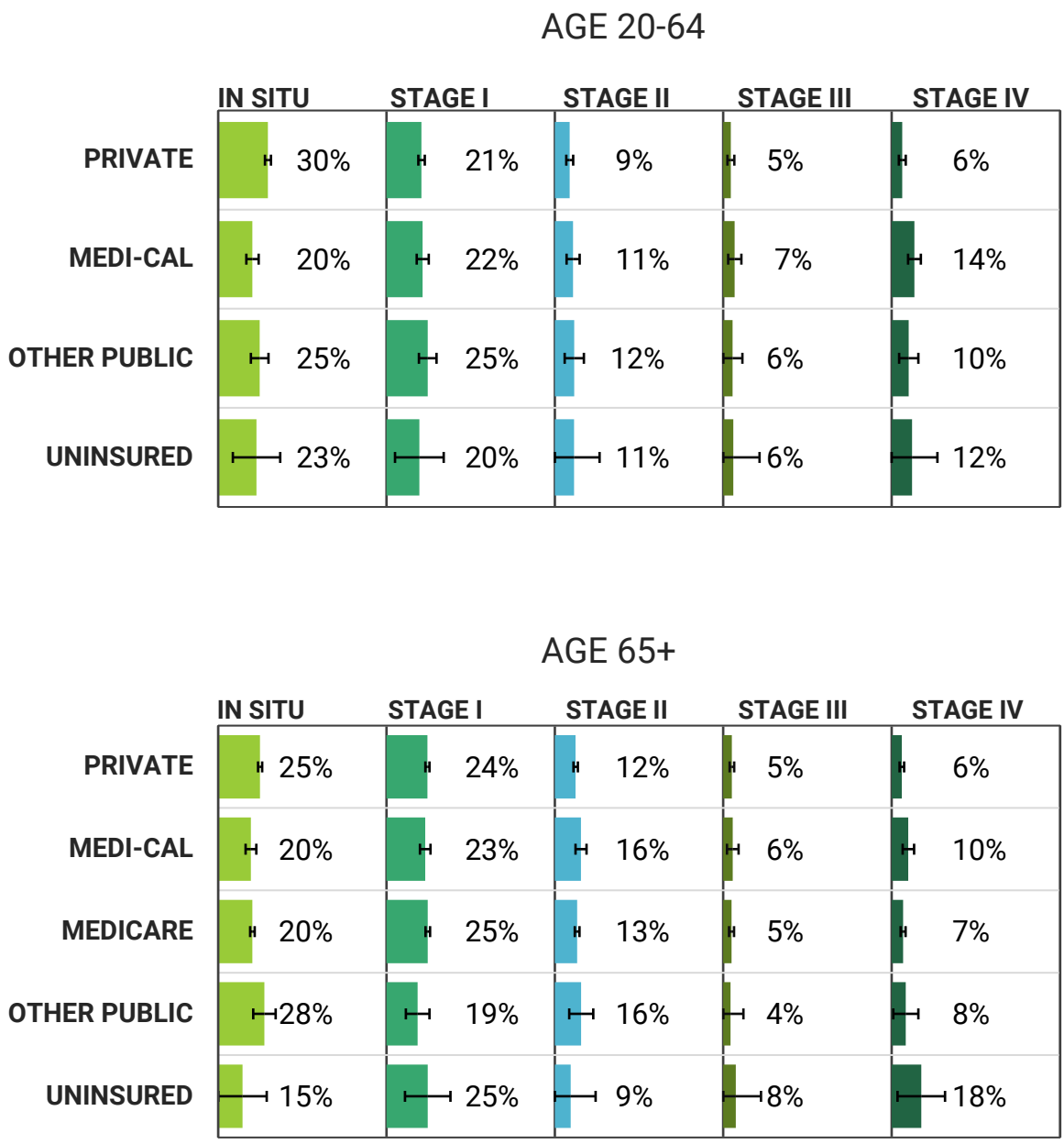
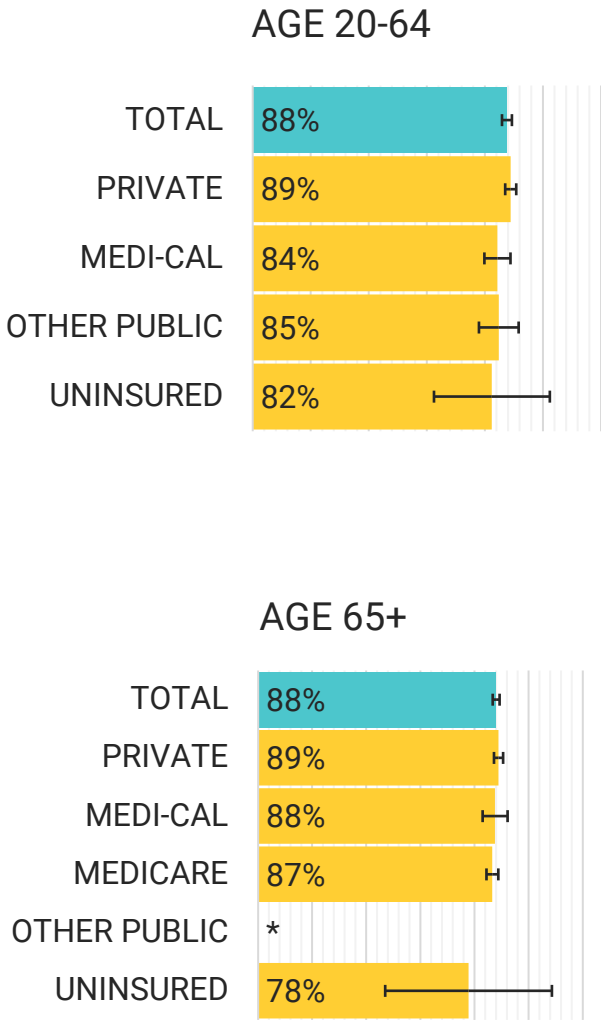


FIGURE 2. PERCENTAGE OF BLADDER CANCER CASES WITH AT LEAST 2 LYMPH NODES REMOVED IN PATIENTS UNDER 80 UNDERGOING PARTIAL OR RADICAL CYSTECTOMY BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

BREAST CANCER

A total of 268,611 individuals with breast cancer were identified in the CCR during the study period. After excluding 7,069 cases due to missing insurance type, 261,542 (97.4%) were used in the analysis. Four CoC quality measures were evaluated: (i) radiation therapy administered following any mastectomy within one year of diagnosis for individuals with ≥4 positive regional lymph nodes; (ii) breast-conserving surgery for women with AJCC stage 0, I, or II; (iii) radiation therapy within one year of diagnosis for women under 70 years who received breast-conserving surgery; and (iv) combination chemotherapy is administered within four months of diagnosis for women under 70 with AJCC T1cN0M0 (tumor >10 mm but ≤20 mm, no lymph node metastases or distant metastases), or stage IB - III hormone receptor negative breast cancer.

BREAST CANCER

PATIENTS WITH PRIVATE OR MEDICARE INSURANCE HAD THE LARGEST PERCENTAGE MEETING THE QUALITY MEASURES

Results were as follows:

- Within the younger age group, more patients with private insurance (64.3%) were diagnosed early-stage (in situ, stage I) compared to those with Medi-Cal (47.6%), other public (56.8%), or no insurance (49.0%) (Table 3, Figure 3). Fewer privately insured patients (10.2%) were diagnosed late-stage compared to those with Medi-Cal (20.2%), other public (15.3%), or no insurance (20.7%). For those ≥65 years, privately insured patients similarly had the highest percentage diagnosed early-stage (68.4%) and lowest percentages diagnosed late-stage (9.2%). Among the other insurance types, patients with Medicare (66.3%) had the highest percentage of early-stage diagnoses while the percentage ranged from 54% to 57% for Medi-Cal, other public, and no insurance. Late-stage diagnoses were highest for uninsured patients (17.3%) and those with Medi-Cal (15.9%), while for Medicare and other public insurance the percentages were approximately 10.0%.
- Among the younger age group, the measure with the least disparity by insurance type was the percentage of patients with AJCC stage 0, I, or II undergoing breast-conserving surgery which ranged from 56% (uninsured) to 60% (other public) (Figure 5). For the other three measures, privately insured patients had the largest percentage meeting the quality measures (71.5% to 85%) and Medi-Cal had the lowest (52.4% to 74.3%) (Figures 4, 6, 7). The percentage of patients (under 70 with AJCC

T1cN0M0, or stage IB - III hormone receptor negative breast cancer) receiving combination chemotherapy within four months of diagnosis was the quality measure with the greatest adherence (74.3% to 85.0%) (Figure 7).

- Among the older age group, the measure with the least adherence was the percentage of patients with ≥4 positive regional lymph nodes for which radiation therapy was administered following any mastectomy within one year of diagnosis (56.0%-64.4%, excluding categories with counts ≤50) and the measure with the greatest adherence was percentage of patients under 70 with AJCC T1cN0M0, or stage IB - III hormone receptor negative breast cancer for whom combination chemotherapy is administered within four months of diagnosis (62.4%-74.5%, excluding categories with counts ≤50) (Figures 4, 7). Across all measures, privately insured patients (64.4%-74.5%) had the greatest adherence (excluding categories with counts ≤50) followed by those insured by Medicare (62.5%-71.9%) while Medi-Cal insured patients had the lowest adherence (56.0%-62.6%).

TABLE 3. BREAST CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

Age	Payer	In Situ n (%)	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	Private	22,217 (19.3%)	51,862 (45%)	22,531 (19.5%)	7,869 (6.8%)	3,976 (3.4%)	6,873 (6%)	115,328
	Medi-Cal	3,256 (13.1%)	8,581 (34.5%)	5,616 (22.6%)	2,964 (11.9%)	2,060 (8.3%)	2,386 (9.6%)	24,863
	Other Public	1,002 (16.4%)	2,474 (40.4%)	1,219 (19.9%)	556 (9.1%)	377 (6.2%)	498 (8.1%)	6,126
	Uninsured	179 (15.3%)	395 (33.7%)	226 (19.3%)	122 (10.4%)	121 (10.3%)	130 (11.1%)	1,173
	Total	26,654 (18.1%)	63,312 (42.9%)	29,592 (20.1%)	11,511 (7.8%)	6,534 (4.4%)	9,887 (6.7%)	147,490
65+	Private	9,292 (15.6%)	31,440 (52.8%)	10,042 (16.9%)	3,122 (5.2%)	2,361 (4%)	3,265 (5.5%)	59,522
	Medi-Cal	1,179 (13.2%)	3,766 (42.2%)	1,758 (19.7%)	727 (8.2%)	687 (7.7%)	802 (9%)	8,919
	Medicare	6,764 (15.1%)	22,968 (51.2%)	7,477 (16.7%)	2,528 (5.6%)	2,282 (5.1%)	2,862 (6.4%)	44,881
	Other Public	49 (13.1%)	163 (43.7%)	80 (21.4%)	24 (6.4%)	15 (4%)	42 (11.3%)	373
	Uninsured	43 (12%)	148 (41.5%)	60 (16.8%)	28 (7.8%)	34 (9.5%)	44 (12.3%)	357
	Total	17,327 (15.2%)	58,485 (51.3%)	19,417 (17%)	6,429 (5.6%)	5,379 (4.7%)	7,015 (6.2%)	114,052

FIGURE 3. PERCENTAGE OF BREAST CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021

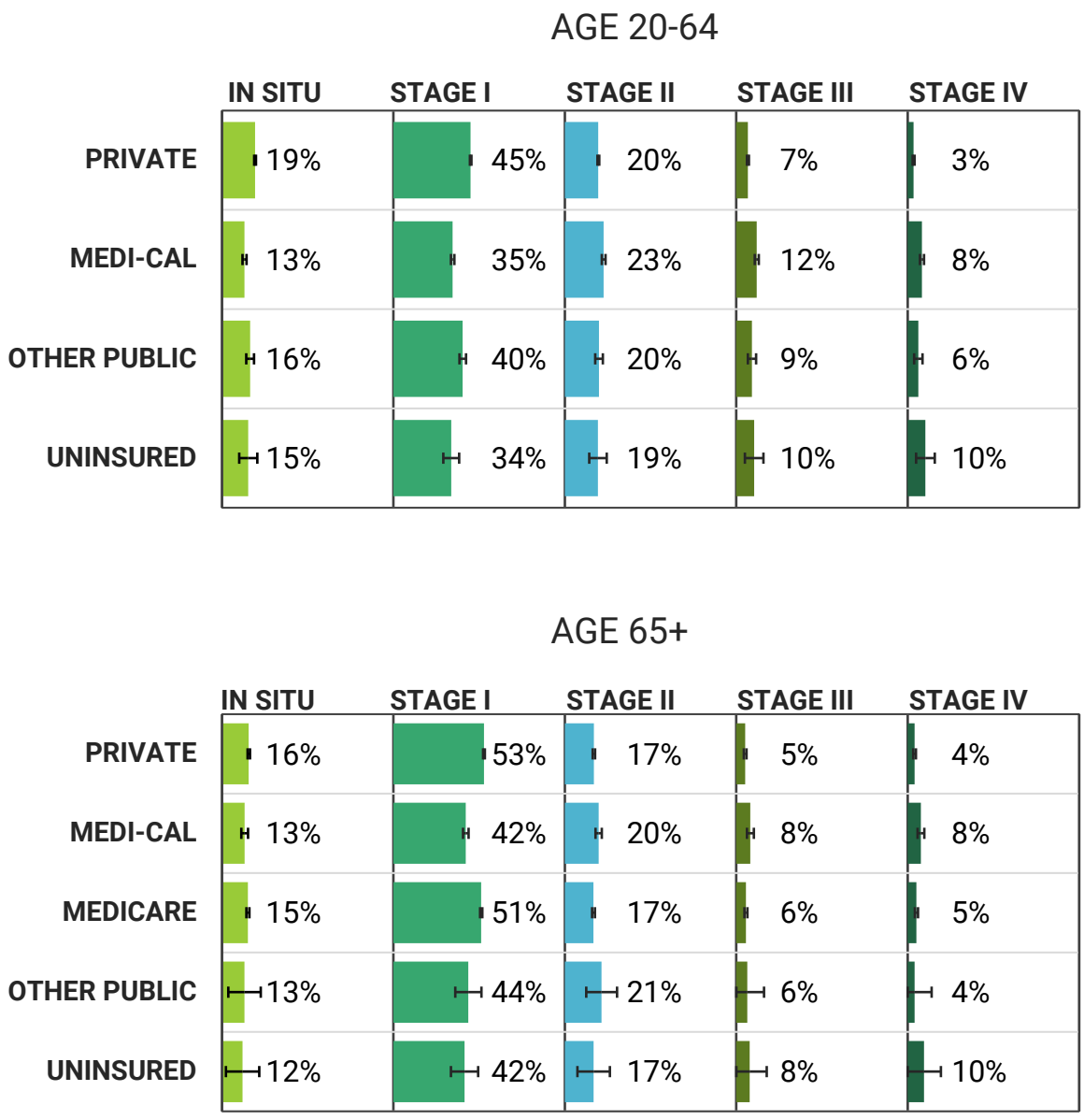
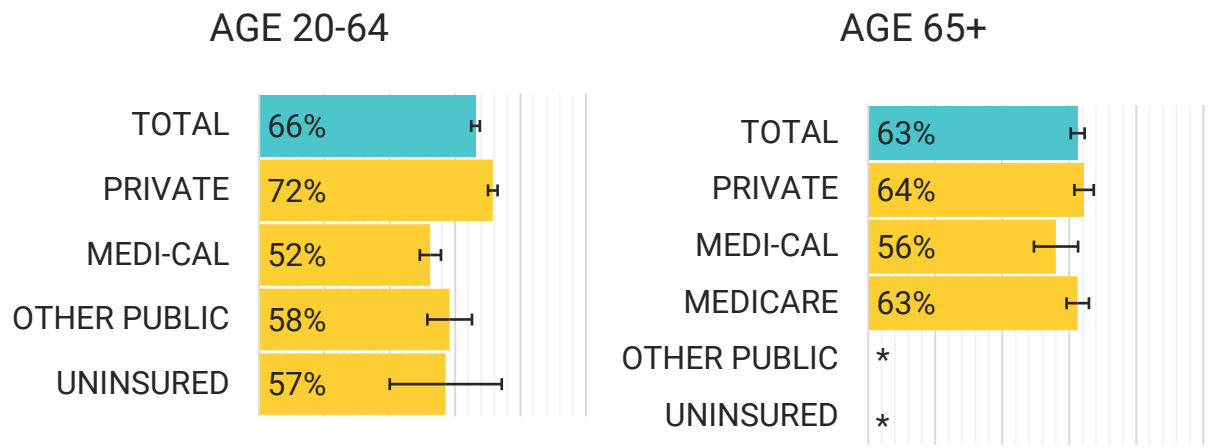


FIGURE 4. PERCENTAGE OF BREAST CANCER CASES WITH ≥4 POSITIVE REGIONAL LYMPH NODES FOR WHOM RADIATION THERAPY WAS ADMINISTERED FOLLOWING ANY MASTECTOMY WITHIN 1 YEAR (365 DAYS) OF DIAGNOSIS, BY AGE AND PAYER SOURCE: CALIFORNIA 2014-2021



**Not calculated due to small population size.*

FIGURE 5. PERCENTAGE OF BREAST CANCER PATIENTS WITH AJCC STAGE 0, I OR II UNDERGOING BREAST-CONSERVING SURGERY, BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021

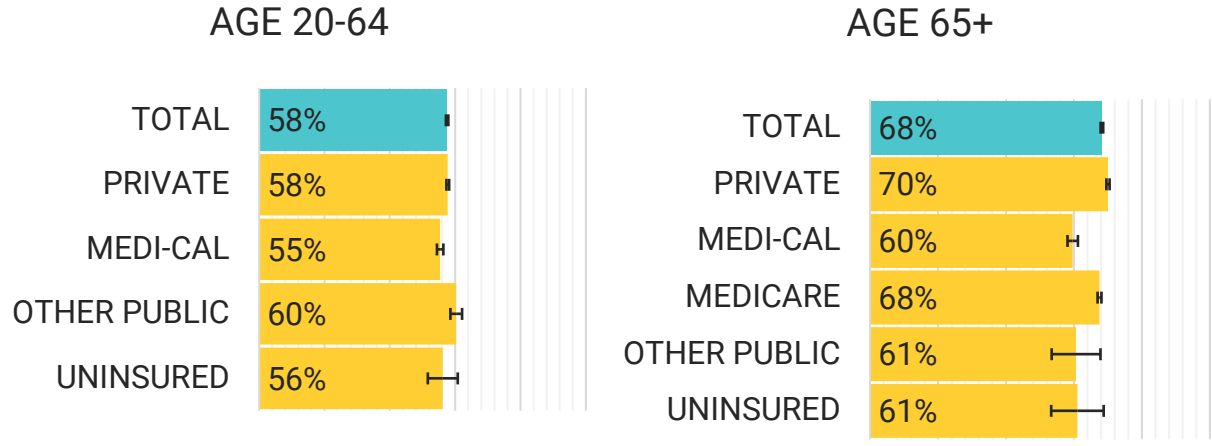


FIGURE 6. PERCENTAGE OF BREAST CANCER PATIENTS UNDER 70 UNDERGOING BREAST-CONSERVING SURGERY WHO RECEIVED RADIATION THERAPY WITHIN 1 YEAR (365 DAYS) OF DIAGNOSIS, BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021

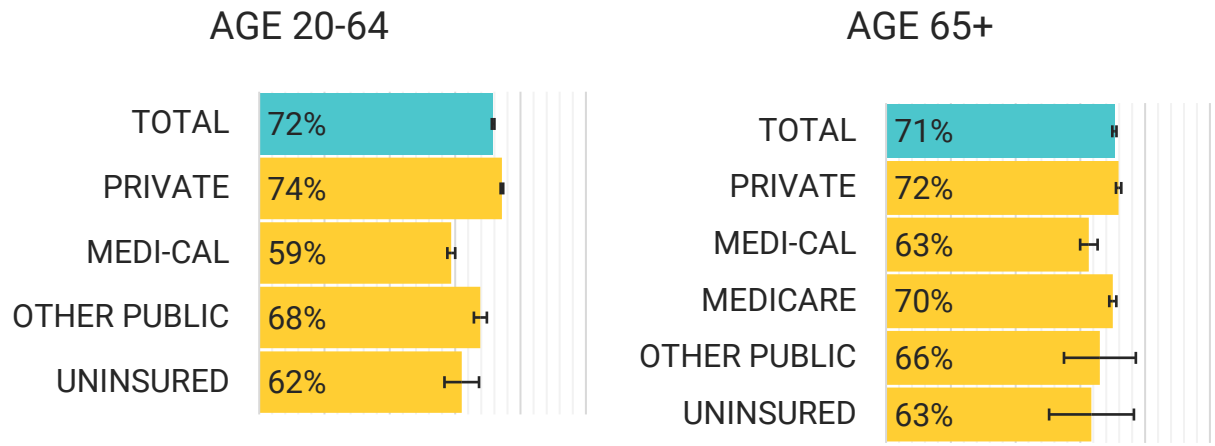
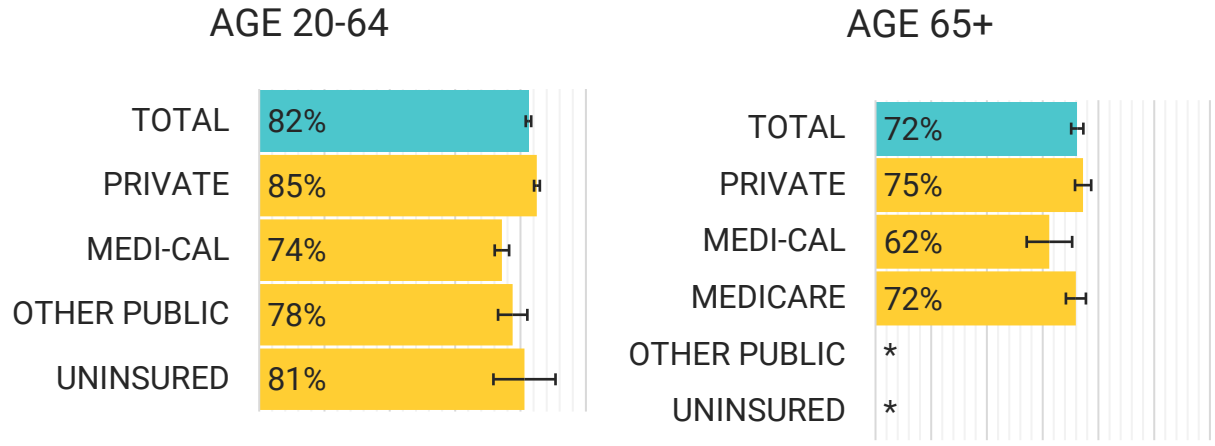


FIGURE 7. PERCENTAGE OF BREAST CANCER CASES FOR WHOM COMBINATION CHEMOTHERAPY IS ADMINISTERED WITHIN 4 MONTHS (120 DAYS) OF DIAGNOSIS FOR WOMEN UNDER 70 WITH AJCC T1CN0M0, OR STAGE IB - III HORMONE RECEPTOR NEGATIVE BREAST CANCER BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

CERVICAL CANCER

A total of 11,687 cases of cervical cancer were identified in the CCR and 429 cases were excluded due to missing insurance type, resulting in 11,258 (96.3%) cases used in the analysis. One CoC quality measure was evaluated: use of brachytherapy in patients treated with primary radiation in any stage of cervical cancer.

Results were as follows:

- Among the younger age group, the percentage diagnosed early-stage (stages I and II) ranged from 49.2% (uninsured) to 67.8% (private insurance) (Table 4, Figure 8). Fewer privately insured women (26.3%) were diagnosed late-stage compared to those with Medi-Cal (38.3%), other public (35.9%), or no insurance (38.5%). Women ≥65 years had lower percentages of early-stage diagnoses (42.7% for Medi-Cal to 49.8% for private, excluding categories with counts ≤50) and higher percentages of late-stage diagnoses (42.3% for private to 47.2% for Medi-Cal, excluding categories with counts ≤50) compared to their younger counterparts.
- Among the younger age group, the percentage meeting the quality measure varied little between the insurance categories. However, privately insured women had the lowest adherence (25.1%) while women with other public insurance (30.7%) or Medi-Cal (30.5%) had the highest followed by uninsured patients (29.3%) (Figure 9).
- Similar to the younger age group, the older age group had little variability across insurance categories in the percentage meeting the quality measure, but for this group, those with private insurance had the greatest proportion (24.2%) meeting the measure, followed by Medi-Cal (21.6%), and Medicare (21.3%) (Figure 9).

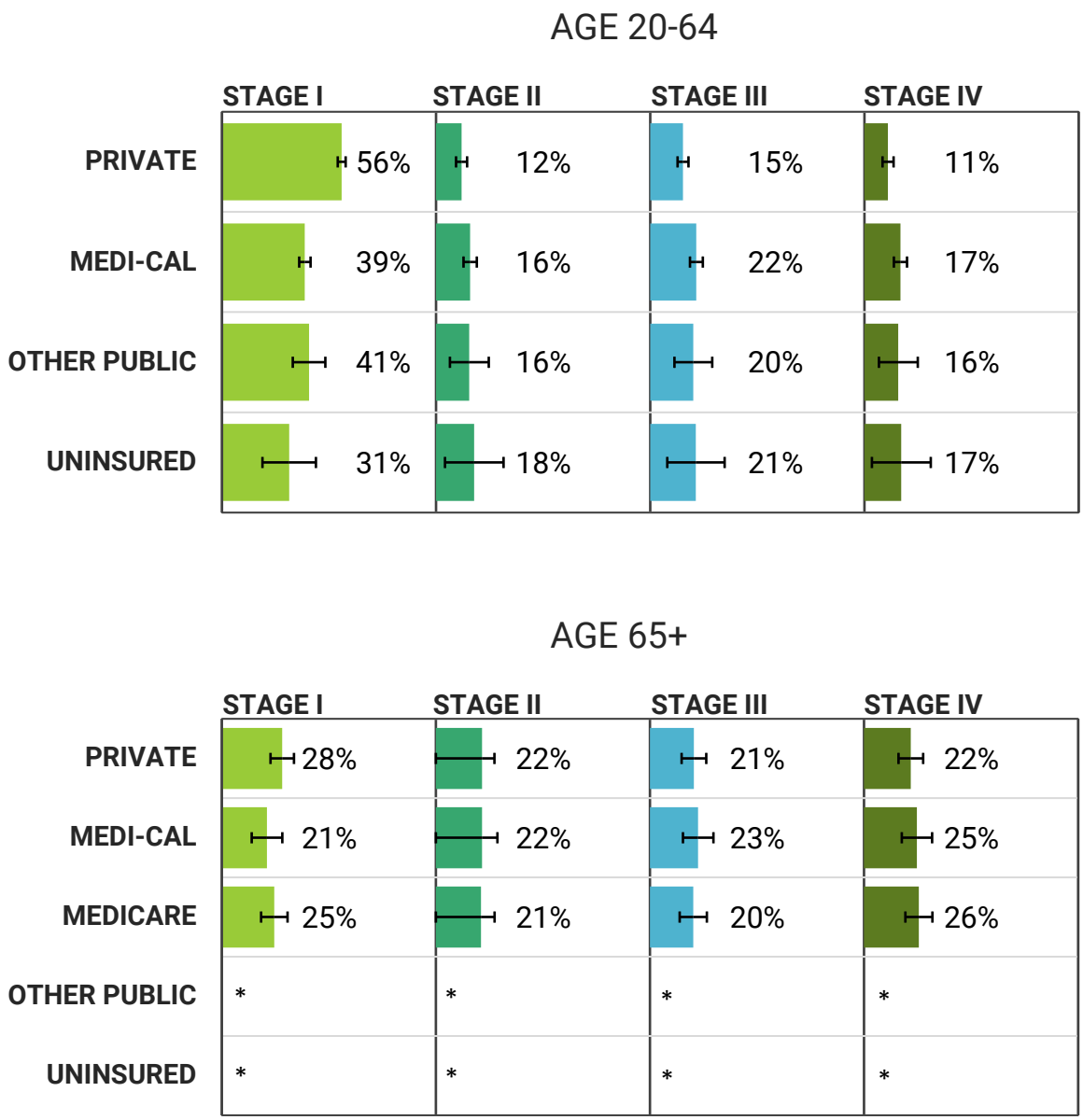
47.2%

OF CERVICAL CANCER PATIENTS ≥65 WITH MEDI-CAL WERE DIAGNOSED LATE-STAGE

TABLE 4: CERVICAL CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

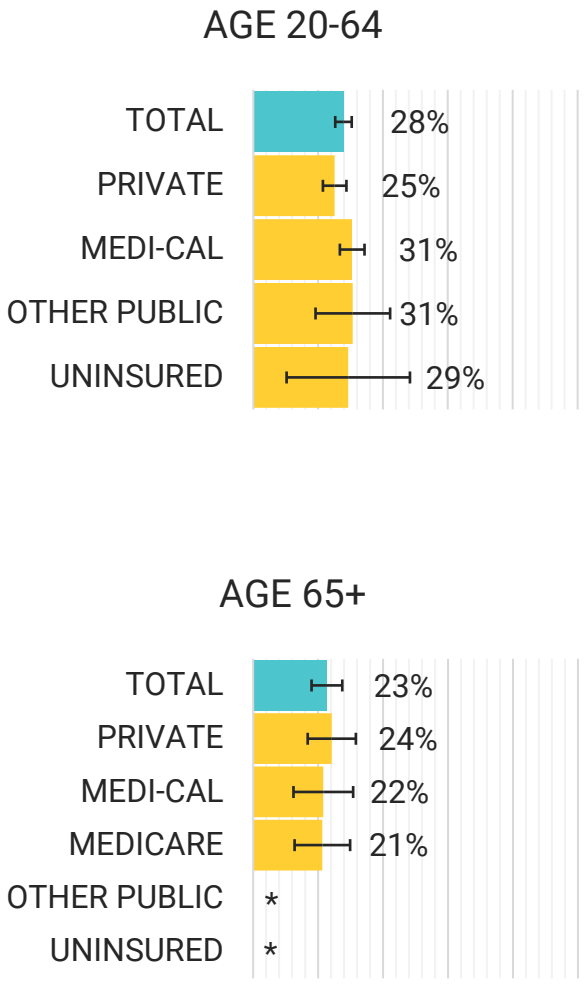
Age	Payer	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	Private	2,806 (55.9%)	598 (11.9%)	766 (15.3%)	553 (11%)	293 (5.8%)	5,016
	Medi-Cal	1,298 (38.7%)	532 (15.9%)	721 (21.5%)	563 (16.8%)	238 (7.1%)	3,352
	Other Public	160 (40.7%)	61 (15.5%)	79 (20.1%)	62 (15.8%)	31 (7.9%)	393
	Uninsured	53 (31.4%)	30 (17.8%)	36 (21.3%)	29 (17.2%)	21 (12.4%)	169
	Total	4,317 (48.3%)	1,221 (13.7%)	1,602 (17.9%)	1,207 (13.5%)	583 (6.5%)	8,930
65+	Private	259 (28.2%)	199 (21.6%)	189 (20.5%)	201 (21.8%)	72 (7.8%)	920
	Medi-Cal	125 (21.1%)	128 (21.6%)	133 (22.5%)	146 (24.7%)	60 (10.1%)	592
	Medicare	187 (24.5%)	161 (21.1%)	154 (20.2%)	195 (25.6%)	66 (8.7%)	763
	Other Public	5 (17.9%)	9 (32.1%)	7 (25%)	7 (25%)	0 (0%)	28
	Uninsured	5 (20%)	4 (16%)	5 (20%)	8 (32%)	3 (12%)	25
	Total	581 (25%)	501 (21.5%)	488 (21%)	557 (23.9%)	201 (8.6%)	2,328

FIGURE 8. PERCENTAGE OF CERVICAL CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021



**Not calculated due to small population size.*

FIGURE 9. USE OF BRACHYTHERAPY IN PATIENTS TREATED WITH PRIMARY RADIATION IN ANY STAGE OF CERVICAL CANCER BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

COLON CANCER

During the study period, 81,936 people were diagnosed with colon cancer and 2,318 were excluded due to missing insurance type resulting in 79,618 cases (97.2%) used in the analysis. Two CoC performance measures were used to evaluate the quality of care: (i) adjuvant chemotherapy administered within 4 months of diagnosis for patients under the age of 80 with AJCC stage III (lymph node positive) colon cancer; (ii) at least 12 regional lymph nodes removed and pathologically examined for resected colon cancer.

Results were as follows:

- Overall, there were low percentages (<30%) of early-stage diagnoses (in situ, stage I) and high percentages (≥40%) of late-stage diagnoses. For both age groups, the privately insured had the highest percentage (29.2% for 20-64 years, 26.2% for 65+ years) of early-stage diagnoses and the uninsured had the lowest (20.5% for 20-64 years, 16.7% for 65+ years) (Table 5, Figure 10). For the younger age group, the privately insured had the lowest percentage (46.2%) of late-stage diagnoses, while for those ≥65 years, the fewest late-stage diagnoses occurred among those with other public insurance (39.7%), followed by Medicare (41.3%), and private (41.4%).
- Adjuvant chemotherapy for AJCC stage III patients was administered most frequently among the privately insured of both age groups, but the percentage was much higher for younger patients (71.6% for ages 20-64 years, 55.3% for 65+ years) (Figure 11). Those with Medi-Cal insurance had

COLON CANCER PATIENTS WITH PRIVATE INSURANCE HAD THE GREATEST ADHERENCE WITH QUALITY MEASURES

the lowest adherence with this measure for both age groups (47.9% for 20-64 years, 41.1% for 65+ years).

- For both age groups, the privately insured had the highest percentage of patients with at least 12 regional lymph nodes removed and pathologically examined (67.5% for ages 20-64 years, 67.7% for 65+ years) (Figure 12). Among the younger age group, Medi-Cal and other public patients had the next highest adherence (59.7% for both) while the uninsured had the lowest (54.9%). For the older age group, Medicare patients had the second highest adherence (65.5%) after privately insured, followed by Medi-Cal (58.8%), other public (54.1%), and uninsured (48.1%).

TABLE 5: COLON CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

Age	Payer	In Situ n (%)	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	**Private**	1,237 (5.6%)	5,202 (23.6%)	4,377 (19.9%)	5,372 (24.4%)	4,804 (21.8%)	1,020 (4.6%)	22,012
	Medi-Cal	371 (4.7%)	1,325 (16.6%)	1,623 (20.3%)	1,925 (24.1%)	2,200 (27.6%)	534 (6.7%)	7,978
	Other Public	111 (5.3%)	388 (18.6%)	438 (21%)	445 (21.3%)	537 (25.7%)	170 (8.1%)	2,089
	Uninsured	23 (4.3%)	87 (16.2%)	121 (22.6%)	111 (20.7%)	149 (27.8%)	45 (8.4%)	536
	Total	1,742 (5.3%)	7,002 (21.5%)	6,559 (20.1%)	7,853 (24.1%)	7,690 (23.6%)	1,769 (5.4%)	32,615
65+	**Private**	899 (4.2%)	4,723 (22%)	5,606 (26.1%)	4,895 (22.8%)	3,995 (18.6%)	1,382 (6.4%)	21,500
	Medi-Cal	229 (4.1%)	898 (16.2%)	1,373 (24.8%)	1,298 (23.4%)	1,228 (22.2%)	514 (9.3%)	5,540
	Medicare	786 (4.1%)	3,895 (20.3%)	5,102 (26.6%)	4,253 (22.2%)	3,662 (19.1%)	1,451 (7.6%)	19,149
	Other Public	41 (7.1%)	104 (18.1%)	119 (20.7%)	104 (18.1%)	124 (21.6%)	83 (14.4%)	575
	Uninsured	6 (2.5%)	34 (14.2%)	48 (20.1%)	42 (17.6%)	86 (36%)	23 (9.6%)	239
	Total	1,961 (4.2%)	9,654 (20.5%)	12,248 (26.1%)	10,592 (22.5%)	9,095 (19.3%)	3,453 (7.3%)	47,003

FIGURE 10. PERCENTAGE OF COLON CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021

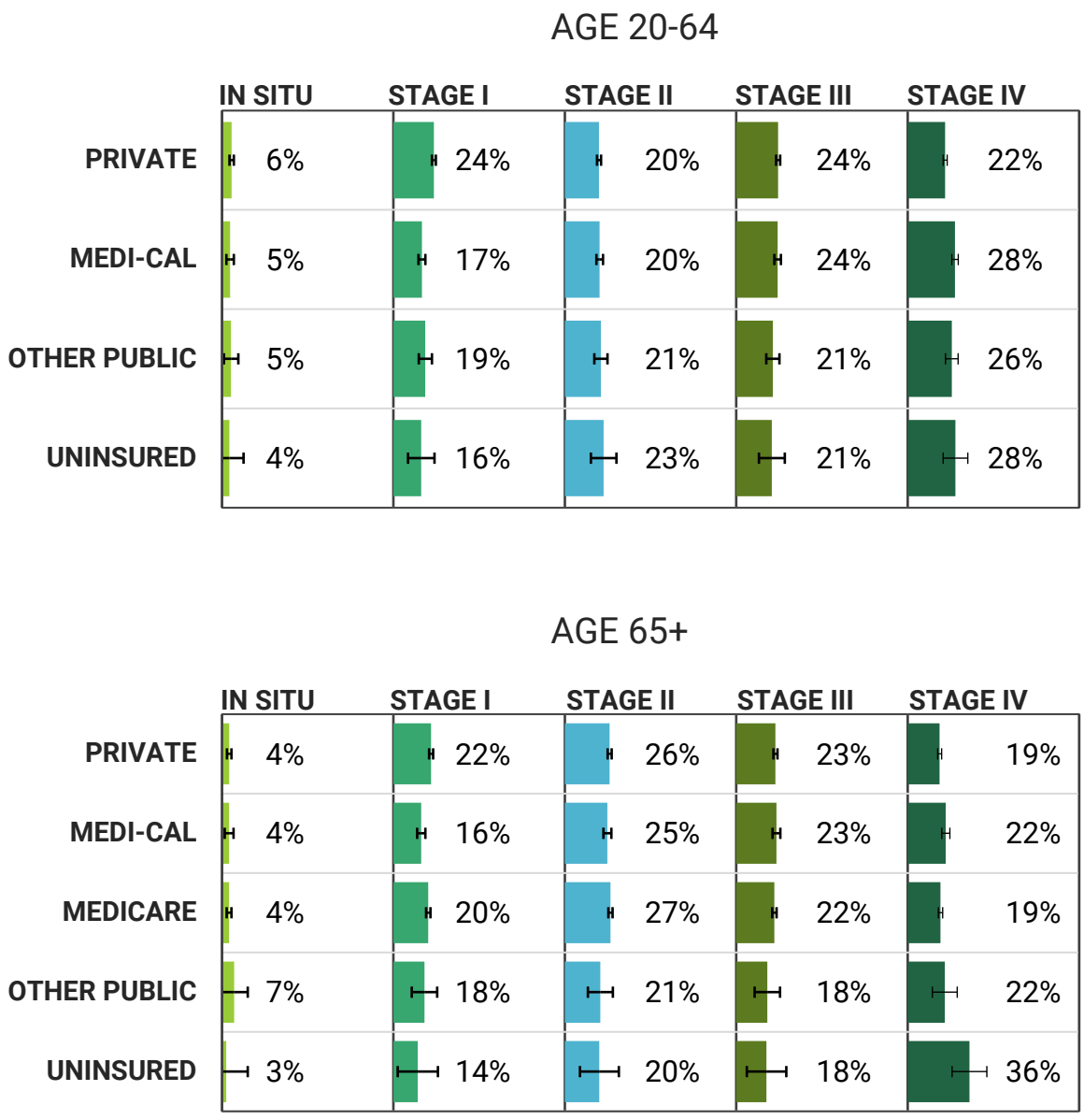
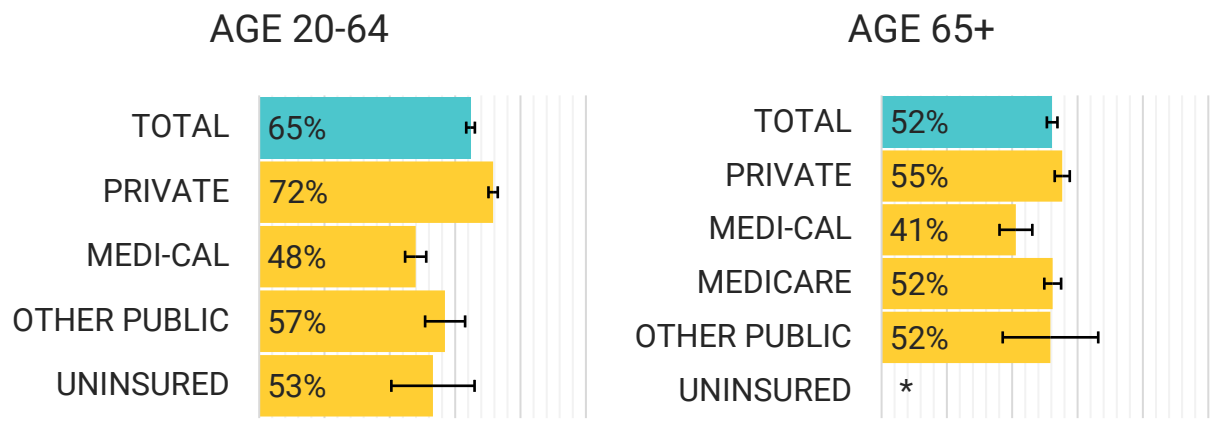
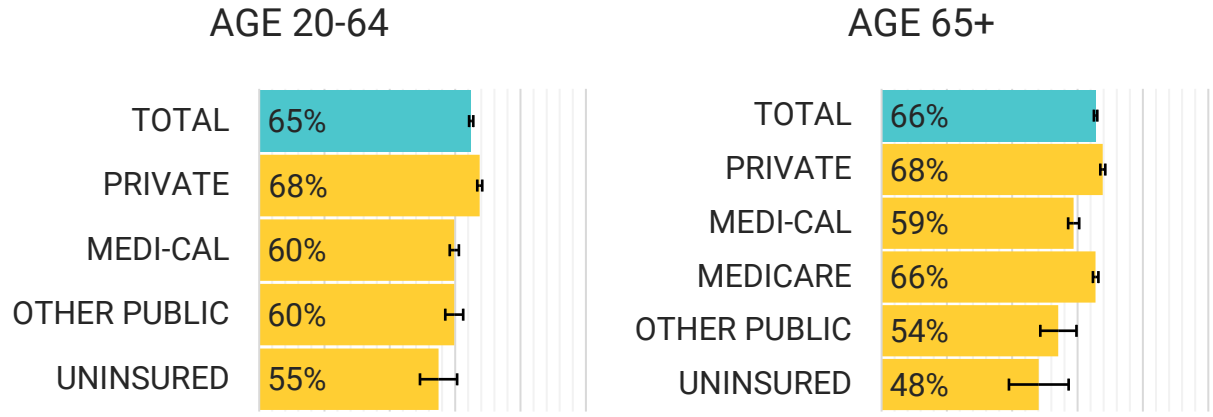


FIGURE 11. PERCENTAGE OF AJCC STAGE III COLON CANCER CASES UNDER THE AGE OF 80 FOR WHOM ADJUVANT CHEMOTHERAPY WAS ADMINISTERED WITHIN FOUR MONTHS BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

FIGURE 12. PERCENTAGE OF RESECTED COLON CANCER CASES FOR WHOM AT LEAST 12 REGIONAL LYMPH NODES WERE REMOVED AND PATHOLOGICALLY EXAMINED BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



ENDOMETRIAL CANCER

Of the 36,777 cases of endometrial cancer identified in the CCR, 733 cases were excluded due to missing insurance type, resulting in 36,044 (98.0%) cases used in the analysis. One CoC performance measure was used to evaluate the quality of care: chemotherapy and/or radiation administered to patients with stage IIIC (lymph node positive) or IV endometrial cancer.

Results were as follows:

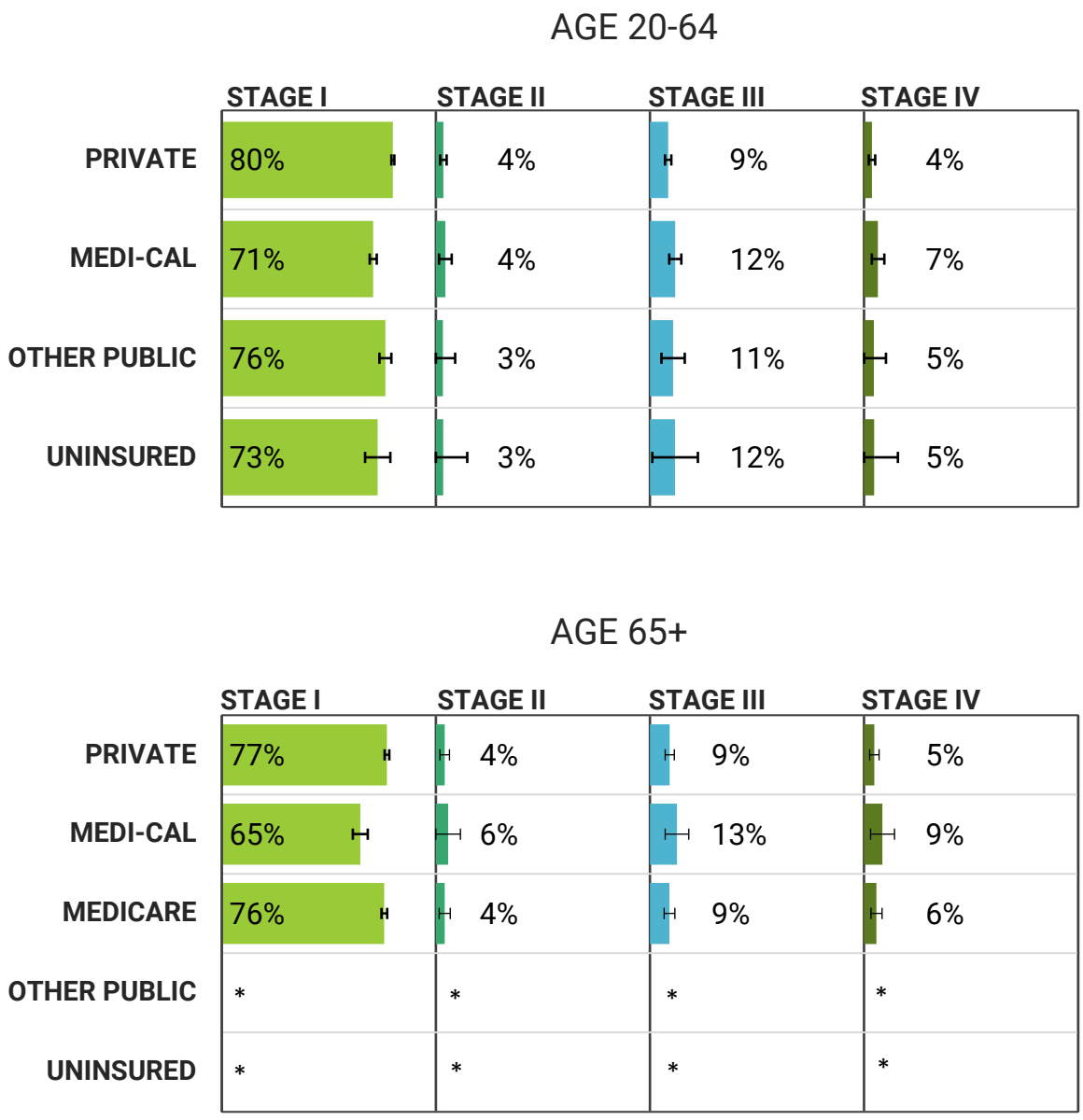
- Both age groups had high percentages of early-stage diagnoses (stages I, II) ranging from 75.1% for Medi-Cal patients to 83.4% for privately insured among the younger age group, and 56.5% for uninsured patients to 81.2% for privately insured among those ≥65 years (Table 6, Figure 13). Late-stage diagnoses ranged from 12.2% for privately insured patients to 18.3% for Medi-Cal patients among younger patients and 14% (privately insured) to 21.2% (Medi-Cal patients) among the older age group.
- The percentage of stage IIIC or IV patients having chemotherapy and/or radiation was low overall for younger patients (42.2%) and markedly low for older patients (28.9%) (Figure 14). For younger patients, the privately insured had the highest percentage in adherence with the measure (44.1%) while Medi-Cal patients had the lowest percentage (37.3%). Among the patients ≥65 years, privately insured (30.5%) and Medicare (30.2%) patients had the highest adherence with the measure (excluding categories with counts ≤50) while Medi-Cal patients had the lowest adherence (19.8%).

ENDOMETRIAL CANCER PATIENTS WITH PRIVATE OR MEDICARE INSURANCE HAD THE LARGEST PERCENTAGE OF EARLY-STAGE TUMORS

TABLE 6: ENDOMETRIAL CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

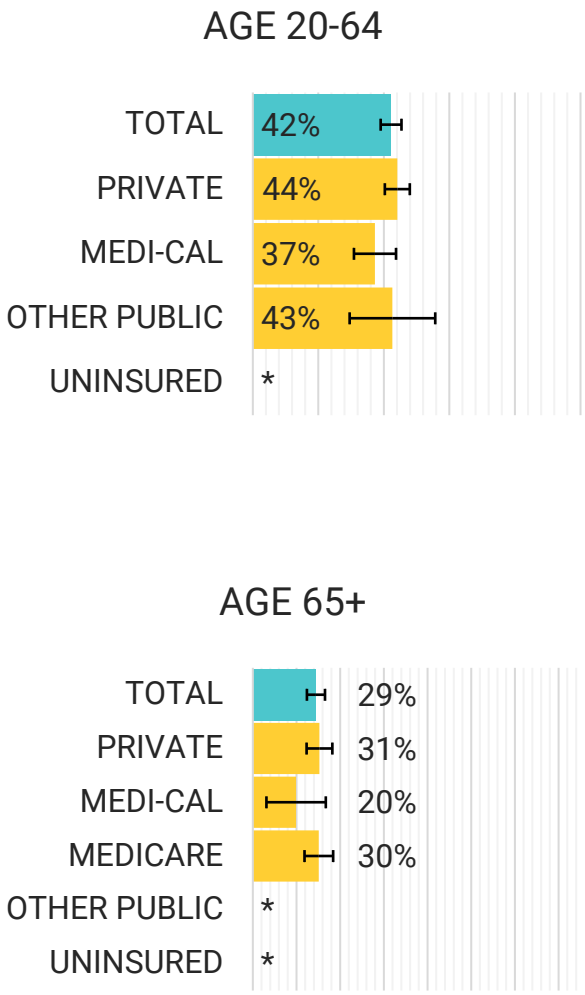
Age	Payer	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	Private	12,907 (79.9%)	573 (3.5%)	1,382 (8.5%)	596 (3.7%)	706 (4.4%)	16,164
	Medi-Cal	2,998 (70.7%)	186 (4.4%)	500 (11.8%)	276 (6.5%)	279 (6.6%)	4,239
	Other Public	885 (76.4%)	38 (3.3%)	125 (10.8%)	53 (4.6%)	57 (4.9%)	1,158
	Uninsured	217 (72.8%)	10 (3.4%)	35 (11.7%)	14 (4.7%)	22 (7.4%)	298
	Total	17,007 (77.8%)	807 (3.7%)	2,042 (9.3%)	939 (4.3%)	1,064 (4.9%)	21,859
65+	Private	5,834 (77.1%)	307 (4.1%)	694 (9.2%)	362 (4.8%)	365 (4.8%)	7,562
	Medi-Cal	720 (64.7%)	63 (5.7%)	140 (12.6%)	96 (8.6%)	94 (8.4%)	1,113
	Medicare	4,115 (75.9%)	225 (4.1%)	494 (9.1%)	316 (5.8%)	272 (5%)	5,422
	Other Public	28 (66.7%)	3 (7.1%)	4 (9.5%)	3 (7.1%)	4 (9.5%)	42
	Uninsured	25 (54.3%)	1 (2.2%)	4 (8.7%)	11 (23.9%)	5 (10.9%)	46
	Total	10,722 (75.6%)	599 (4.2%)	1,336 (9.4%)	788 (5.6%)	740 (5.2%)	14,185

FIGURE 13. PERCENTAGE OF ENDOMETRIAL CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021



**Not calculated due to small population size.*

FIGURE 14. PERCENTAGE OF STAGE IIIC OR IV ENDOMETRIAL CANCER CASES FOR WHOM CHEMOTHERAPY AND/OR RADIATION WERE ADMINISTERED BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



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STOMACH CANCER

During the study period, 25,164 people were diagnosed with stomach cancer and 870 were excluded due to missing insurance type resulting in 24,294 cases (96.5%) used in the analysis. One CoC performance measure was used to evaluate the quality of care: at least 15 regional nodes removed and pathologically examined for resected stomach cancer.

Results were as follows:

- The percentage of patients diagnosed late-stage was high for patients ≥65 years (42.5% for Medicare to 53.4% for uninsured) and markedly high for patients 20 to 64 years (50.5% for other public to 67.1% for uninsured) (Table 7, Figure 15). Early-stage diagnoses were greatest for privately insured patients (19.7%) among the younger age group and for Medicare patients (24.7%) among the older age group.
- Overall, approximately half of patients with resected stomach cancer had at least 15 regional nodes removed and pathologically examined (Figure 16). Among the younger age group, the privately insured had the highest adherence (55.9%) with the measure (excluding the uninsured category because of small counts), but Medi-Cal (54.5%) and other public (53.6%) had nearly equal percentages. Among the older age group, Medi-Cal patients (55.8%) had the greatest adherence followed by Medicare (52.8%) and privately insured (52.1%) while other public had the lowest (39.3%).

67.1%

OF YOUNG AND UNINSURED STOMACH CANCER PATIENTS WERE DIAGNOSED LATE-STAGE

TABLE 7: STOMACH CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

Age	Payer	In Situ n (%)	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	Private	34 (0.6%)	1,149 (19.1%)	721 (12%)	963 (16%)	2,322 (38.7%)	817 (13.6%)	6,006
	Medi-Cal	14 (0.5%)	404 (13.5%)	284 (9.5%)	425 (14.2%)	1,376 (46%)	491 (16.4%)	2,994
	Other Public	4 (0.6%)	123 (18.9%)	81 (12.4%)	93 (14.3%)	236 (36.2%)	115 (17.6%)	652
	Uninsured	1 (0.5%)	18 (9.4%)	15 (7.9%)	24 (12.6%)	104 (54.5%)	29 (15.2%)	191
	Total	53 (0.5%)	1,694 (17.2%)	1,101 (11.2%)	1,505 (15.3%)	4,038 (41%)	1,452 (14.8%)	9,843
65+	Private	44 (0.7%)	1,475 (23.3%)	796 (12.6%)	899 (14.2%)	1,874 (29.7%)	1,230 (19.5%)	6,318
	Medi-Cal	15 (0.7%)	482 (21.9%)	240 (10.9%)	285 (13%)	671 (30.5%)	506 (23%)	2,199
	Medicare	36 (0.6%)	1,350 (24.1%)	677 (12.1%)	693 (12.4%)	1,682 (30.1%)	1,154 (20.6%)	5,592
	Other Public	0 (0%)	51 (22.8%)	33 (14.7%)	30 (13.4%)	73 (32.6%)	37 (16.5%)	224
	Uninsured	0 (0%)	14 (11.9%)	5 (4.2%)	7 (5.9%)	56 (47.5%)	36 (30.5%)	118
	Total	95 (0.7%)	3,372 (23.3%)	1,751 (12.1%)	1,914 (13.2%)	4,356 (30.1%)	2,963 (20.5%)	14,451

FIGURE 15. PERCENTAGE OF STOMACH CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021

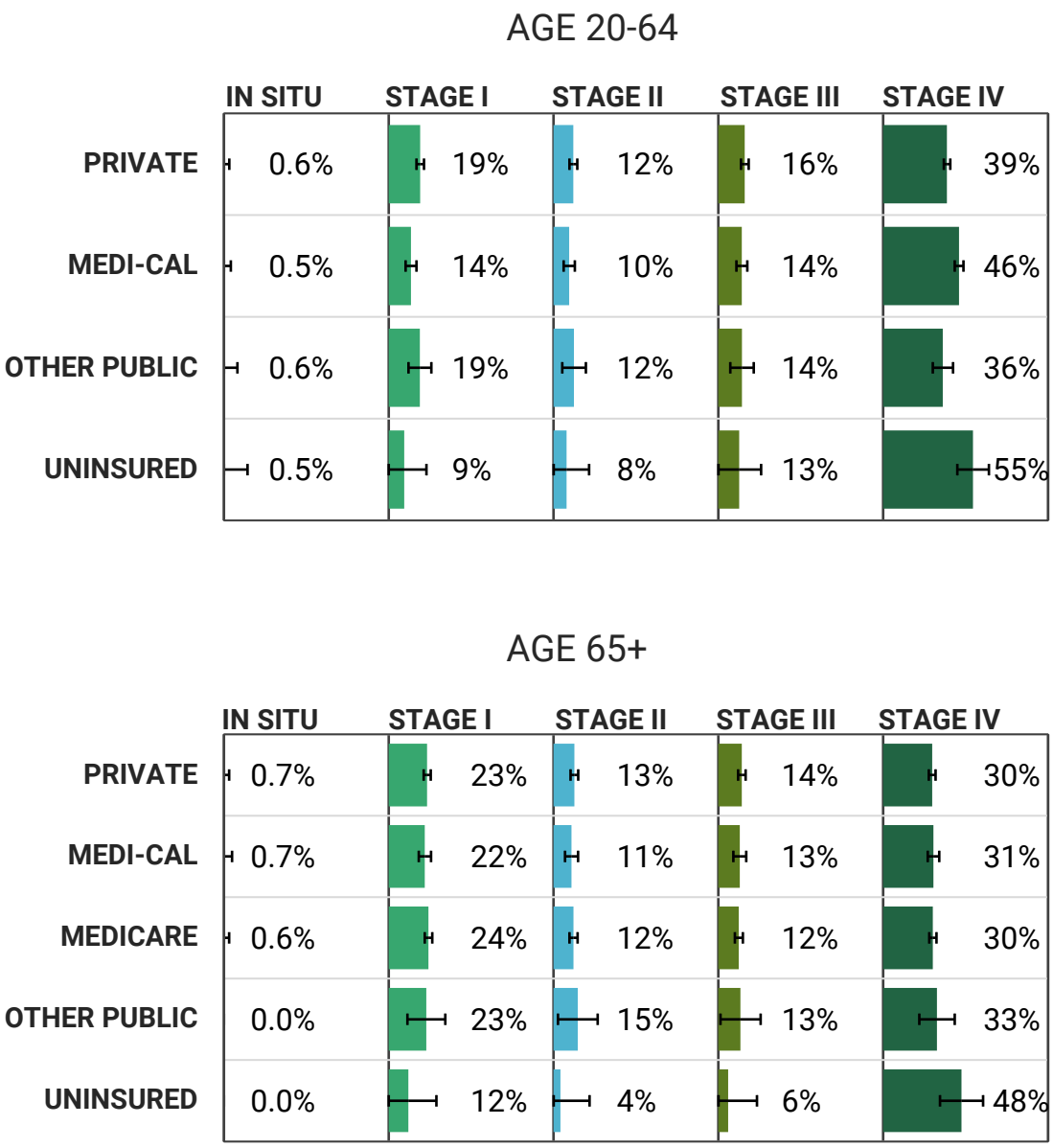
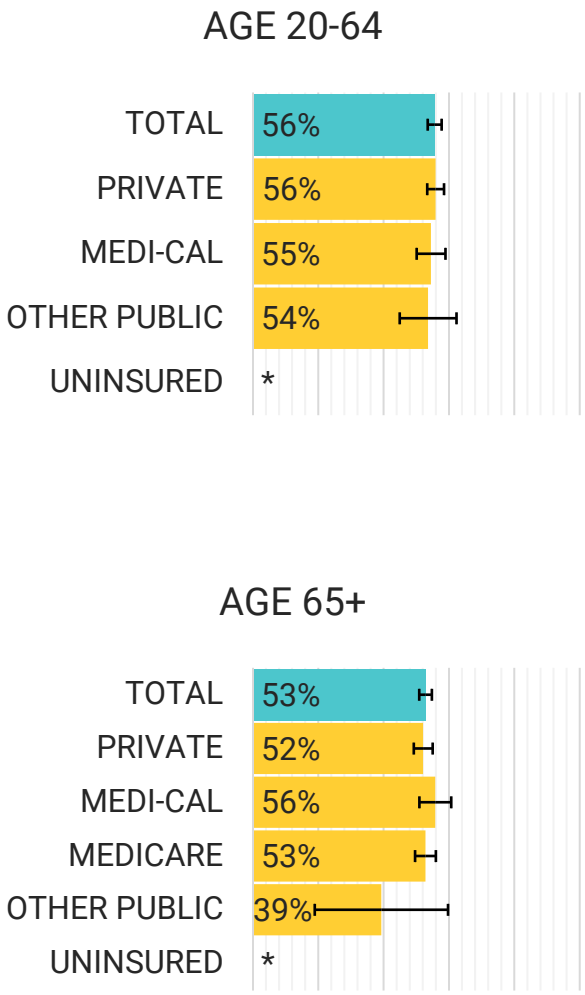


FIGURE 16. PERCENTAGE OF RESECTED STOMACH CANCER CASES FOR WHOM AT LEAST 15 REGIONAL LYMPH NODES WERE REMOVED AND PATHOLOGICALLY EXAMINED BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

NON-SMALL CELL LUNG CANCER (NSCLC)

Of the 102,671 cases of NSCLC identified in the CCR, 2,164 cases were excluded due to missing insurance type, resulting in 100,507 (97.9%) cases used in the analysis. Three CoC performance measures were used to evaluate the quality of care: (i) at least 10 regional lymph nodes removed and pathologically examined for stages IA, IB, IIA, and IIB[20,21] resected NSCLC; (ii) systemic chemotherapy administered within 4 months preoperatively or day of surgery to 6 months postoperatively or recommended for surgically resected cases with pathologic, lymph node-positive (pN1, pathologic metastases to ipsilateral peribronchial and /or hilar lymph nodes and intrapulmonary nodes including by direct extension) and (pN2, pathologic metastases to mediastinal and/or subcarinal lymph nodes) NSCLC; (iii) surgery is not the first course of treatment for cN2, M0 (clinical metastases to mediastinal and/or subcarinal lymph nodes, no distant metastases) NSCLC.

81.5%

OF YOUNG AND UNINSURED NSCLC PATIENTS WERE DIAGNOSED LATE-STAGE

Results were as follows:

- More than half of patients from both age groups were diagnosed late-stage (20-64 years: 65.7% for other public insurance to 81.5% for uninsured; 65+ years: 49.8% for other public insurance to 74.3% for uninsured) (Table 8, Figure 17). The privately insured (22.2%) had the highest percentage of early-stage diagnoses among the younger age group while those with other public insurance (32.5%) had the highest percentage among the older age group.
- Only half of patients of both age groups had at least 10 regional nodes removed and pathologically examined for stages IA, IB, IIA, and IIB resected NSCLC (Figure 18). Among both age groups, the privately insured had the greatest percentage in adherence (ages 20-64 years: 50.2%; 65+ years: 54.0%, excluding categories with small counts) followed by Medi-Cal (ages 20-64 years: 45.5%; 65+ years: 51.9%). For the older age group, Medicare (51.3%) and other public (51.1%) had nearly identical percentages to Medi-Cal.

- Slightly more younger patients (64.4%) compared to older patients (59.1%) were adherent with the second quality measure that assesses systemic chemotherapy receipt or recommendation (Figure 19). Among those 20 to 64 years, the privately insured (66.9%) had the greatest percentage meeting the quality measure (excluding categories with low counts) followed by other public (61.8%) and Medi-Cal (55.6%). For those ≥65 years, private (58.2%), Medi-Cal (58.8%), and Medicare (60.1%) insured all had similar percentages of patients meeting the quality measure.
- The third quality measure, surgery is not the first course of treatment for cN2, M0 NSCLC, had the greatest adherence (20-64 years: 70.2%, 65+ years: 78.6%) (Figure 20). Patients with Medi-Cal (20-64 years: 79.0%, 65+ years: 82.1%) and other public insurance (20-64 years: 75.8%, 65+ years: 83.1%) had the greatest adherence for both age groups (excluding categories with low counts) while privately insured patients had the lowest adherence (20-64 years: 64.0%, 65+ years: 76.1%).

TABLE 8: NSCLC STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

Age	Payer	In Situ n (%)	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	**Private**	84 (0.6%)	3,255 (21.6%)	942 (6.3%)	2,418 (16.1%)	7,804 (51.8%)	555 (3.7%)	15,058
	Medi-Cal	28 (0.4%)	990 (14.5%)	364 (5.3%)	1,171 (17.1%)	3,903 (57%)	389 (5.7%)	6,845
	Other Public	12 (0.5%)	557 (21.2%)	169 (6.4%)	513 (19.5%)	1,215 (46.2%)	166 (6.3%)	2,632
	Uninsured	4 (1.1%)	23 (6.1%)	15 (4%)	59 (15.6%)	249 (65.9%)	28 (7.4%)	378
	Total	128 (0.5%)	4,825 (19.4%)	1,490 (6%)	4,161 (16.7%)	13,171 (52.9%)	1,138 (4.6%)	24,913
65+	**Private**	218 (0.6%)	10,182 (28.7%)	3,034 (8.5%)	5,627 (15.8%)	14,573 (41%)	1,868 (5.3%)	35,502
	Medi-Cal	44 (0.5%)	1,662 (20.7%)	549 (6.8%)	1,371 (17.1%)	3,853 (48%)	553 (6.9%)	8,032
	Medicare	159 (0.5%)	7,939 (26.4%)	2,390 (7.9%)	4,804 (15.9%)	13,029 (43.2%)	1,807 (6%)	30,128
	Other Public	2 (0.1%)	479 (32.4%)	119 (8%)	265 (17.9%)	472 (31.9%)	143 (9.7%)	1,480
	Uninsured	2 (0.4%)	50 (11.1%)	33 (7.3%)	75 (16.6%)	261 (57.7%)	31 (6.9%)	452
	Total	425 (0.6%)	20,312 (26.9%)	6,125 (8.1%)	12,142 (16.1%)	32,188 (42.6%)	4,402 (5.8%)	75,594

FIGURE 17. PERCENTAGE OF NSCLC CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021

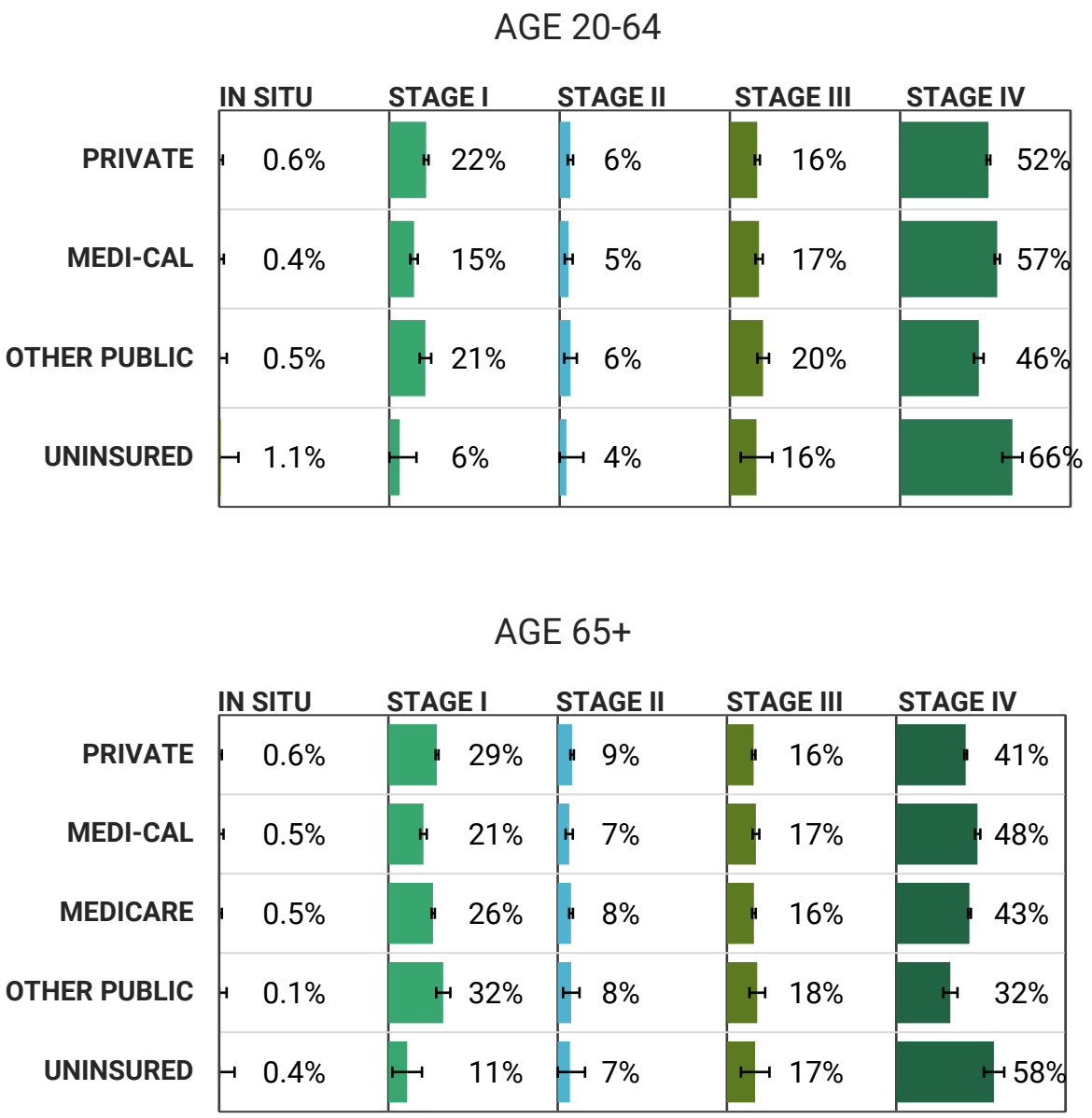
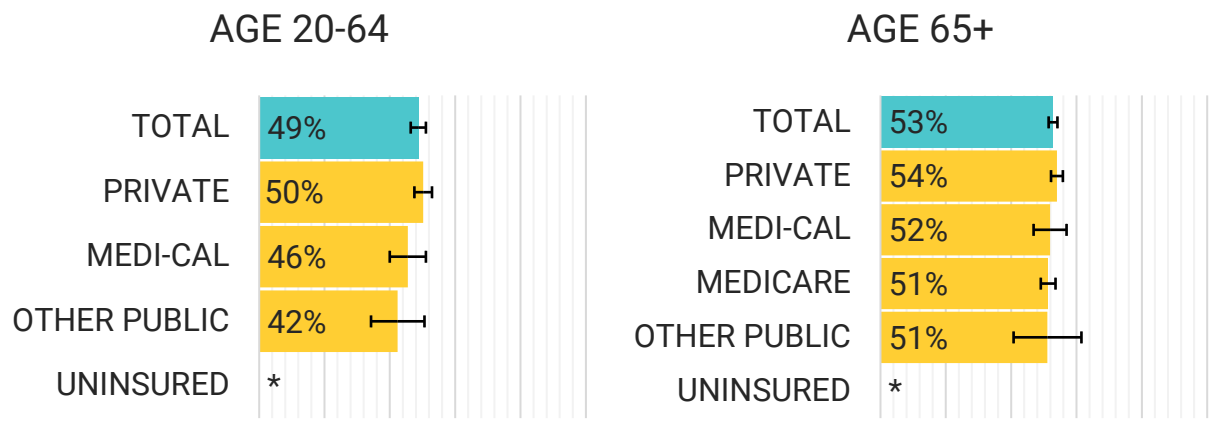
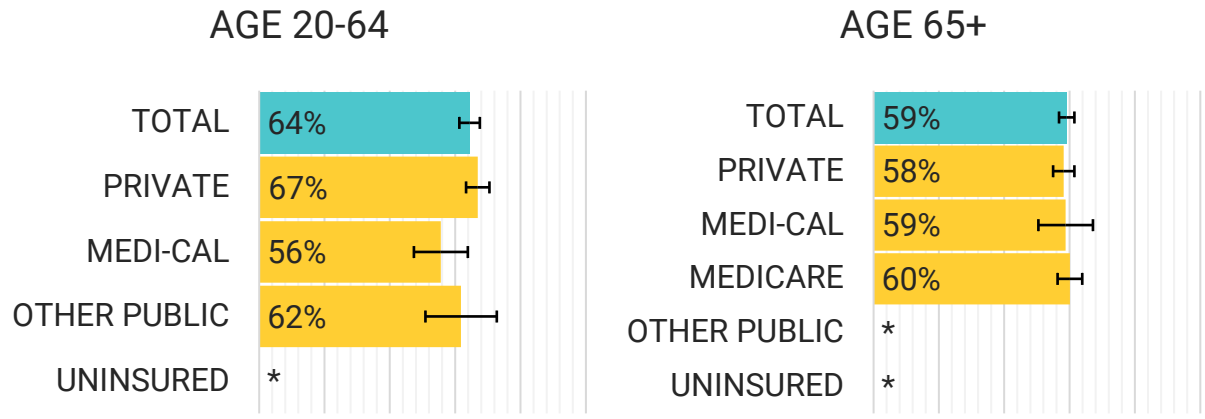


FIGURE 18: PERCENTAGE OF RESECTED AJCC STAGE IA, IB, IIA, AND IIB NSCLC CASES THAT HAD AT LEAST 10 REGIONAL LYMPH NODES REMOVED AND PATHOLOGICALLY EXAMINED BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



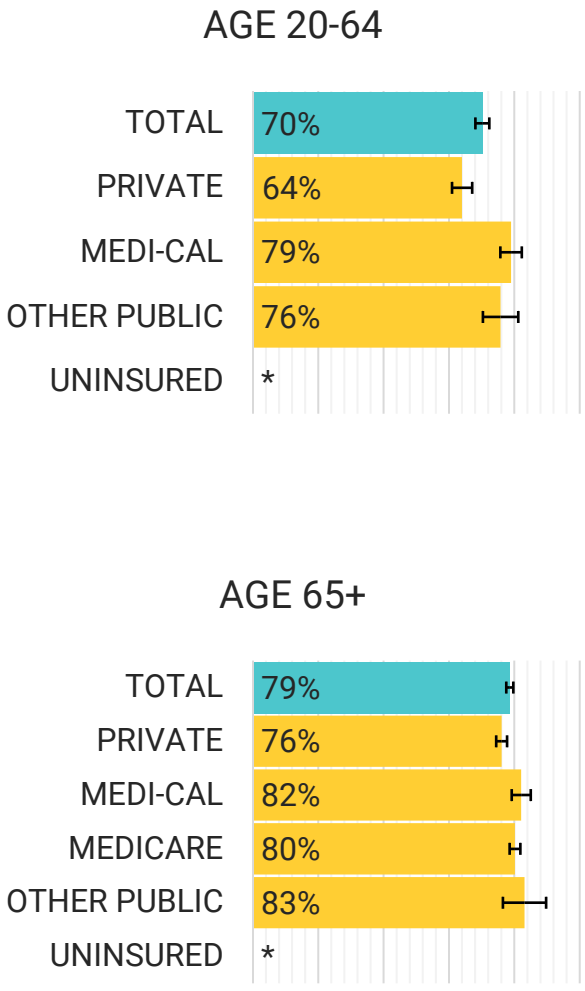
**Not calculated due to small population size.*

FIGURE 19: PERCENTAGE OF SURGICALLY RESECTED PATHOLOGIC LYMPH NODE-POSITIVE (PN1, PN2) NSCLC CASES FOR WHOM SYSTEMIC CHEMOTHERAPY WAS ADMINISTERED WITHIN 4 MONTHS TO DAY PREOPERATIVELY OR DAY OF SURGERY TO 6 MONTHS POSTOPERATIVELY, OR IT WAS RECOMMENDED BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

FIGURE 20: PERCENTAGE OF CN2, M0 NSCLC CASES FOR WHOM SURGERY IS NOT THE FIRST COURSE OF TREATMENT BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

OVARIAN CANCER

There were 20,063 cases of ovarian cancer identified in the CCR with 422 cases excluded due to missing insurance type, resulting in 19,641 (97.9%) cases used in the analysis. One CoC quality measure was evaluated: salpingo-oophorectomy with omentectomy, debulking; cytoreductive surgery, or pelvic exenteration in stages I-IIIC (peritoneal metastases beyond pelvis >2 cm and/or regional lymph node metastases) ovarian cancer.

Results were as follows:

- Approximately half of patients 20 to 64 years and two-thirds of patients ≥65 years were diagnosed with late-stage ovarian cancer (Table 10, Figure 21). Among the younger age group, privately insured patients (46.9%) had the lowest percentage of late-stage diagnoses while among the older age group private (69.3%), Medi-Cal (69.3%), and Medicare (70.4%) all had similar proportions.
- A lower proportion younger patients (66.9%) met the quality measure compared to older patients (63.9%) (Figure 22). For both age groups, the privately insured (20-64 years: 68.5%, 65+ years: 67.3%) had the greatest adherence with the measure. Among younger patients, the uninsured (50.8%) had the lowest adherence with the measure while for the older patients, Medi-Cal had the lowest (56.4%).

OVARIAN CANCER

PATIENTS WITH

PRIVATE INSURANCE

HAD THE

GREATEST

ADHERENCE

WITH

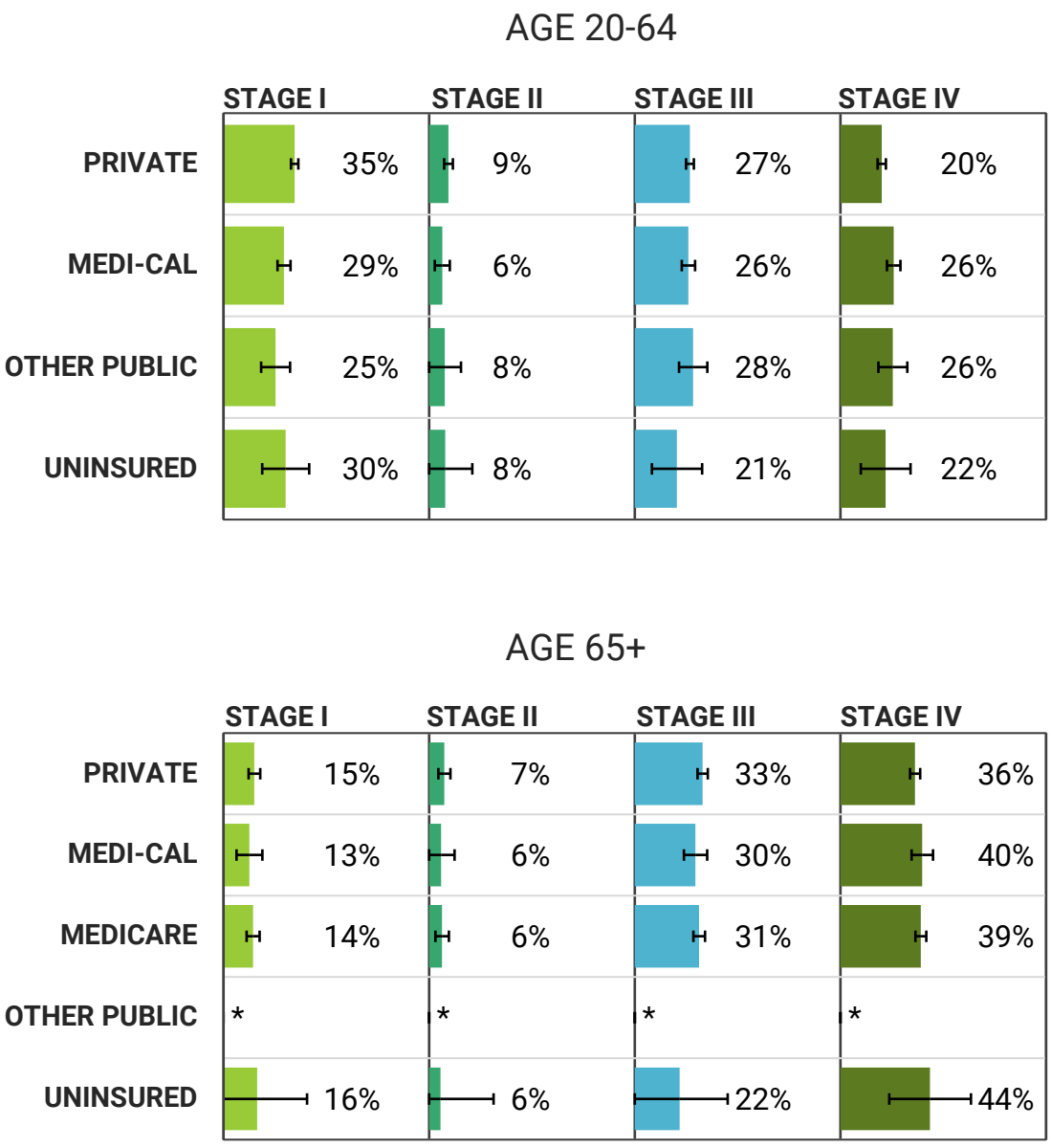
QUALITY

MEASURES

TABLE 10: OVARIAN CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

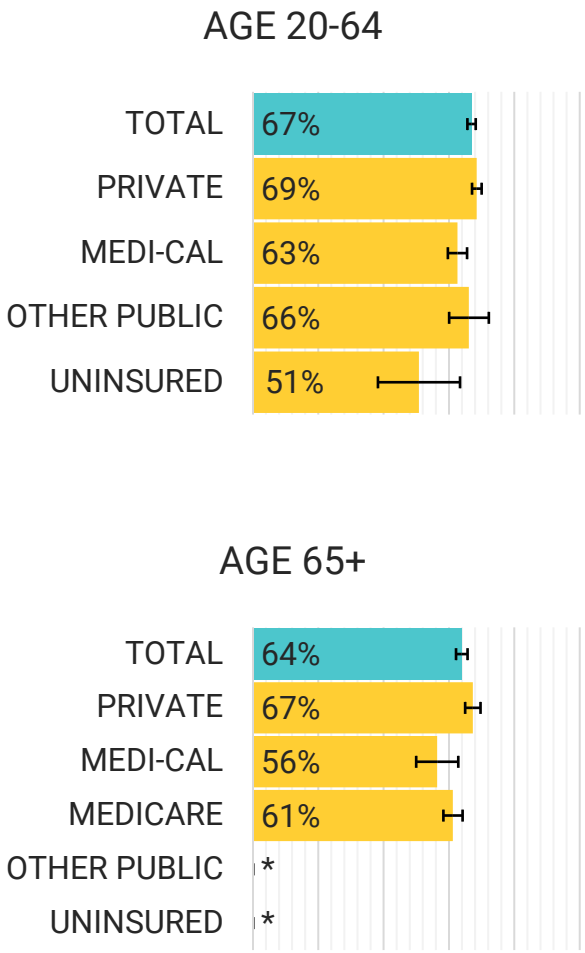
Age	Payer	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	Private	2,705 (34.6%)	731 (9.4%)	2,095 (26.8%)	1,574 (20.1%)	713 (9.1%)	7,818
	Medi-Cal	792 (29.4%)	172 (6.4%)	704 (26.1%)	699 (25.9%)	330 (12.2%)	2,697
	Other Public	146 (25.3%)	44 (7.6%)	164 (28.4%)	147 (25.5%)	76 (13.2%)	577
	Uninsured	62 (30.2%)	16 (7.8%)	42 (20.5%)	45 (22%)	40 (19.5%)	205
	Total	3,705 (32.8%)	963 (8.5%)	3,005 (26.6%)	2,465 (21.8%)	1,159 (10.3%)	11,297
65+	Private	617 (15%)	305 (7.4%)	1,356 (33%)	1,492 (36.3%)	339 (8.3%)	4,109
	Medi-Cal	107 (12.6%)	49 (5.8%)	250 (29.5%)	337 (39.8%)	104 (12.3%)	847
	Medicare	476 (14.4%)	209 (6.3%)	1,035 (31.3%)	1,294 (39.1%)	297 (9%)	3,311
	Other Public	5 (22.7%)	2 (9.1%)	7 (31.8%)	4 (18.2%)	4 (18.2%)	22
	Uninsured	9 (16.4%)	3 (5.5%)	12 (21.8%)	24 (43.6%)	7 (12.7%)	55
	Total	1,214 (14.5%)	568 (6.8%)	2,660 (31.9%)	3,151 (37.8%)	751 (9%)	8,344

FIGURE 21. PERCENTAGE OF OVARIAN CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021



**Not calculated due to small population size.*

FIGURE 22. PERCENTAGE OF STAGES I-IIIC OVARIAN CANCER CASES RECEIVING SALPINGO-OOPHORECTOMY WITH OMENTECTOMY, DEBULKING; CYTOREDUCTIVE SURGERY, OR PELVIC EXENTERATION BY AGE AND PAYER SOURCE: CALIFORNIA, 2014-2021



**Not calculated due to small population size.*

RECTAL CANCER

Of the 29,600 cases of rectal cancer identified in the CCR, 1,320 cases were excluded due to missing insurance type, resulting in 28,280 (95.5%) cases used in the analysis. One CoC performance measure was used to evaluate the quality of care: preoperative chemo and radiation administered for clinical AJCC T3N0, T4N0 (tumor invades through muscularis propria into pericolorectal tissues or invades the visceral peritoneum or invades or adheres to adjacent organ or structure, no lymph node metastases), or stage III; or postoperative chemo and radiation administered within 180 days of diagnosis for clinical AJCC T1-2N0 (tumor invades the submucosa or invades the muscularis propria) with pathologic AJCC T3N0, T4N0, or stage III; or treatment is recommended; for patients under the age of 80 receiving resection for rectal cancer.

55.0%

OF YOUNG AND UNINSURED RECTAL CANCER PATIENTS WERE DIAGNOSED LATE-STAGE

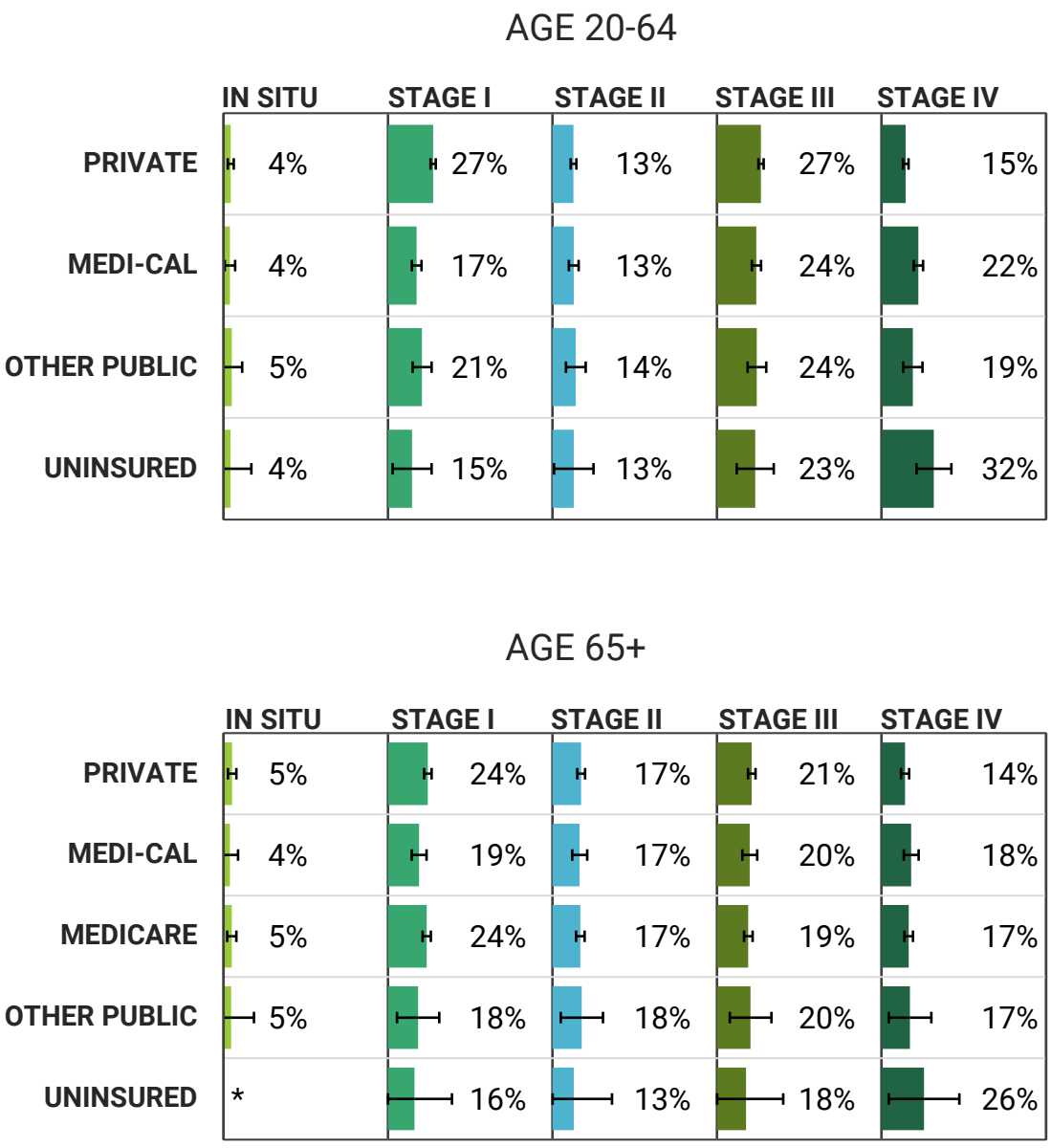
Results were as follows:

- More younger patients were diagnosed late-stage than older patients (42.9% vs. 35.8%, respectively) (Table 11, Figure 23). The privately insured younger patients had the lowest percentage of late-stage tumors (41.4%) and the uninsured had the highest percentage (55.0%). Among patients ≥65 years, those with private (35.4%) or Medicare (35.5%) had the lowest percentage late-stage and Medi-Cal (37.9%) and other public had the highest (37.7%), excluding categories with small counts. For both age groups, the privately insured had the greatest percentage of early-stage tumors (20-64 years: 31.8%, 65+ years: 29.4%).
- Few patients were adherent with the quality measure regardless of age (20-64 years: 26.2%, 65+ years: 27.9%) (Figure 24). Among the younger age group, those with Medi-Cal (29.0%) and other public (29.8%) had the highest adherence while privately insured patients had the lowest (25.1%). For patients ≥65 years, those with other public insurance (30.2%) had the greatest adherence followed by Medi-Cal (28.9%), private (27.7%), and Medicare (27.7%).

TABLE 11: RECTAL CANCER STAGE AT DIAGNOSIS BY AGE AND PAYER SOURCE, CALIFORNIA 2014-2021

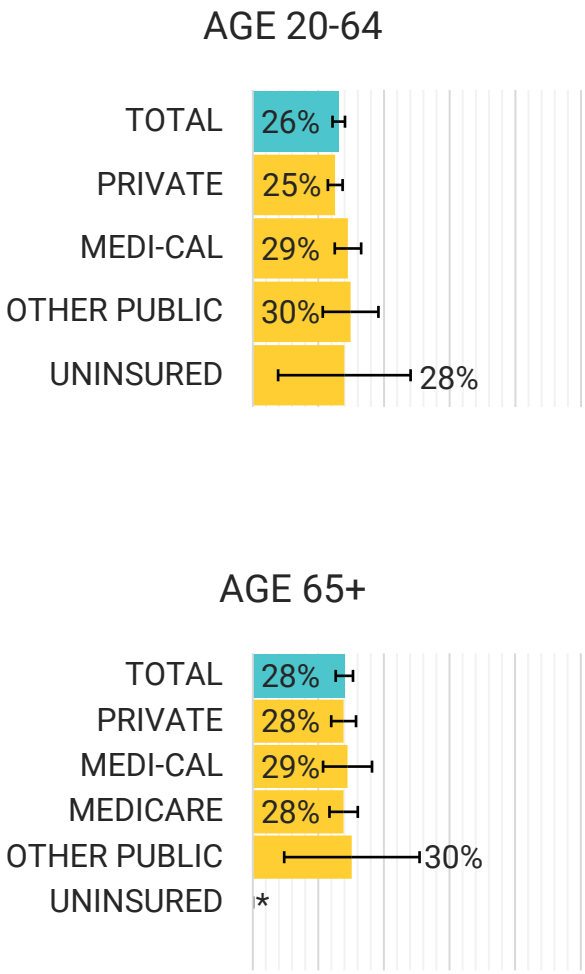
Age	Payer	In Situ n (%)	I n (%)	II n (%)	III n (%)	IV n (%)	Unknown n (%)	Total
20-64	Private	500 (4.4%)	3,112 (27.4%)	1,439 (12.7%)	3,032 (26.7%)	1,670 (14.7%)	1,589 (14%)	11,342
	Medi-Cal	146 (3.9%)	658 (17.4%)	486 (12.9%)	902 (23.9%)	846 (22.4%)	735 (19.5%)	3,773
	Other Public	46 (5%)	189 (20.7%)	129 (14.1%)	221 (24.2%)	173 (19%)	154 (16.9%)	912
	Uninsured	10 (4.3%)	34 (14.6%)	30 (12.9%)	54 (23.2%)	74 (31.8%)	31 (13.3%)	233
	Total	702 (4.3%)	3,993 (24.6%)	2,084 (12.8%)	4,209 (25.9%)	2,763 (17%)	2,509 (15.4%)	16,260
65+	Private	293 (5.2%)	1,353 (24.2%)	974 (17.4%)	1,184 (21.1%)	802 (14.3%)	993 (17.7%)	5,599
	Medi-Cal	60 (3.9%)	291 (18.9%)	254 (16.5%)	306 (19.9%)	277 (18%)	351 (22.8%)	1,539
	Medicare	233 (5%)	1,090 (23.5%)	784 (16.9%)	881 (19%)	763 (16.5%)	878 (19%)	4,629
	Other Public	9 (4.7%)	35 (18.3%)	34 (17.8%)	39 (20.4%)	33 (17.3%)	41 (21.5%)	191
	Uninsured	0 (0%)	10 (16.1%)	8 (12.9%)	11 (17.7%)	16 (25.8%)	17 (27.4%)	62
	Total	595 (5%)	2,779 (23.1%)	2,054 (17.1%)	2,421 (20.1%)	1,891 (15.7%)	2,280 (19%)	12,020

FIGURE 23. PERCENTAGE OF RECTAL CANCER CASES BY AGE, STAGE AT DIAGNOSIS AND PAYER SOURCE: CALIFORNIA 2014-2021



**Not calculated due to small population size.*

FIGURE 24. PERCENTAGE OF RECTAL CANCER CASES FOR WHOM PREOPERATIVE CHEMOTHERAPY AND RADIATION WERE ADMINISTERED FOR CLINICAL AJCC T3N0, T4N0[1] OR STAGE III; OR POSTOPERATIVE CHEMOTHERAPY AND RADIATION WERE ADMINISTERED WITHIN 180 DAYS OF DIAGNOSIS FOR CLINICAL AJCC T1-2N0[2] WITH PATHOLOGIC AJCC T3N0, T4N0, OR STAGE III; OR TREATMENT WAS RECOMMENDED; FOR PATIENTS UNDER THE AGE OF 80 RECEIVING RESECTION BY AGE AND PAYER SOURCE: CALIFORNIA 2014-2021



**Not calculated due to small population size.*

[1]Tumor invades through muscularis propria into pericolorectal tissues or invades the visceral peritoneum or invades or adheres to adjacent organ or structure, no lymph node metastases.
[2]Tumor invades the submucosa or invades the muscularis propria.

CONCLUSION

Overall, substantial differences in stage at diagnosis and adherence with CoC quality measures were found among cancer patients by source of health insurance in California during the study period of 2014 to 2021. In general, patients having Medi-Cal coverage or no health insurance were diagnosed at more advanced stages of disease and had lower compliance with quality measures than those with private or Medicare insurance. However, there were differences by age group and cancer type.

Across age groups and cancer sites, the privately insured had greater proportions of early-stage and lower proportions of late-stage diagnoses. For older patients, the Medicare insured group had similarly high proportions of early-stage and low proportions of late-stage diagnoses as privately insured individuals, especially for cancers of the bladder, colon, endometrium, stomach, ovary, and rectum. Similarly, for the quality measures, the privately and Medicare insured had the greatest proportions in adherence for most sites including breast, colon, endometrial, non-small cell lung, and ovarian cancers. These findings are consistent with research showing favorable outcomes for Medicare beneficiaries including earlier stage at diagnosis and higher likelihood of cancer-specific treatments compared to their younger, uninsured counterparts.[25-29]

Younger patients had similar patterns to older patients with regard to more early-stage diagnoses, fewer late-stage diagnoses, and greater adherence to quality measures for the privately insured while the converse was true for those with Medi-Cal or no insurance. These findings are in line with studies showing more late-stage cancer diagnoses among Medicaid insured patients and more early-stage diagnoses among the privately insured.[7,22-24]

There were some substantial differences in stage at diagnosis between the age groups. Younger individuals had greater proportions of late-stage diagnoses for stomach and NSCLCs, while the older individuals had greater proportions of late-stage diagnoses for cervical and ovarian cancers. For colon and rectal cancers, the differences between the age groups were not as pronounced, but the younger group had greater proportions of late-stage diagnoses. Reasons for these disparities and how insurance type may relate to them are unclear. Further investigation is warranted with more granular age groupings to better evaluate associations with insurance type.

Our investigation had some limitations. Although we found worse outcomes in terms of later stage at diagnosis and lower adherence with quality measures for Medi-Cal insured patients, we were unable to account for timing of Medi-Cal enrollment. Prior work has shown better outcomes for those enrolled in Medicaid prior to their cancer diagnosis compared to those enrolled around the time of

diagnosis.[35-38] We also did not directly compare our results to pre-ACA findings so we cannot quantify changes associated with Medi-Cal expansion and greater access to private insurance after ACA enactment. Finally, our analyses did not examine the impact of sociodemographic and clinical factors. Despite these limitations, we found large disparities in stage at diagnosis and adherence with quality measures by health insurance type. Future research should investigate timing of Medi-Cal enrollment as well as differences by race/ethnicity as research has shown less Medicaid coverage for racial/ethnic minorities after ACA expansion.[39]

Based on the findings summarized in this report, there are opportunities for improvements among health insurers in California. Although the privately insured generally had the greatest percentage of patients adherent with the quality measures and diagnosed early-stage, there were still gaps. The positive results seen for Medicare insured individuals adds to the current debate regarding Medicare for All and improved cancer outcomes.[25,40,41]

SUBSTANTIAL DIFFERENCES IN STAGE AT DIAGNOSIS AND COMPLIANCE WITH COMMISSION ON CANCER QUALITY MEASURES WERE FOUND AMONG CANCER PATIENTS BY SOURCE OF HEALTH INSURANCE IN CALIFORNIA

APPENDIX TABLE 1. CANCER SITE SELECTION CRITERIA

Cancer Site	SEER WHO Recode	Histology Code Restrictions (if applicable)
Bladder	29010	
Breast	26000	
Cervix	27010	
Colon	21041, 21042, 21043, 21044, 21045, 21046, 21047, 21048, 21049	
Endometrium	27020, 27030	8050, 8140, 8141, 8210, 8211, 8260, 8261, 8262, 8263, 8380, 8381, 8382, 8383, 8440, 8470, 8471, 8480, 8481, 8490, 8560, 8570, 8571
Stomach	21020	
Non-Small Cell Lung	22030	8050, 8052, 8070, 8071, 8072, 8073, 8074, 8075, 8082, 8083, 8140, 8144, 8230, 8250, 8551, 8253, 8254, 8255, 8256, 8257, 8260, 8265, 8333, 8480, 8012, 8560, 8022, 8031, 8032, 8033, 8046, 8972, 8980, 8023, 8044, 8200, 8562, 8430, 8310, 8982, 8010, 8014, 8020, 8021, 8030, 8042, 8043, 8046
Ovary	27040	
Rectum	21052	

APPENDIX TABLE 2. COMMISSION ON CANCER QUALITY MEASURES BY CANCER SITE

Original Quality Measure	Amended Quality Measure (if changes were made)
Bladder	
At least 2 lymph nodes are removed in patients under 80 undergoing partial or radical cystectomy.	
Breast	
Radiation therapy is administered within 1 year (365 days) of diagnosis for women under age 70 receiving breast conserving surgery for breast cancer.	
Combination chemotherapy is recommended or administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1cN0M0, or stage IB - III hormone receptor negative breast cancer.	Combination chemotherapy is ~~recommended or~~ administered within 4 months (120 days) of diagnosis for women under 70 with AJCC T1cN0M0, or stage IB - III hormone receptor negative breast cancer.
Radiation therapy is recommended or administered following any mastectomy within 1 year (365 days) of diagnosis of breast cancer for women with ≥ 4 positive regional lymph nodes.	Radiation therapy is ~~recommended or~~ administered following any mastectomy within 1 year (365 days) of diagnosis of breast cancer for women with ≥ 4 positive regional lymph nodes.
Breast conservation surgery rate for women with AJCC clinical stage 0, I, or II breast cancer.	
Cervix	
Use of brachytherapy in patients treated with primary radiation with curative intent in any stage of cervical cancer.	Use of brachytherapy in patients treated with primary radiation ~~with curative intent~~ in any stage of cervical cancer
Colon	
Adjuvant chemotherapy is recommended or administered within 4 months (120 days) of diagnosis for patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer.	Adjuvant chemotherapy is ~~recommended or~~ administered within 4 months (120 days) of diagnosis for patients under the age of 80 with AJCC Stage III (lymph node positive) colon cancer.
At least 12 regional lymph nodes are removed and pathologically examined for resected colon cancer.	
Endometrium	
Chemotherapy and/or radiation administered to patients with Stage IIIC or IV Endometrial cancer.	
Stomach	
At least 15 regional lymph nodes are removed and pathologically examined for resected gastric cancer.	
Non-Small Cell Lung	
At least 10 regional lymph nodes are removed and pathologically examined for AJCC stage IA, IB, IIA, and IIB resected NSCLC.	
Systemic chemotherapy is administered within 4 months to day preoperatively or day of surgery to 6 months postoperatively, or it is recommended for	

surgically resected cases with pathologic, lymph node-positive (pN1) and (pN2) NSCLC.	
Surgery is not the first course of treatment for cN2, M0 lung cases.	
Ovary	
Salpingo-oophorectomy with omentectomy, debulking; cytoreductive surgery, or pelvic exenteration in Stages I-IIIC Ovarian cancer.	
Rectum	
Preoperative chemo and radiation are administered for clinical AJCC T3N0, T4N0, or Stage III; or Postoperative chemo and radiation are administered within 180 days of diagnosis for clinical AJCC T1-2N0 with pathologic AJCC T3N0, T4N0, or Stage III; or treatment is recommended; for patients under the age of 80 receiving resection for rectal cancer.	

BIBLIOGRAPHY

1. Centers for Disease Control and Prevention. Leading Causes of Death. 2020. https://www.cdc.gov/nchs/pressroom/states/california/ca3.htm (accessed April 15 2024).
2. Curtin SC, Tejada-Vera B, Bastian BA. Deaths: Leading Causes for 2021. 2024. https://www.cdc.gov/nchs/products/index.htm. (accessed April 15 2024).
3. Centers for Disease Control and Prevention. Cancer Mortality by State. 2022. https://www.cdc.gov/nchs/pressroom/sosmap/cancer_mortality/cancer.htm (accessed April 15 2024).
4. Siegel RL, Miller KD, Wagle NS, Jemal A. Cancer statistics, 2023. *CA: a cancer journal for clinicians* 2023; **73**(1): 17-48.
5. Fang P, He W, Gomez D, et al. Racial disparities in guideline-concordant cancer care and mortality in the United States. *Adv Radiat Oncol* 2018; **3**(3): 221-9.
6. Islami F, Guerra CE, Minihan A, et al. American Cancer Society's report on the status of cancer disparities in the United States, 2021. *CA: a cancer journal for clinicians* 2022; **72**(2): 112-43.
7. Walker GV, Grant SR, Guadagnolo BA, et al. Disparities in stage at diagnosis, treatment, and survival in nonelderly adult patients with cancer according to insurance status. *Journal of clinical oncology : official journal of the American Society of Clinical Oncology* 2014; **32**(28): 3118-25.
8. Ward E, Halpern M, Schrag N, et al. Association of insurance with cancer care utilization and outcomes. *CA: a cancer journal for clinicians* 2008; **58**(1): 9-31.
9. Yabroff KR, Reeder-Hayes K, Zhao J, et al. Health Insurance Coverage Disruptions and Cancer Care and Outcomes: Systematic Review of Published Research. *Journal of the National Cancer Institute* 2020; **112**(7): 671-87.
10. Pulte D, Jansen L, Brenner H. Disparities in Colon Cancer Survival by Insurance Type: A Population-Based Analysis. *Diseases of the colon and rectum* 2018; **61**(5): 538-46.
11. Ellis L, Canchola AJ, Spiegel D, Ladabaum U, Haile R, Gomez SL. Trends in Cancer Survival by Health Insurance Status in California From 1997 to 2014. *JAMA oncology* 2018; **4**(3): 317-23.
12. Sung JM, Martin JW, Jefferson FA, et al. Racial and Socioeconomic Disparities in Bladder Cancer Survival: Analysis of the California Cancer Registry. *Clin Genitourin Cancer* 2019; **17**(5): e995-e1002.
13. Hsu CD, Wang X, Habif DV, Jr., Ma CX, Johnson KJ. Breast cancer stage variation and survival in association with insurance status and sociodemographic factors in US women 18 to 64 years old. *Cancer* 2017; **123**(16): 3125-31.
14. Wu J, Huang Y, Tergas AI, et al. The effect of guideline-concordant care in mitigating insurance status disparities in cervical cancer. *Gynecologic oncology* 2020; **159**(2): 309-16.
15. U.S. Department of Health & Human Services. In Celebration of 10 Years of ACA Marketplaces, the Biden-Harris Administration Releases Historic Enrollment Data. 2024. https://www.hhs.gov/about/news/2024/03/22/celebration-10-years-aca-marketplaces-biden-harris-administration-releases-historic-enrollment-data.html (accessed April 15 2024).
16. American College of Surgeons. Commission on Cancer Quality Measures. https://www.facs.org/media/arldkl5o/quality-measures (accessed August 1 2023).
17. Nicholson AG, Tsao MS, Beasley MB, et al. The 2021 WHO Classification of Lung Tumors: Impact of Advances Since 2015. *J Thorac Oncol* 2022; **17**(3): 362-87.
18. World Health Organization. International Classification of Diseases for Oncology. Third ed. Switzerland; 2019.
19. California Cancer Registry. Volume I: Abstracting and Coding Procedures. 2023. https://www.ccrcal.org/submit-data/cancer-registrars-hospitals-and-facilities/reporting-by-cancer-registrars/#volumes-anchor (accessed October 10 2023).

20. American Joint Committee on Cancer. Cancer Staging Manual. Seventh ed. Chicago, Illinois: Springer; 2010.
21. American Joint Committee on Cancer. Cancer Staging Manual. Eighth ed. Chicago, Illinois: Springer; 2017.
22. Akhiwu TO, Freeman JQ, Scott AW, Umutoni V, Kanemo PO. Impact of Insurance Status on Late-Stage Disease Presentation and Disease-Specific Survival among US Patients With Gastric Cancer. *medRxiv* 2023.
23. Bradley CJ, Stevens JL, Enewold L, Warren JL. Stage and mortality of low-income patients with cancer: Evidence from SEER-Medicaid. *Cancer* 2021; **127**(2): 229-38.
24. Zhao J, Han X, Nogueira L, et al. Health insurance status and cancer stage at diagnosis and survival in the United States. *CA: a cancer journal for clinicians* 2022; **72**(6): 542-60.
25. Patel DC, He H, Berry MF, et al. Cancer diagnoses and survival rise as 65-year-olds become Medicare-eligible. *Cancer* 2021; **127**(13): 2302-10.
26. Poulson MR, Geary A, Papageorge M, et al. The effect of medicare and screening guidelines on colorectal cancer outcomes. *J Natl Med Assoc* 2023; **115**(1): 90-8.
27. Shu TD, Prunty MC, Pominville R, et al. Bladder and Kidney Cancer Diagnosis and Survival Increase With Medicare Eligibility at Age 65. *Urol Pract* 2023; **10**(1): 59-65.
28. Silvestri GA, Jemal A, Yabroff KR, Fedewa S, Sineshaw H. Cancer Outcomes Among Medicare Beneficiaries And Their Younger Uninsured Counterparts. *Health affairs (Project Hope)* 2021; **40**(5): 754-62.
29. Smith JB, Jayanth P, Hong SA, Simpson MC, Massa ST. The "Medicare effect" on head and neck cancer diagnosis and survival. *Head Neck* 2023; **45**(7): 1663-75.
30. Kim BJ, Hanna MH. Colorectal cancer in young adults. *J Surg Oncol* 2023; **127**(8): 1247-51.
31. Mauri G, Sartore-Bianchi A, Russo AG, Marsoni S, Bardelli A, Siena S. Early-onset colorectal cancer in young individuals. *Mol Oncol* 2019; **13**(2): 109-31.
32. Murphy CC, Zaki TA. Changing epidemiology of colorectal cancer - birth cohort effects and emerging risk factors. *Nat Rev Gastroenterol Hepatol* 2024; **21**(1): 25-34.
33. Gupta S. Screening for Colorectal Cancer. *Hematol Oncol Clin North Am* 2022; **36**(3): 393-414.
34. Lin JS, Perdue LA, Henrikson NB, Bean SI, Blasi PR. Screening for Colorectal Cancer: Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. *JAMA : the journal of the American Medical Association* 2021; **325**(19): 1978-98.
35. Xie E, Colditz GA, Lian M, et al. Timing of Medicaid Enrollment, Late-Stage Breast Cancer Diagnosis, Treatment Delays, and Mortality. *JNCI Cancer Spectr* 2022; **6**(3).
36. Hoover S, Subramanian S, Sabatino SA, Khushalani JS, Tangka FKL. Late-Stage Diagnosis and Cost of Colorectal Cancer Treatment in Two State Medicaid Programs. *J Registry Manag* 2021; **48**(1): 20-7.
37. Parsons HM, Maguire FB, Morris CR, et al. Impact of insurance type and timing of Medicaid enrollment on survival among adolescents and young adults with cancer. *Pediatr Blood Cancer* 2020; **67**(9): e28498.
38. Keegan THM, Parsons HM, Chen Y, et al. Impact of Health Insurance on Stage at Cancer Diagnosis Among Adolescents and Young Adults. *Journal of the National Cancer Institute* 2019; **111**(11): 1152-60.
39. Snyder RA, Hu CY, DiBrito SR, Chang GJ. Association of Medicaid expansion with racial disparities in cancer stage at presentation. *Cancer* 2022; **128**(18): 3340-51.
40. Kinney ED. The Affordable Care Act and the Medicare program: the engines of true health reform. *Yale J Health Policy Law Ethics* 2013; **13**(2): 253-325.
41. Oberlander J. Lessons From the Long and Winding Road to Medicare for All. *American journal of public health* 2019; **109**(11): 1497-500.