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COMMUNITY CANCER CARE IN WASHINGTON STATE

Medicaid Supplement 2020

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Hutchinson Institute for Cancer Outcomes Research

The Hutchinson Institute for Cancer Outcomes Research (HICOR®) developed the Community Cancer Care in Washington State: Quality and Cost Report 2019 to improve quality and lower costs in cancer care. HICOR is a scientific research institute based at Fred Hutchinson Cancer Research Center. HICOR's mission is to improve cancer prevention, detection and treatment in ways that will reduce the economic and human burden of cancer. The Medicaid Supplement 2020 promotes transparency by providing an analysis of quality measures on selected indicators of care. HICOR hopes that the information in this supplement will facilitate the development of interventions aimed at improving care quality, reducing variability in care, and lowering the costs of cancer care for patients and the health care system.

This work has been reviewed by the Institutional Review Boards of Fred Hutchinson Cancer Research Center and Washington state, and is covered by data use agreements with the Centers for Medicare & Medicaid Services, Premera Blue Cross, Cambia Health Solutions Inc., Washington State Healthcare Authority, State of Washington Department of Health, Washington State Cancer Registry and the Cancer Surveillance System.

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Supplement data ***may not*** be used for clinic or payer advertising or marketing.

For at least one year after release of this supplement, its data ***may not*** be used for the following:

- Establishing coverage networks
- Designing employee benefit packages
- Negotiating contracts without mutual agreement from all involved parties

ACKNOWLEDGMENTS

This supplement is a culmination of many years of collaboration with patients, providers, payers, researchers and guideline experts to define and measure value in cancer care. We would like to thank the individuals involved in HICOR's Value in Cancer Care Working Groups, Data Methods Committee and Steering Committee for helping us achieve community alignment in our priorities and our methodologies for performance measurement.

We would like to sincerely thank Fred Hutchinson Cancer Research Center for funding this supplement.

HOW TO CITE THIS SUPPLEMENT

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CONTENTS

INTRODUCTION

The Hutchinson Institute for Cancer Outcomes Research (HICOR) is pleased to release its first Community Cancer Care supplemental report for Medicaid-insured patients. Like its companion report--Community Cancer Care in Washington State: Quality and Cost Report--the intent of HICOR community reporting is to identify opportunities to improve cancer care delivery, facilitate the sharing of best practices in our community, and encourage collaboration between the oncology community and researchers in order to evaluate new models of care. Ensuring high-quality care is imperative to reducing health care disparities, particularly for under-served populations.

HICOR's 2018 and 2019 Community Cancer Care Reports focus on commercially-insured and Medicare populations, reporting results at the clinic level. The Medicaid Supplement reports on the same nationally-recognized metrics, in this case comparing quality of care for adult patients under the age of 65 enrolled in Medicaid versus commercial insurance at the state level. The results presented in this report draw from our patient-level database that links enrollment and claims records from commercial and Medicaid health insurance plans with clinical information and mortality records from Washington State cancer registries for patients who received care between 2015-2017.

There are some notable differences between this supplement and the Community Cancer Care Report. First, results are reported for the entire state rather than at a clinic level. Because most oncology practices care for a small number of Medicaid-insured patients, the number of patients per provider group are generally insufficient for meaningful inter-practice comparisons. More importantly, Medicaid-insured patients face unique challenges to receiving high quality cancer care, many beyond the control of the oncology clinics and providers who treat them. By reporting for all Medicaid-insured cancer patients in Washington state, these results are intended to highlight system-wide issues that may be impacting performance and outcomes. The second important difference is that episode costs information has been excluded. As a single insurer for low-income and vulnerable populations, Medicaid's coverage rules differ substantially from commercial insurers, making cost comparisons less relevant.

This supplement is not intended to be a comprehensive overview of quality or patient experience. Instead, we believe that our findings represent an important first step in understanding key elements of cancer care and outcomes for a population of cancer patients with significant economic, social, and medical challenges. We beliee that the findings have relevance for policy makers, cancer providers, advocacy groups, and of course, patients themselves. HICOR hopes that the information provided in the supplement will provide support for continued efforts to provide high-quality cancer care to some of the most vulnerable patients in Washington state.

EXECUTIVE SUMMARY

The HICOR team is pleased to present the Medicaid Supplement, a complementary report to the Community Cancer Care in Washington State: Quality and Cost Report. The Medicaid Supplement compares quality of cancer care in the Medicaid- and commercially-insured population in Washington state. We believe that public reporting is the first step toward improving and achieving health care's triple aim for cancer care — better health, better care and lower costs — by spurring collaboration, research and innovation. This supplement includes metrics that are identified as meaningful and actionable by community leaders who are involved in paying for and helping patients navigate cancer care and are not intended to inform individual medical care decisions. The information in this report is, therefore, a selective view of a very complex world. Issues not included in this report — such as doctor-patient communication, respect for patient preferences and quality of life — are also critical aspects of cancer care.

The results presented in this supplement draw from a patient-level database that links enrollment and claims records from commercial and public health insurance plans with clinical information from Washington state cancer registries. The supplement displays quality measures across the spectrum of cancer care including recommended treatment following diagnosis, emergency department and inpatient hospital admissions during treatment, appropriate use of surveillance testing for patients who have been treated with curative intent, and care for patients in the last 30 days of life. Where possible, community input has been aligned with recommendations and evidence-based guidelines from national organizations such as the National Comprehensive Cancer Network and the American Society of Clinical Oncology, and quality initiatives such as the Quality Oncology Practice Initiative.

Medicaid- and commercially-insured patients with cancer in Washington State differ by race, underlying health status, and socioeconomic status. Compared to the overall racial/ethnic demographics of Washington state, patients diagnosed with cancer with commercial insurance are disproportionately white, whereas Medicaid-insured cancer patients are more likely to be persons of color, to have one or more comorbidities, and are more likely to come from high-deprivation neighborhoods based on the Area Deprivation Index (ADI)[1]. ADI measures a patient's neighborhood socioeconomic disadvantage or the material deprivation in a person's residence at the census tract level.

Additionally, differences in cancer characteristics were observed between the two insurance types. Medicaid-insured patients had higher rates of lung cancer, lower rates of breast cancer, and are more likely to be diagnosed with cancer at later stages.

Overall, the findings in the supplement show that patients enrolled in Medicaid when compared to commercial health plans have similar rates of receipt of recommended cancer treatment following diagnosis. However, there are some differences and potential areas for improvement. Patients enrolled in Medicaid visit the emergency department or require hospitalization during their first six months of chemotherapy treatment at a higher rate than those enrolled in commercial plans. However, at the end-of-life, patients enrolled in Medicaid have higher rates of hospice use and lower rates of intensive care unit stays (ICU) compared to the patients with commercial plans.

1. University of Wisconsin School of Medicine and Public Health. Area Deprivation Index. Available at: https://www.neighborhoodatlas.medicine.wisc.edu/

METHODOLOGY

Washington State's Medicaid program, Apple Health, covers over 1 million adults.[1] To generate these metrics, HICOR linked 2015-2017 Washington state cancer registry records for cancer patients under the age of 65 with enrollment and claims records for the two largest commercial insurers in the state and Medicaid. Patients who are dual enrolled in both Medicare and Washington State Medicaid are excluded from the population.

Fifteen nationally recognized quality measures were then generated, each with its own inclusion criteria. Quality metrics are categorized as either process or outcome measures. Process measures are used to determine if providers are following guidelines or protocols (e.g.providing chemotherapy within certain time-frame). Outcome measures are used to determine if following a protocol or guideline has the desired effect (e.g., keeping patients out of the hospital during treatment). Outcome measures are often risk-adjusted for factors that may impact adherence. Process metrics are generally not risk-adjusted. The metrics used are listed below along with their type (process or outcome) and our risk adjustment methods.

Measure	Type
Anti-nausea medication during chemotherapy	Process
Recommended therapy for breast cancer based on HER2 status	Process
Recommended therapy for breast cancer based on ER/PR status	Process
Receipt of chemotherapy within 120 days of diagnosis for stage III colon cancer patients	Process
Receipt of chemotherapy within 270 days of diagnoses for stage II-III rectal cancer patients	Process
Receipt of chemotherapy within 60 days of surgery for stage II-IIIA lung cancer patients	Process
No bevacizumab use for metastatic tumors within three months of diagnosis	Process
Emergency department visits during chemotherapy	Outcome
Inpatient stays during chemotherapy	Outcome
Advanced imaging following treatment	Process (with risk adjustment)
Tumor marker testing for breast cancer patients following treatment	Process (with risk adjustment)
Chemotherapy in last 14 days of life	Process
Multiple emergency department visits in the last 30 days of life	Outcome
Intensive care unit stay in last 30 days of life	Outcome
Hospice care three or more days prior to death	Process

Full details for each metric are included in Appendix A.

Differences in quality metrics between the commercially-insured and Medicaid-insured patients were compared. Outcome measures were adjusted for age, sex, comorbidity score, stage, cancer site, and treatment factors where appropriate. In line with national methodology for reporting quality measures, process measures of care are reported as unadjusted averages, with the exception of Measure 3: *Follow-Up Testing After Treatment* as discussed in the Results section. P-values less than 0.05 are reported to indicate the measures where there is statistically significant difference in quality between the Medicaid and commercial populations. (See Statistical Methodology Appendix for details).

1. Authority, W.S.H.C. Apple Health Enrollment September 2018 through September 2019. 2020; Available from: https://www.hca.wa.gov/assets/free-or-low-cost/Apple-Health-enrollment-totals.pdf.

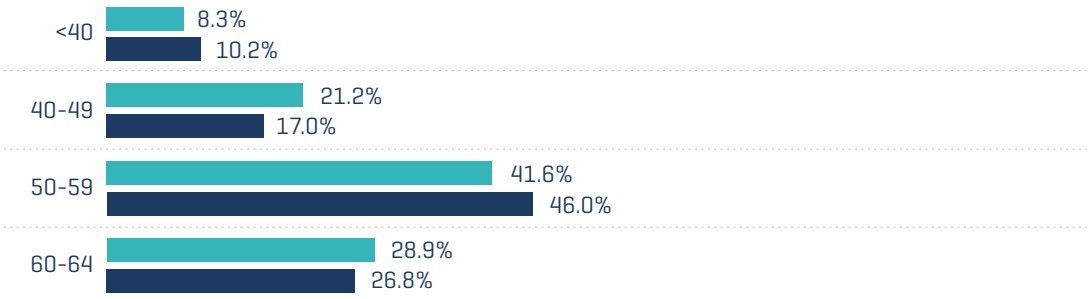
RESULTS

DEMOGRAPHICS

Demographic and clinical factors are presented below comparing age, sex, race, cancer type, stage at diagnosis, and comorbidities between Medicaid-and commercially-insured enrollees with a cancer diagnosis.

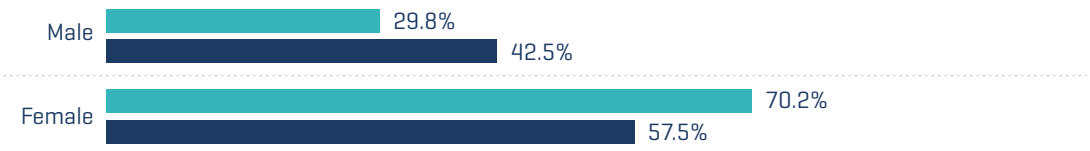
KEY Commercial Medicaid

AGE



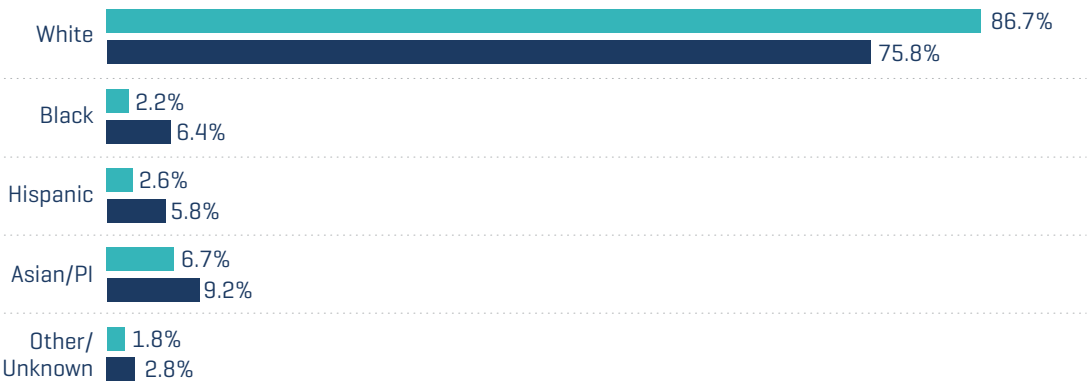
Medicaid-insured patients are more likely to be between 50 to 60 years of age. A higher proportion of young people, (under 40) are enrolled in Medicaid rather than commerical insurance.

GENDER



In Washington state, Medicaid-insured patients are more likely to be male than commerically-insured patients.

RACE



Similar to the population of Washington state, Medicaid-insured patients are largely White. The under-65 commercial population has disproportionately more white enrollees (87%) than the state population (79%).

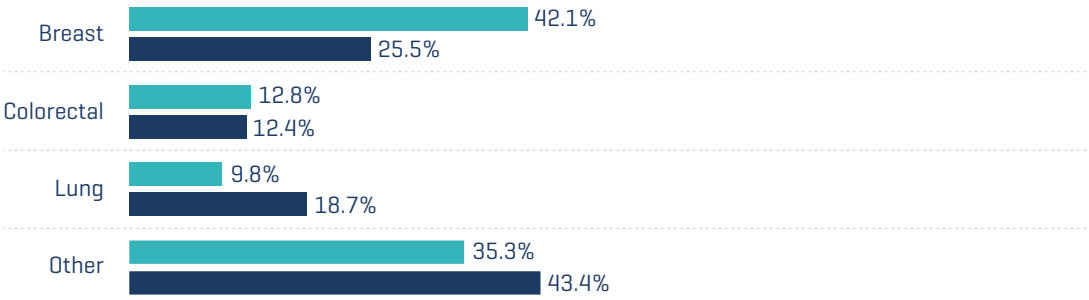
WHY DO WE COMPARE DEMOGRAPHICS?

Demographic differences exist between the Medicaid -and commerically-insured populations in Washington state. We know that Medicaid insured patients are more likely to live in neighborhood's that face greater socioeconomic disadvantages and we know that Black, Hispanic, and Asian/ Pacific Islander populations are more likely to be enrolled in Medicaid rather than a commerical insurance plan. Understanding these population differences enables us to recognize areas of disparity between and among populations. This enables us to highlight system wide issues which impact performance and outcomes.

DEMOGRAPHICS *continued*

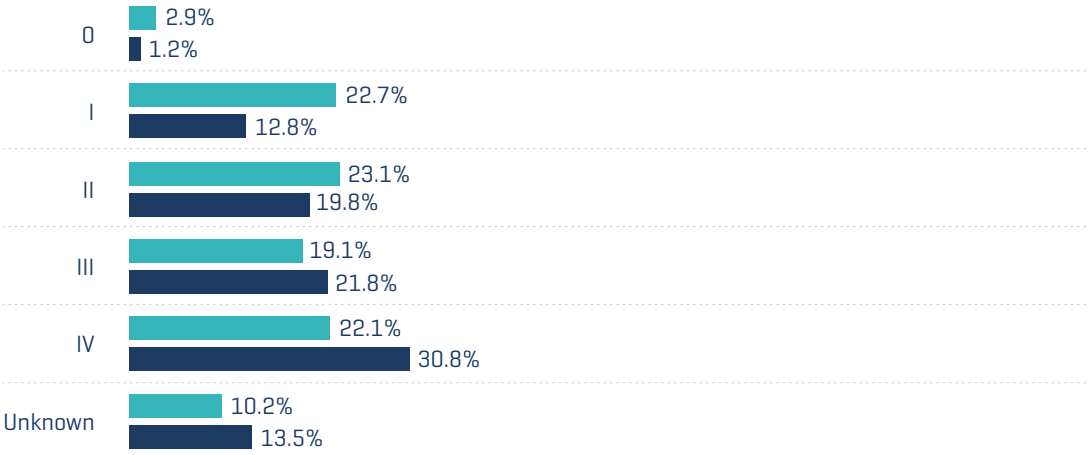
KEY Commercial Medicaid

CANCER TYPE



The Medicaid-insured population included a greater proportion of lung cancer patients and a smaller proportion of breast cancer patients compared to the commercially-insured population.

AJCC STAGE

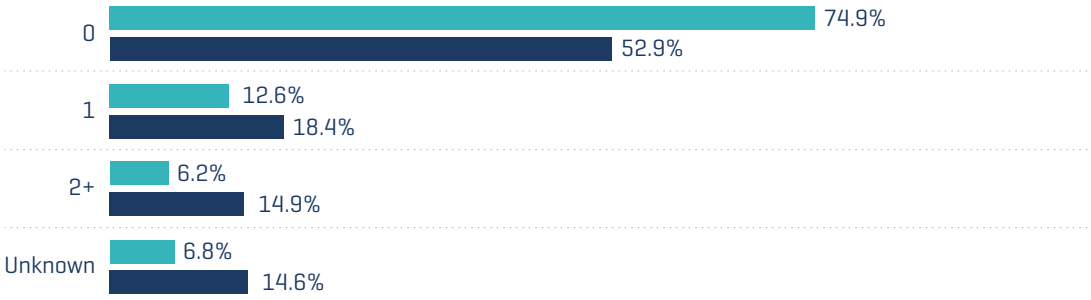


Medicaid-insured patients in Washington state are diagnosed with cancer at later stages than patients with commercial insurance.

DEMOGRAPHICS *continued*

KEY Commercial Medicaid

COMORBIDITY SCORE (post 6 months/6 months pre death)



Medicaid-insured patients are more likely to have one or more comorbidities compared to the patients insured by commercial health plans.

The National Cancer Institute (NCI) Comorbidity Index includes the following[1]:

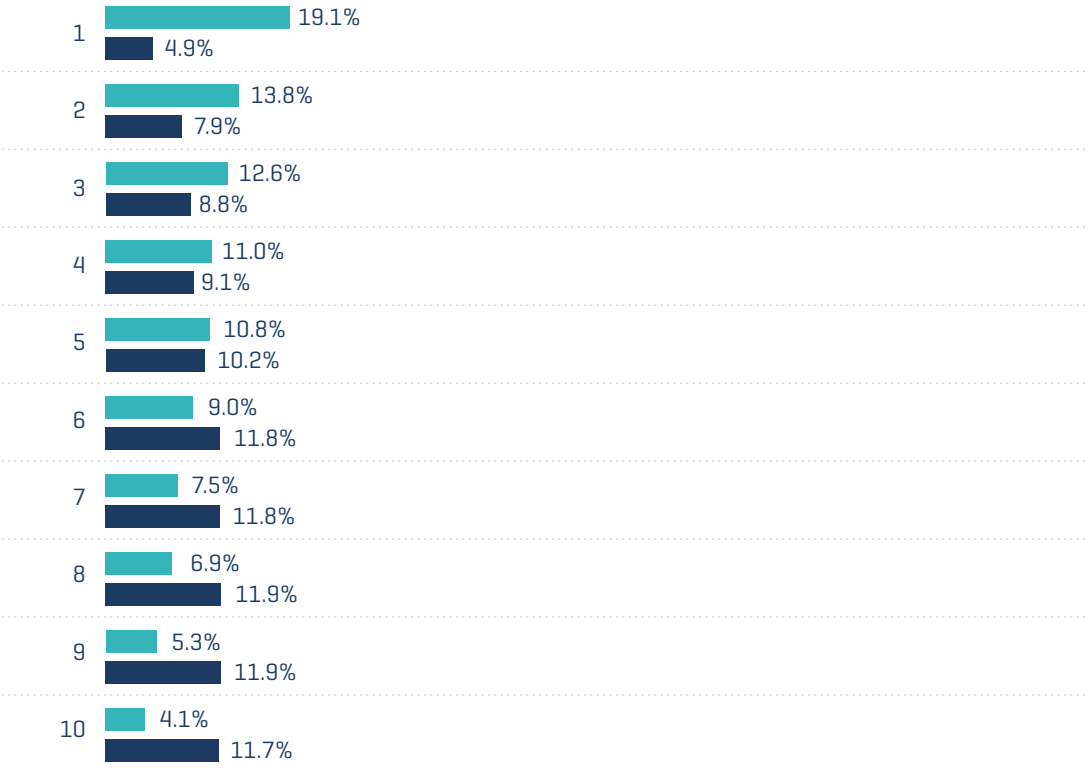
Acute Myocardial Infarction
History of Myocardial Infarction
Congestive Heart Failure
Peripheral Vascular Disease
Cerebrovascular Disease (CVD)
Chronic Obstructive Pulmonary Disease (COPD)
Dementia
Paralysis (Hemiplegia or Paraplegia)
Diabetes
Diabetes with Complications
Renal Disease
Mild Liver Disease
Moderate/Severe Liver Disease
Peptic Ulcer Disease
Rheumatologic
Acquired Immunodeficiency Syndrome (AIDS)

1. NCI Comorbidity Index Overview, NIH National Cancer Institute, 23 May 2019, healthcaredelivery.cancer.gov/seermedicare/considerations/comorbidity.html

DEMOGRAPHICS *continued*

KEY Commercial Medicaid

AREA DEPRIVATION INDEX (ADI) **1** - Least deprived **10** - Most deprived



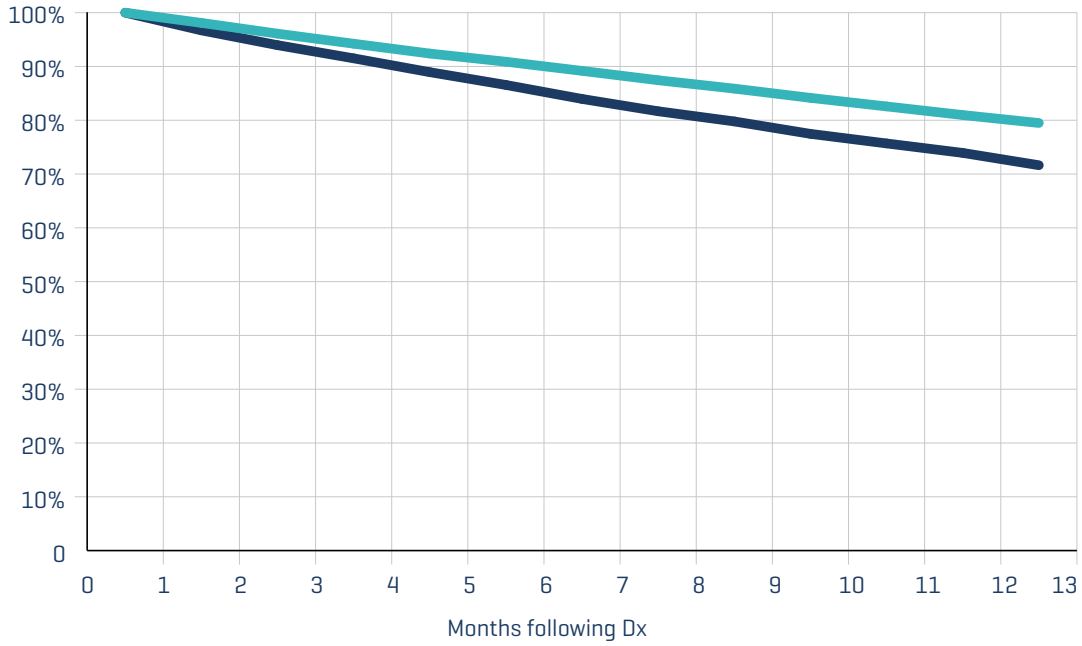
Medicaid-insured patients are more likely to come from high-deprivation neighborhoods based on the Area Deprivation Index (ADI). The ADI measures a patient's neighborhood's socioeconomic disadvantage at the census tract level. It includes 17 factors such as income and income disparity, education, employment, and housing cost and quality. ADI ranks range from 1 (least deprived) to 10 (most deprived.)[1] ADI is used as a risk adjustor in our methodology as it is a more sensitive measure of socioeconomic status and is calibrated to Washington state rather than national disparities.

1. University of Wisconsin School of Medicine and Public Health. Area Deprivation Index. Available at: https://www.neighborhoodatlas.medicine.wisc.edu/

DEMOGRAPHICS *continued*

KEY Commercial Medicaid

ENROLLMENT IN HEALTH PLAN FOLLOWING DIAGNOSIS (enrollment percentage)



To measure adherence to metrics, patients are required to be continuously enrolled in one of the health plans in the dataset for specific periods of time depending on the measure. In order to understand the impact disenrollment may have on the results, disenrollment rates were compared between commercial and Medicaid health plans.

Patients were all enrolled in their plan at the time of diagnosis and did not die or turn 65 in the year following. Results indicate that patients insured by Medicaid disenrolled at a faster rate; however, patients with both commercial and Medicaid plans either changed (or lost) coverage during that time period.

MEASURE 1

RECOMMENDED CANCER TREATMENT

Cancer patient outcomes are better when cancer care providers follow evidence-based recommendations for treatment. By measuring how well clinics follow recommendations for treating breast, colorectal and lung cancer, this measure provides insight into how well clinics follow cancer treatment recommendations overall.

RESULTS: Both commercially and Medicaid-insured patients have high levels of adherence to these metrics for receipt of recommended treatment and anti-nausea medications during chemotherapy. Access to anti-nausea medication for patients taking high-emetic risk chemotherapy is high for almost all patients regardless of insurance. The difference in adherence to the recommended treatment guidelines for commercially compared to Medicaid-insured patients is statistically significant. Due to a sufficient number of breast cancer cases it was feasible to present separate results for those patients. Similar trends were found in the breast cancer only population.

DISCUSSION: Overall, we see high levels of adherence to appropriate care measures. It is unclear if the difference in recommended treatment measures indicates a clinical difference in care received by patients. As process measures, they are not risk adjusted to account for factors that may be more prevalent in the Medicaid-insured population such as multiple comorbid conditions and challenges with getting access to care.

MEASURE 1: RECOMMENDED TREATMENT FOR BREAST, COLORECTAL AND LUNG CANCER

Recommended therapy based on cancer type

Breast cancer

- Receipt of chemotherapy within 120 days of diagnosis for ER/PR negative patients (stage IC-III)
- Hormone therapy (tamoxifen or aromatase inhibitor) within 365 days of diagnosis for ER/PR positive patients (stage IC-III)
- Receipt of trastuzumab based on HER2 status (stage IC-III)

Colorectal cancer

- Receipt of chemotherapy within 120 days of diagnosis for colon cancer patients (stage III)
- Receipt of chemotherapy within 270 days of diagnosis for rectal cancer patients (stage II-III)

Non-small cell lung cancer

- Receipt of chemotherapy within 60 days of surgery (stage II-IIIA)
- No bevacizumab use for metastatic tumors within three months of diagnosis

Anti-nausea medication during chemotherapy

- Receipt of serotonin antagonist within seven days of moderate- or high-emetic risk chemotherapy

Population: Breast, colorectal and lung cancer patients undergoing cancer treatment

Reporting Years: 2015-2017

Time Period: The treatment period begins at the start of active treatment (surgery, chemotherapy or radiation therapy) and continues until there is a four-month gap in treatment. The period may end earlier if the patient died or treatment extended beyond 12 months.

Measure	Tumor Site	Commercial	Medicaid	p-value
Recommended cancer treatment	Breast, lung, colorectal	89%	84%	< 0.01
	Breast	89%	83%	0.01
Anti-nausea meds during chemotherapy	Breast, lung, colorectal	98%	98%	
	Breast	98%	99%	

MEASURE 2

HOSPITALIZATION DURING CHEMOTHERAPY

Hospitalization during chemotherapy includes visits to the emergency department or an inpatient hospital stay (excluding stays for cancer-directed surgeries) during the time that a patient receives chemotherapy. Cancer clinics that are the most successful at managing their patients' symptoms during chemotherapy will have the lowest rates of emergency department and hospital stays.

RESULTS: Medicaid-insured patients undergoing chemotherapy have a significantly and substantially higher rate of emergency department visits and hospitalizations than similar patients enrolled in commercial health plans.

DISCUSSION: Some factors that might lead to higher visits for Medicaid patients cannot be controlled for in these analyses such as the patient's financial and housing status, access to care, caregiver availability, available community resources, and unmeasured comorbidities. The Medicaid-insured population in this supplement have a larger percentage of patients with multiple co-morbid conditions potentially requiring more complex or intensive care and increasing the risk of adverse outcomes.

MEASURE 2: HOSPITALIZATION DURING CHEMOTHERAPY

Emergency department (ED) visits during chemotherapy

- ED visit without subsequent inpatient admission within six months of first chemotherapy

Inpatient (IP) stays during chemotherapy

- Hospital IP admission for any reason within six months of first chemotherapy

Population: Cancer patients receiving chemotherapy

Reporting Years: 2015-2017

Time Period: Six months following the start of chemotherapy

Measure	Tumor Site	Commercial	Medicaid	p-value
Emergency department visits during chemotherapy	All except leukemia	23%	39%	<0.01
Inpatient stays during chemotherapy	All except leukemia	27%	37%	0.01

MEASURE 3

FOLLOW-UP TESTING AFTER CANCER TREATMENT

Studies have shown no benefit from the routine use of certain types of advanced imaging and tumor marker testing for patients with earlier-stage cancers who were treated with curative intent and have no symptoms. Unnecessary testing increases radiation exposure and may lead to misdiagnosis and overtreatment, as well as increased costs.

RESULTS: Rates of advanced imaging following treatment among Medicaid insured patients with earlier stage cancers were modestly higher than for commercially-insured patients, the difference was not statistically significant.

DISCUSSION: This measure is intended to focus on imaging for asymptomatic patients. In our database, we are not able to capture the reason for imaging. Our results on page 10 show that the patients enrolled in Medicaid have more comorbidities and therefore potentially more reasons to need imaging beyond cancer-related surveillance care. To account for this difference in populations, we risk-adjusted for a patient's comorbid conditions even though this is a process measure.

MEASURE 3: FOLLOW-UP ADVANCED IMAGING AFTER BREAST, COLON, AND LUNG CANCER TREATMENT

Advanced imaging following treatment

- Imaging test during first 13 months of follow-up
  - Breast cancer (stage I-IIIA): PET, PET-CT, CT, or bone scan
  - Colon cancer (stage I-III): PET, PET-CT
  - Non-small cell lung cancer (stage I-II): PET, PET-CT

Population: Breast, colon and lung cancer patients who have completed active treatment

Reporting Years: 2015-2017

Time Period: The follow-up period focuses on the initial (13 month) period after the end of active treatment (surgery, chemotherapy or radiation therapy), but may end earlier if the patient died or restarted active treatment. Patients must have a four-month gap in active treatment to be considered to have completed treatment.

MEASURE 3: BREAST CANCER TUMOR MARKER TESTING FOLLOWING TREATMENT

Breast cancer tumor marker testing following treatment

- Serum tumor marker test (CEA, CA 15-3, CA 27.29) for breast cancer (stage I-IIIA) during first 13 months of follow-up

Population: Breast cancer patients who completed active treatment

Reporting Years: 2015–2017

Time Period: The follow-up period focuses on the initial (13 month) period after the end of active treatment (surgery, chemotherapy or radiation therapy), but may end earlier if the patient died or restarted active treatment. Patients must have a four-month gap in active treatment to be considered to have completed treatment.

Measure	Tumor Site	Commercial	Medicaid	p-value
Advanced imaging after treatment	Breast, lung, colorectal	12%	17%	
	Breast	13%	22%	
Tumor marking testing after treatment	Breast	98%	99%	

MEASURE 4

END OF LIFE CARE

Aggressive cancer-directed treatment for patients with advanced, incurable cancer can be harmful, traumatic and costly without providing benefit. Studies have shown that symptom-focused palliative care is much more beneficial to patients at this stage of their disease.

RESULTS: Overall adherence to measures of quality in end of life care was higher for Medicaid insured patients compared to their commercial counterparts. ICU stays were significantly lower and enrollment in hospice care was significantly higher for the Medicaid enrollees than commercially insured patients.

DISCUSSION: It is worth noting that patient preference for intensity of care at end of life is not measured. We are not able to determine if patients are being offered all the services they would choose.

MEASURE 4: END OF LIFE CARE

Chemotherapy in the last 14 days of life

- Receipt of any chemotherapy in the last 14 days of life

Multiple Emergency Department (ED) visits in the last 30 days of life

- More than one ED visit in the last 30 days of life

Intensive Care Unit (ICU) stay in the last 30 days of life

- Hospital ICU admission for any reason in the last 30 days of life

Hospice care three or more days prior to death

- Two or more inpatient or outpatient hospice encounters, with the first encounter at least three days prior to death

Population: Cancer patients at end of life

Reporting Years: 2015-2017

Time Period: Patient's last 30 days of life.

Measure	Tumor Site	Commercial	Medicaid	p-value
End of LIfe (EOL): Chemotherapy	Solid	9%	7%	
EoL: 2+ ED visits *	Solid	18%	20%	
EoL: ICU stay*	Solid	26%	21%	<0.01
EoL: Hospice	Solid	37%	43%	0.01

APPENDICES

APPENDIX A

INDIVIDUAL METRIC DEFINITIONS

General inclusion criteria:

- Diagnosed or treated with cancer in Washington state
- Known date of diagnosis, and not diagnosed at autopsy or by death certificate
- Enrolled in Premera Blue Cross, Regence BlueShield, or Washington State Medicaid

HICOR METRIC	SOURCE	NUMERATOR	DENOMINATOR	CLINIC ATTRIBUTION PERIOD
Measure 1: Recommended Cancer Treatment for Breast, Colorectal and Lung Cancer (Summary Quality Score)				
Recommended therapy based on cancer type	*See below for appropriate therapy metrics for each cancer type*			
Anti-nausea medication during chemotherapy	**QOPI** SMT26	• Claim for serotonin antagonist within seven days of moderate- or high-emetic-risk chemotherapy (according to NCCN antiemesis guidelines)	• Age 18+ • Colorectal, female breast, or non-small cell lung cancer • Known stage • Claim for chemotherapy classified as moderate- or high-emetic risk • Medical coverage in month of diagnosis to one month following initiation of chemotherapy • Exclude stage 0 and unknown stage	HICOR Treatment Period*
Breast Cancer				
Recommended therapy based on ER/PR and HER2 status	**MACRA** #450 **OCM**-10 **QOPI** BR55 **NQF** #1858	• HER2/neu positive: Claim for trastuzumab, lapatinib, or pertuzumab within 365 days of diagnosis • HER2/neu negative: No claim for trastuzumab, lapatinib, or pertuzumab within 365 days of diagnosis	• Age 18+ • Female • Breast cancer • First or only cancer • AJCC stage T1c or AJCC stage II-III breast cancer • Known HER2/neu status • Alive 365 days after diagnosis • Medical coverage in 12 months following diagnosis • Claim for chemotherapy within 365 days of diagnosis • Exclude patients receiving anthracycline-based chemotherapy or radiation therapy in days 335-365 following diagnosis	HICOR Treatment Period*
	OCM-9 **QOPI** BR53 **NQF** #0559	• ER/PR Negative: Claim for two or more chemotherapy agents within 120 days of diagnosis; second agent given within three days of first agent	• Age 18-79 • Female • Breast cancer • First or only cancer • Known stage AJCC T1cN0M0 or IB-III breast cancer • Known ER and PR status • Alive 120 days (ER/PR negative) or 365 days (ER/PR positive) after diagnosis • Exclude phyllodes (9020) and rare (8940, 8950, 8980, 8981) histology types • Exclude tumors size ≤1cm2 & AJCC N0 • Alive with medical coverage for 120 days (ER/PR negative) or 365 days (ER/PR positive) after diagnosis • ER/PR negative: Lumpectomy or mastectomy in the first 120 days from diagnosis • ER/PR positive: Exclude patients receiving chemotherapy or radiation therapy in days 335-365 after diagnosis; exclude patients who received oophorectomy in year following diagnosis	HICOR Treatment Period*
	OCM-11 **QOPI** BR58 **QOPI** BR59 **NQF** #0220 **NQF** #0387 **PQRS** #71	• ER/PR Positive: Hormone therapy (tamoxifen, aromatase inhibitor or as defined by cancer registry) within 365 days of diagnosis		

* See page 23 for definitions of HICOR Treatment Period and HICOR Follow-Up Period

APPENDIX A

INDIVIDUAL METRIC DEFINITIONS *continued*

HICOR METRIC	SOURCE	NUMERATOR	DENOMINATOR	CLINIC ATTRIBUTION PERIOD
Colorectal Cancer				
Receipt of chemotherapy within 120 days of diagnosis for stage III colon cancer patients	**OCM**-8 **QOPI** CRC68 **NQF** #0223 **NQF** #0385	• Claim for chemotherapy within 120 days of diagnosis	• Age 18-79 • Colon cancer • First or only cancer • AJCC stage III • Alive 120 days after diagnosis • Medical coverage for 120 days after diagnosis	HICOR Treatment Period*
Receipt of chemotherapy within 270 days of diagnosis for stage II-III rectal cancer patients	**QOPI** CRC72	• Claim for chemotherapy within 270 days of diagnosis	• Age 18-79 • Rectal cancer • First or only cancer • AJCC stage II-III • Alive 270 days after diagnosis • Medical coverage for 270 days after diagnosis	HICOR Treatment Period*
Non-Small Cell Lung Cancer				
Receipt of chemotherapy within 60 days of surgery	**QOPI** NSCLC80 & 81	• Claim for chemotherapy within 60 days of curative surgery	• Age 18+ • Non-small cell lung cancer • First or only cancer • AJCC stage II-IIIA • Claim for curative surgery • Medical coverage from diagnosis to two months following surgery	HICOR Treatment Period*
No bevacizumab use for metastatic tumors within three months of diagnosis	**QOPI** NSCLC86a	• No claim for bevacizumab within three months of diagnosis	• Age 18+ • Non-small cell lung cancer • First or only cancer • AJCC stage IV or registry stage distant • Squamous histology • Medical coverage from diagnosis to three months after diagnosis or death	HICOR Treatment Period*

* See page 23 for definitions of HICOR Treatment Period and HICOR Follow-Up Period

INDIVIDUAL METRIC DEFINITIONS *continued*

HICOR METRIC	SOURCE	NUMERATOR	DENOMINATOR	CLINIC ATTRIBUTION PERIOD
Measure 2: Hospitalization During Chemotherapy (Summary Quality Score)				
Emergency department (ED) visits during chemotherapy	**OCM**-2	• ED claim without subsequent inpatient admission (≤1 day) within 180 days of first chemotherapy claim	• Age 18+ • All cancers except leukemia • First or only cancer • Medical coverage in month of diagnosis & for six months from first chemotherapy claim (or until death) • Claim for outpatient chemotherapy within 180 days of diagnosis • No bone marrow transplant between diagnosis and 180 days after first outpatient chemotherapy	Start: First outpatient chemotherapy End: Start date + 180 days
Inpatient (IP) stays during chemotherapy	**OCM**-1	• Hospital IP admission not related to a cancer-directed surgery within 180 days of first chemotherapy claim	• Age 18+ • All cancers except leukemia • First or only cancer • Medical coverage in month of diagnosis & for six months from first chemotherapy claim (or until death) • Claim for outpatient chemotherapy within 180 days of diagnosis • No bone marrow transplant between diagnosis and 180 days after first outpatient chemotherapy	Start: First outpatient chemotherapy End: Start date + 180 days

DEFINITION OF CHEMOTHERAPY:

Chemotherapy utilization is measured using administrative and drug procedure codes. Chemotherapy includes traditional chemotherapy, immunotherapy, and biologics. The drugs could be delivered either through an intravenous (IV) or orally. Chemotherapy does not include hormone therapy (e.g. tamoxifen) or supportive care (e.g. colony stimulating factors).

* See page 23 for definitions of HICOR Treatment Period and HICOR Follow-Up Period

APPENDIX A

INDIVIDUAL METRIC DEFINITIONS *continued*

HICOR METRIC	SOURCE	NUMERATOR	DENOMINATOR	CLINIC ATTRIBUTION PERIOD
Measure 3: Follow-up Advanced Imaging After Breast, Colon and Lung Cancer Treatment (Summary Quality Score)				

Advanced imaging following treatment	**QOPI** BR62b1 & BR62b2
	QOPI CRC76 & CRC76a
	QOPI NSCLC90 & NSCLC90a
		• Claim for imaging test during HICOR Follow-Up Period:*
		• Breast: PET, PET-CT, CT, bone scan
		• Colon: PET, PET-CT
		• NSCLC: PET, PET-CT
			• Age 18+
			• Breast, colon, or non-small cell lung cancer (NSCLC)
			• First and only cancer
			• AJCC stage:
			  • Breast: I, II, IIIA
			  • Colon: I, II, III
			  • NSCLC: I, II
			• Received curative treatment
			  • Breast: mastectomy, or lumpectomy plus radiation within 90 days
			  • Colon: curative surgery
			  • NSCLC: curative surgery
			• Medical coverage from diagnosis through end of follow-up period*
				HICOR Follow-Up Period*

Measure 3: Breast Cancer Tumor Marker Testing Following Treatment (Summary Quality Score)				
Breast cancer tumor marker testing following treatment	**QOPI** BR62c1 & BR62c2	• Claim for tumor marker test (CEA, CA 15-3, CA 27.29) during HICOR Follow-Up Period*	• Age 18+ • Female • Breast cancer • First and only cancer • AJCC stage I, II, IIIA • Received curative treatment (mastectomy, or lumpectomy plus radiation within 90 days) • Medical coverage from diagnosis through end of follow-up period*	HICOR Follow-Up Period*

* See page 23 for definitions of HICOR Treatment Period and HICOR Follow-Up Period

APPENDIX A

INDIVIDUAL METRIC DEFINITIONS *continued*

HICOR METRIC	SOURCE	NUMERATOR	DENOMINATOR	CLINIC ATTRIBUTION PERIOD
Measure 4: End of Life Care (Summary Quality Score)				
Chemotherapy in the last 14 days of life	**MACRA** #453 **QOPI** EOL48 **NQF** #0210	• Claim for any chemotherapy in the last 14 days of life	• Age 18+ • Patient died • Solid tumors only (excludes leukemia, lymphoma and myeloma) • Includes AJCC stage II/III/IV or SEER stage regional/ distant • Medical coverage six months prior to death through date of death	Last 180 days of life
Multiple Emergency Department (ED) visits in the last 30 days of life	**MACRA** #454 **QOPI** EOL49 **NQF** #0211	• More than one ED visit in the last 30 days of life	• Age 18+ • Patient died • Solid tumors only (excludes leukemia, lymphoma and myeloma) • Includes AJCC stage II/III/IV or SEER stage regional/ distant • Medical coverage six months prior to death through date of death	Last 180 days of life
Intensive Care Unit (ICU) Stay in the last 30 days of life	**MACRA** #455 **QOPI** EOL49a **NQF** #0213	• Hospital ICU admission for any reason in the last 30 days of life	• Age 18+ • Patient died • Solid tumors only (excludes leukemia, lymphoma and myeloma) • Includes AJCC stage II/III/IV or SEER stage regional/ distant • Medical coverage six months prior to death through date of death	Last 180 days of life
Hospice Care Three or More Days Prior to Death	**MACRA** #457 **OCM**-3 **QOPI** EOL44 **NQF** #0216	• Two or more inpatient or outpatient hospice claims, with the first claim at least three days prior to death	• Ages 18+ • Patient died • Solid tumors only (excludes leukemia, lymphoma and myeloma) • Includes AJCC stage II/III/IV or SEER stage regional/ distant • Medical coverage six months prior to death through date of death	Last 180 days of life

DEFINITIONS OF HICOR CARE PERIODS:

TREATMENT PERIOD:

START: First treatment. Treatment is defined as surgery, chemotherapy or radiation therapy.

END: Earliest of:

1. 12 months following first treatment, or
2. Start of follow-up period. The follow-up period begins at the start of a four-month gap in treatment (i.e., surgery, chemotherapy or radiation therapy).

FOLLOW-UP PERIOD:

START: Beginning of a four-month gap in treatment. Treatment is defined as surgery, chemotherapy or radiation therapy.

END: Earliest of:

1. 13 months following start of follow-up period, or
2. Start of new treatment (i.e., surgery, chemotherapy or radiation therapy).

APPENDIX B

STATISTICAL METHODOLOGY

This supplement compares summary metrics for key measures of cancer care and outcomes for the commercially-insured and Medicaid-insured patients with cancer in Washington State. We report p-values less than 0.05 to indicate the measures where there is statistically significant difference between the outcomes of the Medicaid and commercial populations.

To determine statistical significance, we first propensity score weighted the Medicaid and commercial populations for each measure to account for broad population differences. Specifically, we used inverse propensity score weighting based on age, gender, ADI, cancer group, liquid tumor status, AJCC stage, and 24 Hierarchical Condition Categories (HCC's) capturing comorbidities.[1,2] We estimated the likelihood of each cohort using a generalized boosted propensity model, which is augmented by machine learning.[3] A predetermined standardized mean difference of 0.2 was used to determine adequate balance between the Medicaid and commercial populations.[4] We included the propensity weighting in a Hierarchical Generalized Linear (HGLM) statistical model with a binary distribution and a logit link function. The main report included a similar HGLM model (see 2019 Community Cancer Care Report page 47) but without a propensity score weighting.[5] The HGLM model was further risk adjusted for each measure according to the table below.

Our risk adjustors for each measure are similar to those included in our main report with two exceptions (see 2019 Community Cancer Care Report page 52).[3] We included HCCs in the Medicaid report due to sufficient numbers of patients in the Medicaid and commercial populations and the importance of accounting for differences in the health status of these cohorts. We also adjusted imaging for comorbidities as we are not able to capture the reason for imaging. Our results on page 10 show that the patients enrolled in Medicaid have more comorbidities and therefore potentially more reasons to need imaging beyond cancer-related surveillance care. To account for this difference in populations, we risk-adjusted for a patient's comorbid conditions even though this is a process measure.

Measure	Type
Anti-nausea medication during chemotherapy	Process
Recommended therapy for breast cancer based on HER2 status	Process
Recommended therapy for breast cancer based on ER/PR status	Process
Receipt of chemotherapy within 120 days of diagnosis for stage III colon cancer patients	Process
Receipt of chemotherapy within 270 days of diagnoses for stage II-III rectal cancer patients	Process
Receipt of chemotherapy within 60 days of surgery for stage II-IIIA lung cancer patients	Process
No bevacizumab use for metastatic tumors within three months of diagnosis	Process
Emergency department visits during chemotherapy	Outcome
Inpatient stays during chemotherapy	Outcome
Advanced imaging following treatment	Process (with risk adjustment)
Tumor marker testing for breast cancer patients following treatment	Process (with risk adjustment)
Chemotherapy in last 14 days of life	Process
Multiple emergency department visits in the last 30 days of life	Outcome
Intensive care unit stay in last 30 days of life	Outcome
Hospice care three or more days prior to death	Process

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3. McCaffrey DF, Griffin BA, Almirall D, Slaughter ME, Ramchand R, Burgette LF (2013) A tutorial on propensity score estimation for multiple treatments using generalized boosted models. Stat Med 32(19):3388–3414.

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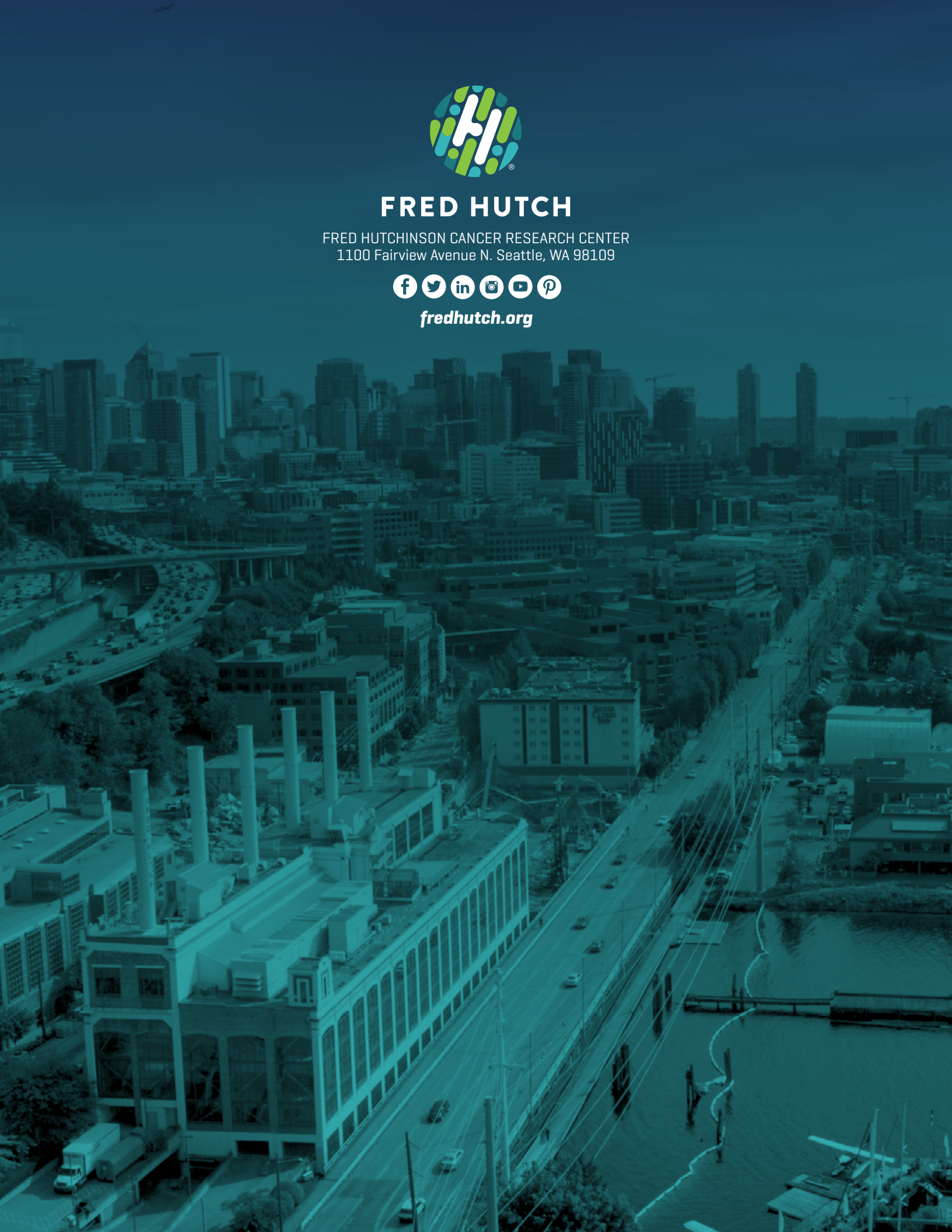

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