O'NEAL COMPREHENSIVE CANCER CENTER
UAB THE UNIVERSITY OF ALABAMA AT BIRMINGHAM

DCH Health System

Geriatric Assessment and Novel Biomarkers among Older Adults with Cancer from Under-Represented Communities

Grant R. Williams, MD, MSPH

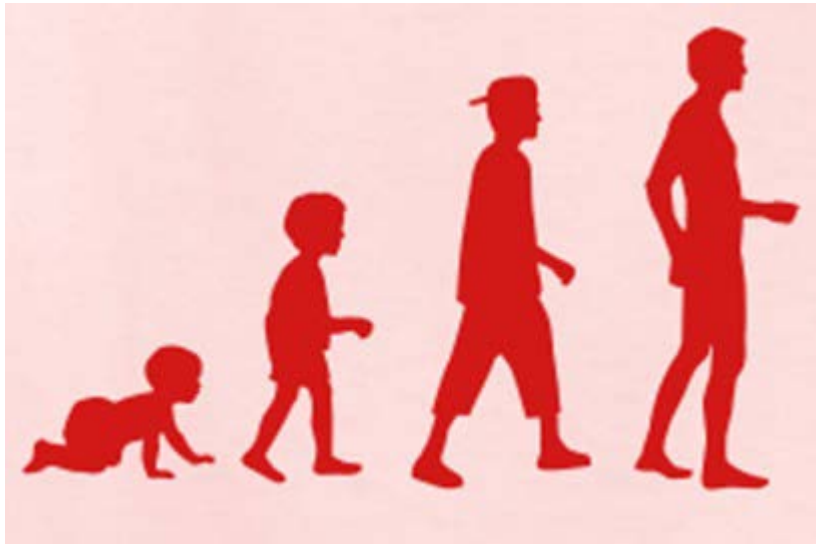
Cancer Disparities Meeting

September, 29th, 2023

Roadmap

- Barriers to Geriatric Assessment in Clinical Practice
- Development of the Cancer & Aging Resilience Evaluation (CARE) Tool and Registry
- Transition to focus on health disparities in the Deep South

Aging is a heterogeneous process



Chronological age insufficient!

Outcomes in older adults with cancer highly variable

Cancer Diagnosis

Cancer Tx

Outcomes

- Good
- Intermediate
- Poor

JOURNAL OF CLINICAL ONCOLOGY

ASCO SPECIAL ARTICLE

Practical Assessment and Management of Vulnerabilities in Older Patients Receiving Chemotherapy: ASCO Guideline for Geriatric Oncology

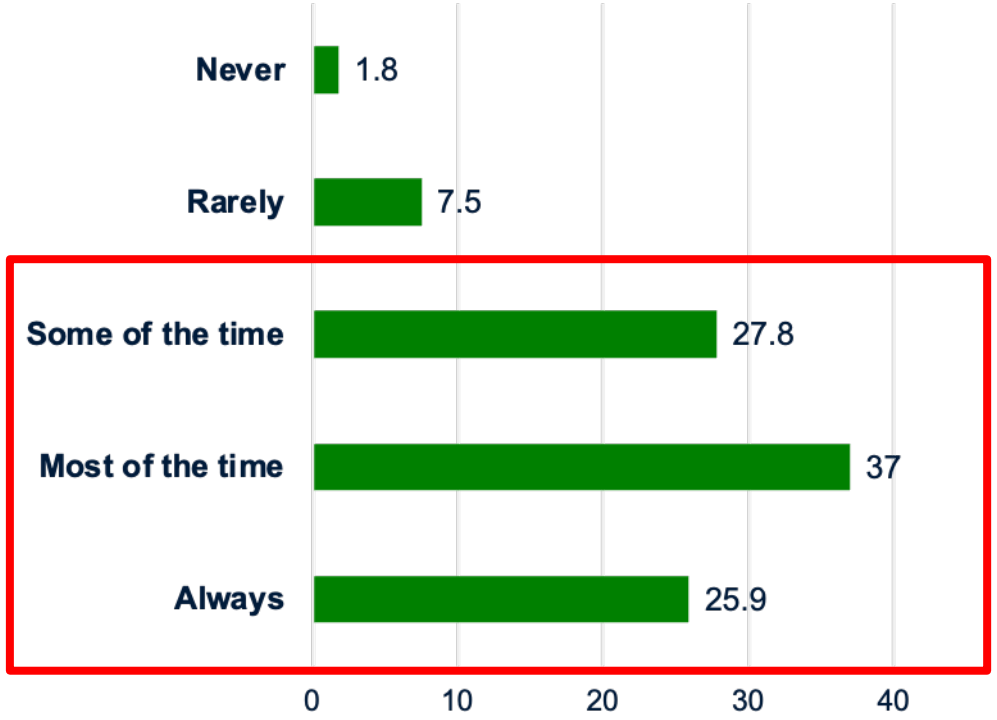
Supriya G. Mohile, William Dale, Mark R. Somerfield, Mara A. Schonberg, Cynthia M. Boyd, Peggy S. Burhenn, Beverly Canin, Harvey Jay Cohen, Holly M. Holmes, Judith O. Hopkins, Michelle C. Janelsins, Alok A. Khorana, Heidi D. Klepin, Stuart M. Lichtman, Karen M. Mustian, William P. Tew, and Arti Hurria

"Geriatric assessment (GA) should be used to identify vulnerabilities that are not routinely captured in oncology assessments. Evidence supports, at a minimum, assessment of function, comorbidity, falls, depression, cognition, and nutrition."

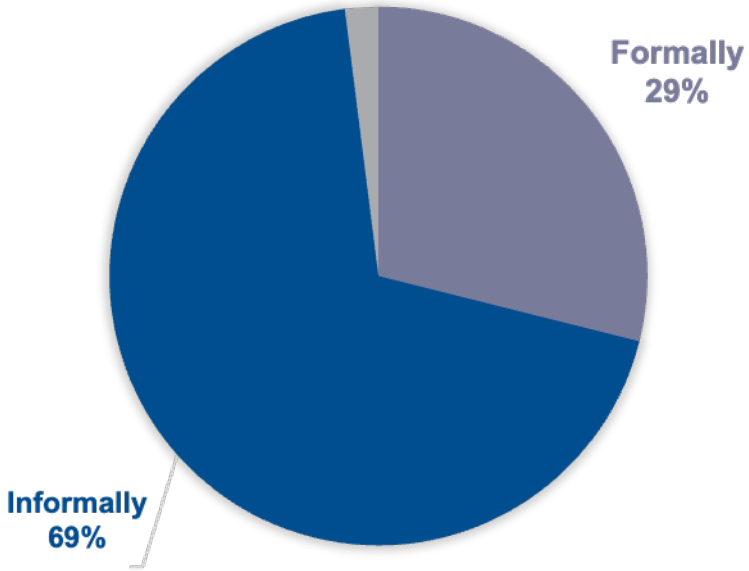
Mohile *et al*. J Clin Oncol, 2018.

How are Older Adults Evaluated?

- Do you assess older patients differently than your younger patients?



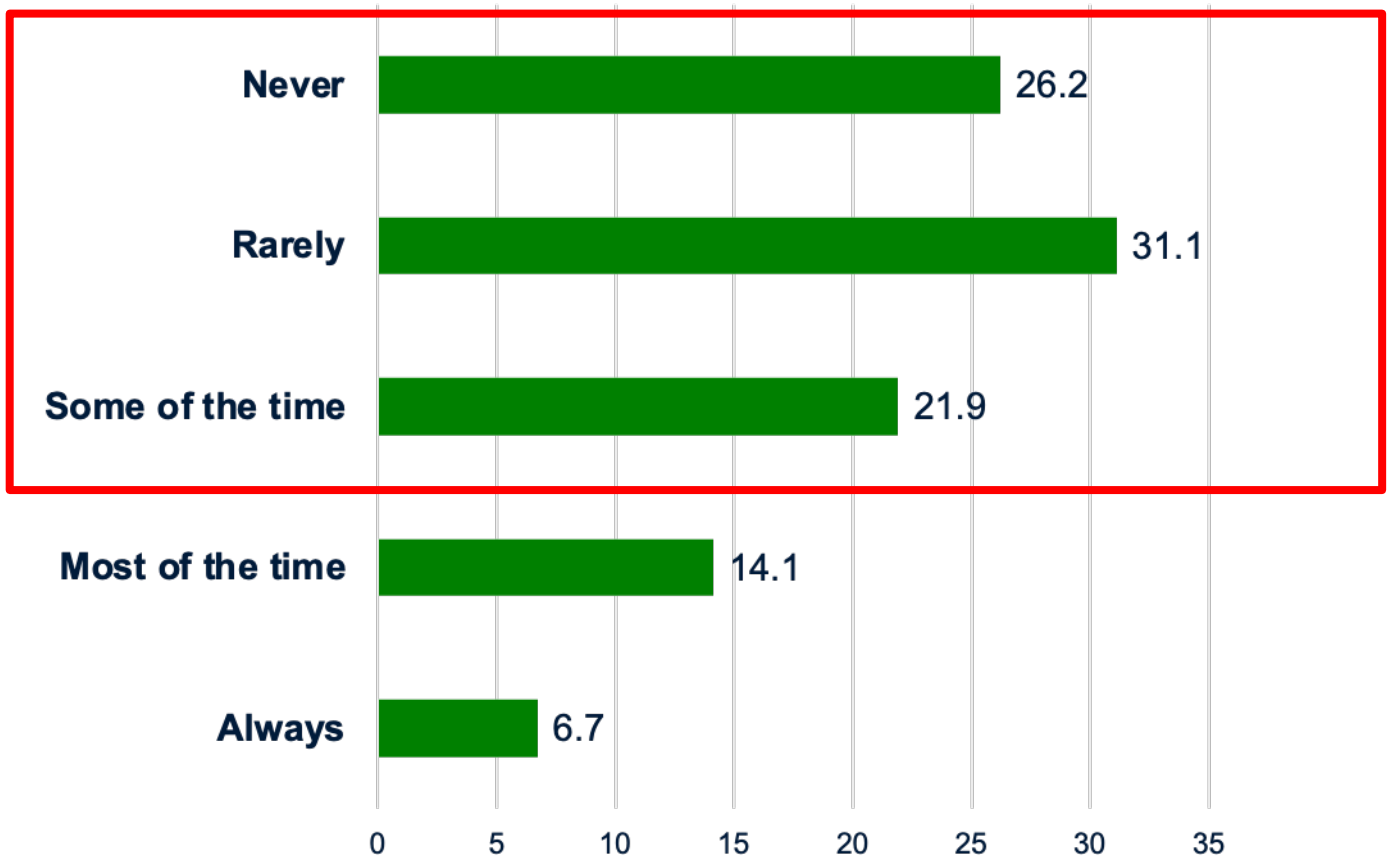
- In what way do you assess these older patients differently?



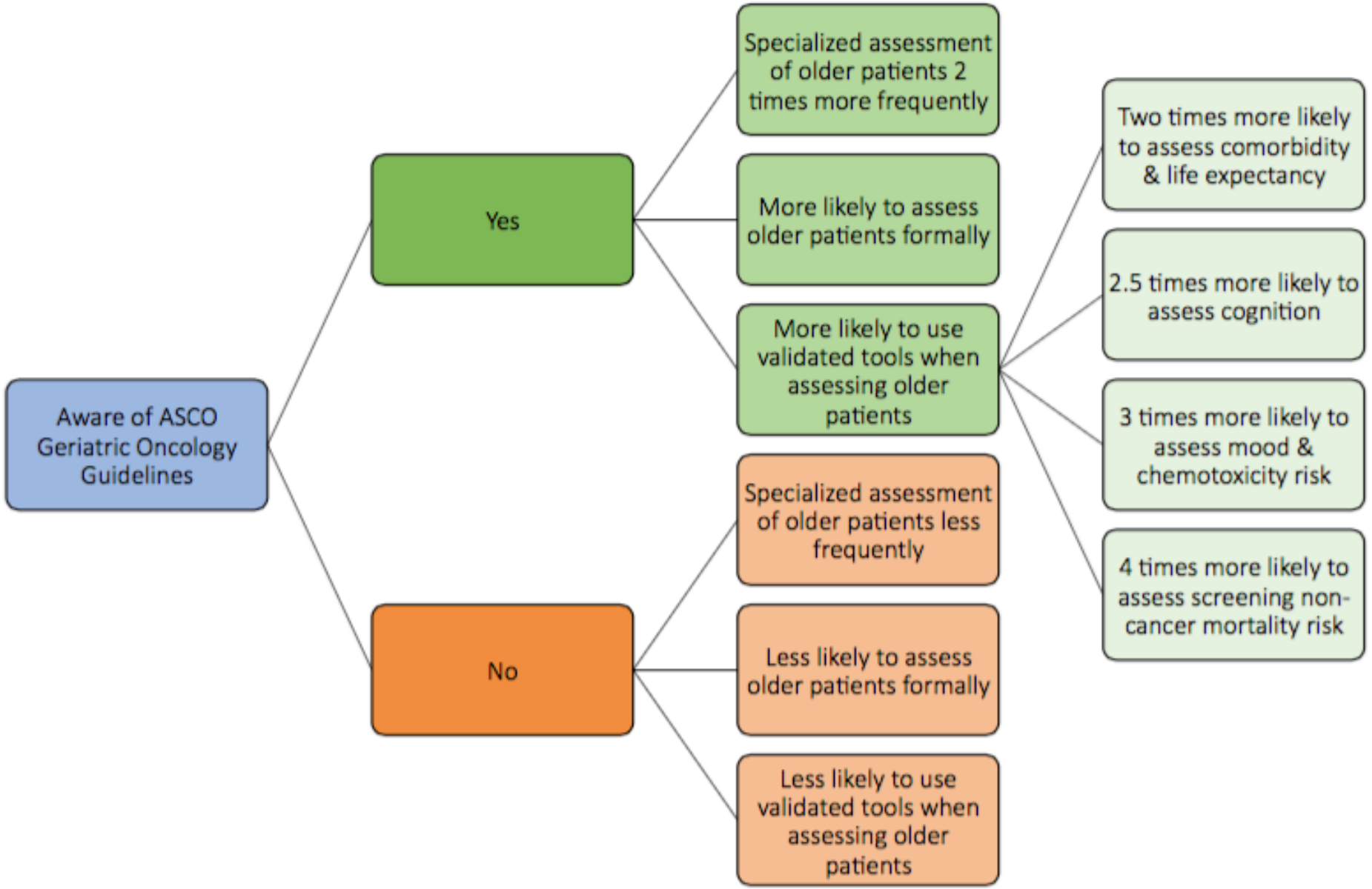
Dale *et al*. *JCO Oncology Practice*. 2020

The Use of Geriatric Assessment in Oncology

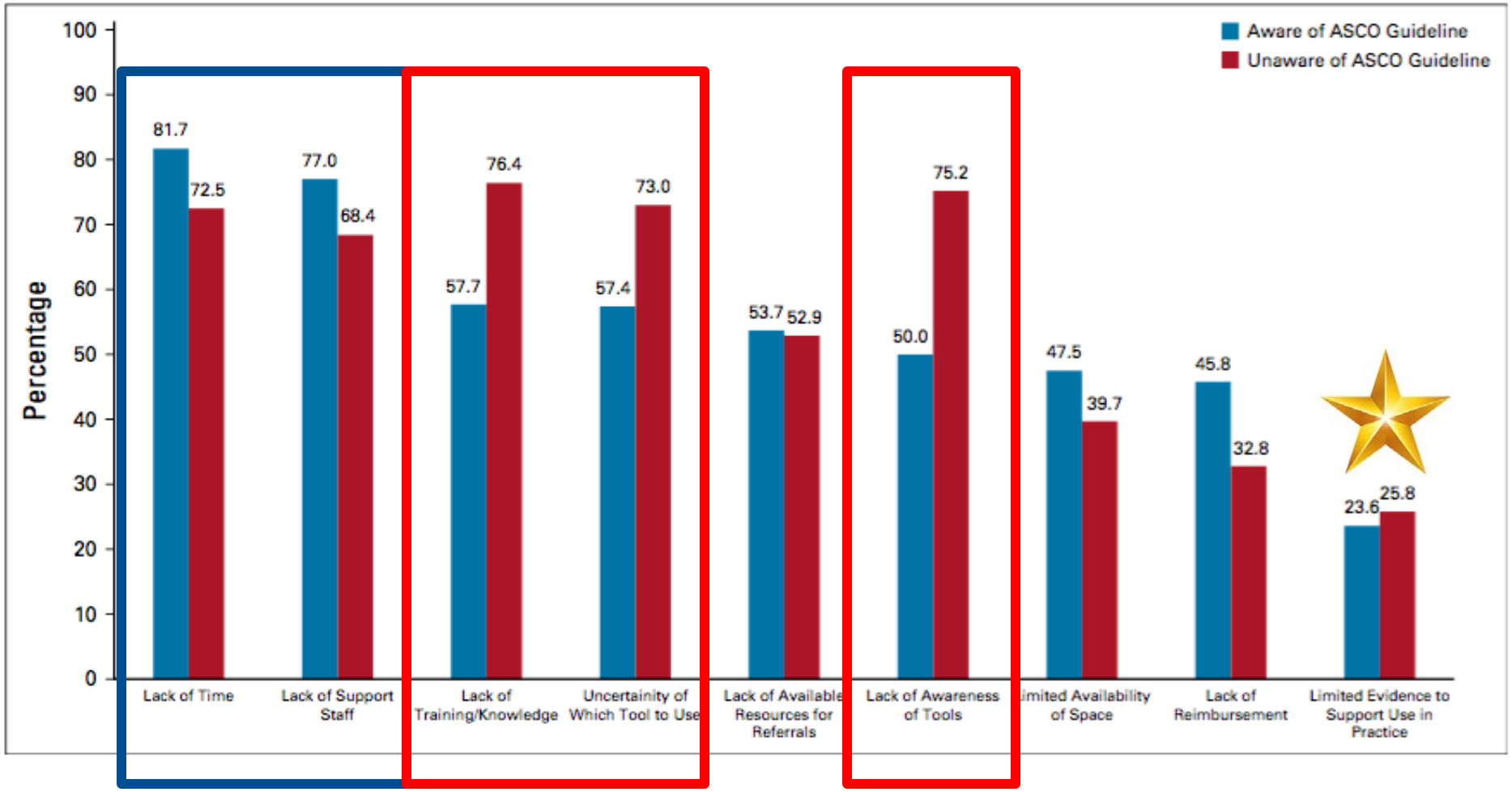
- How often do you perform a geriatric assessment?



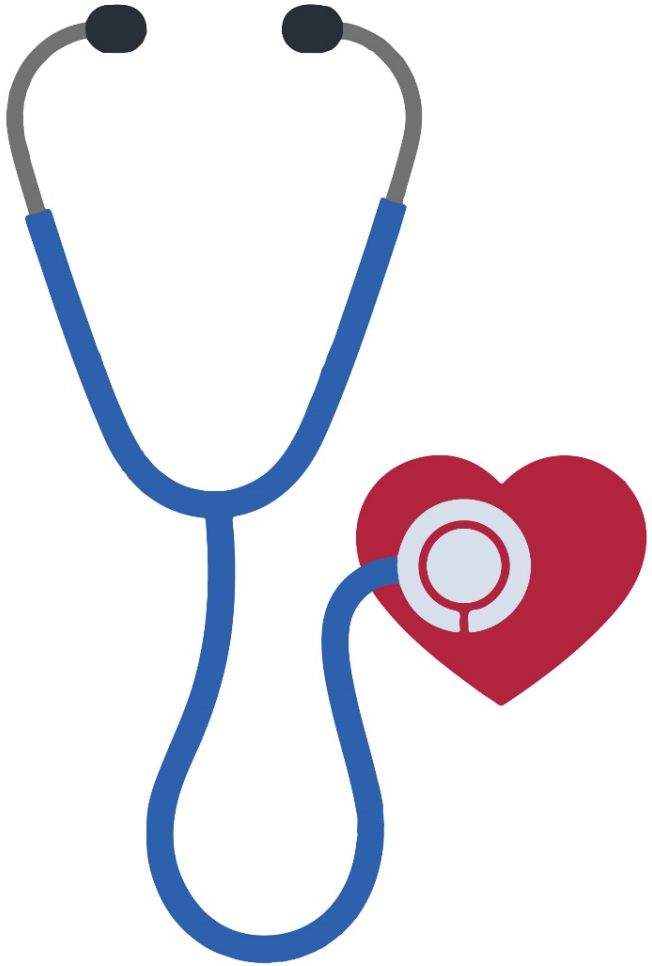
Dale *et al*. *JCO Oncology Practice*. 2020



Dale *et al*. *JCO Oncology Practice*. 2020



Dale *et al*. *JCO Oncology Practice*. 2020



CARE

Cancer & Aging Resilience Evaluation

Brief Geriatric Assessment

DOMAIN	ASSESSMENT MEASURE	
	Health Professional	Patient Reported
Functional Status	Timed Up and Go Physician Rated Karnofsky Performance Status (KPS)	Activities of Daily Living (ADL) Instrumental Activities of Daily Living (IADL) Karnofsky Self Reported Performance No. of Falls in the last 6 months
Comorbidity		Number and Type of Comorbid Conditions Number of Medications Vision Assessment Hearing Assessment
Cognition	Blessed Orientation Memory Concentration Test	
Psychological		Mental Health Index 17
Social		Social Activity Limitation Measure (MOS) Social Support Survey (MOS)
Nutrition	Body Mass Index	Unintentional Weight Loss in 6 Months

Hurria *et al*. Cancer, 2005.

Patient-Reported Geriatric Assessment

DOMAIN	ASSESSMENT MEASURE	
	~~Health Professional~~	Patient Reported
Functional Status	~~Timed Up and Go~~ ~~Physician Rated Karnofsky Performance Status (KPS)~~	Activities of Daily Living (ADL) Instrumental Activities of Daily Living (IADL) Karnofsky Self Reported Performance No. of Falls in the last 6 months
Comorbidity		Number and Type of Comorbid Conditions Number of Medications → Provide a #, no list Vision Assessment Hearing Assessment
Cognition	~~Blessed Orientation Memory Concentration Test~~	
Psychological		~~Mental Health Index 17~~ → PROMIS Anxiety/Depression
Social	Shortened →	Social Activity Limitation Measure (MOS) Social Support Survey (MOS)
Nutrition	Body Mass Index	Unintentional Weight Loss in 6 Months → PG-SGA

PROMIS Cog. Function

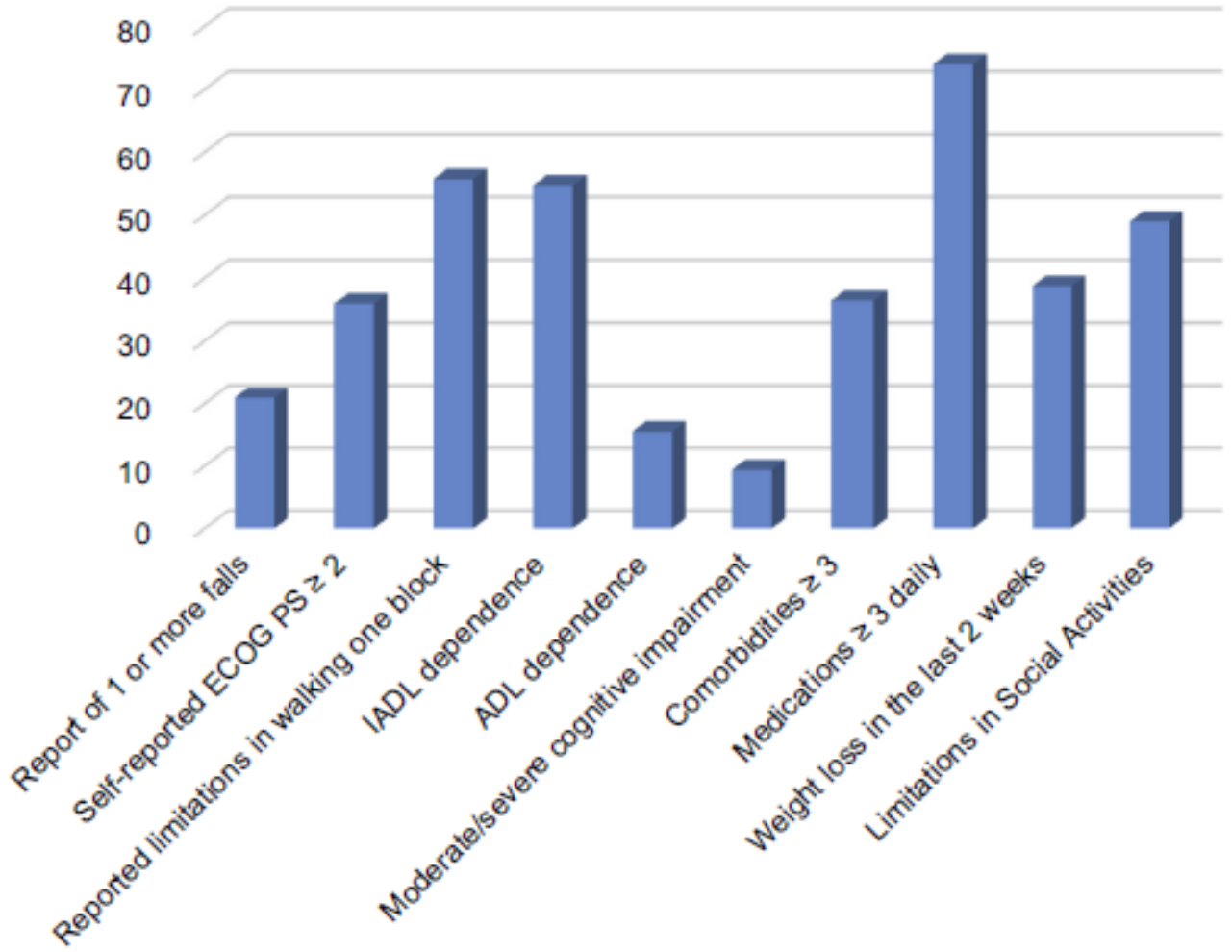
Added PROMIS 10 Global

Hurria *et al*. Cancer, 2005.

Table 1
Patient characteristics and implementation results.

Total patients	$N = 323$
Age, mean (SD)	70 (6.9)
Sex, n (%)	
Male	175 (54.2)
Race, n (%)	
White	237 (73.4)
Black	82 (25.4)
Other	4 (1.2)
Educational level, n (%)	
Less than high school	47 (15.1)
High school graduate	85 (27.2)
Associate/Bachelors	135 (43.3)
Advanced degree	45 (14.4)
Marital status, n (%)	
Single	25 (8.0)
Widowed/Divorced	85 (27.1)
Married	204 (65.0)
Cancer type, n (%)	
Colon	75 (23.2)
Pancreatic	74 (22.9)
Rectal	34 (10.5)
Esophageal-gastric	33 (10.2)
Neuroendocrine	30 (9.3)
Other	77 (23.9)
Cancer stage, n (%)	
I/II	94 (29.3)
III/IV	227 (70.7)
Geriatric assessment implementation results	
Time to completion	
Median (IQR)	10 min (10–15.7)

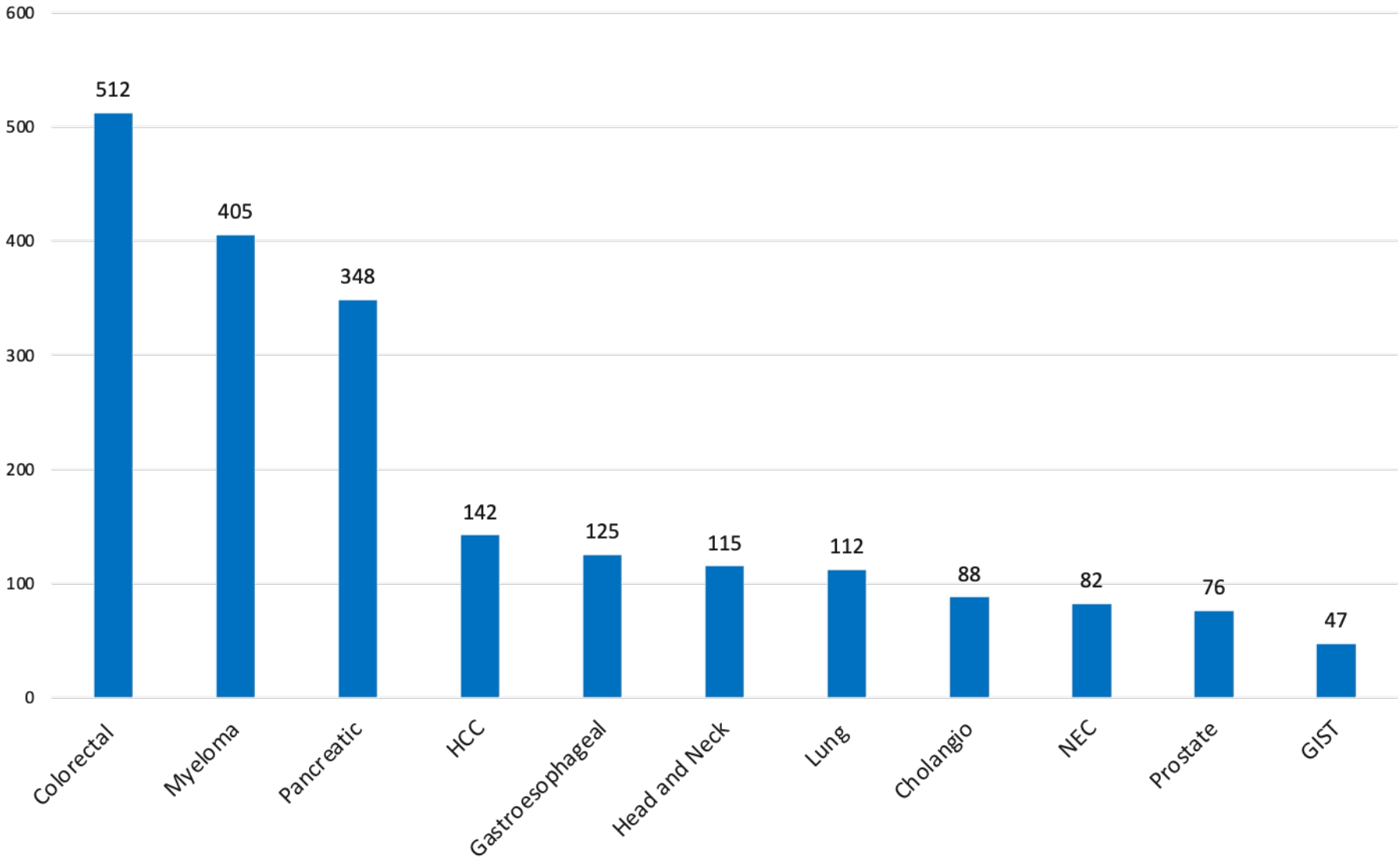
~90% of target population



Williams *et al*., J Geri Onc, 2019

CARE

>3000 patients to date
(85% of target population)



CARE
Cancer & Aging
Resilience Evaluation

CARE 1.0

Instructions: Please answer the questionnaire to the best of your ability. Please mark boxes with an "x" or a check. If you make a mistake, please mark out the incorrect answer and mark an "x" in the correct box and circle it.

Example: ☒ Yes ☐ No 

1. How many times have you fallen in the last 6 months? ☐☐
2. Does your health limit you in walking one block? ☐ Not limited at all ☐ Limited a little ☐ Limited a lot
3. Does your health now limit you in vigorous activities, such as running, lifting heavy objects, participating in strenuous sports? ☐ Not limited at all ☐ Limited a little ☐ Limited a lot
4. Does your health now limit you in climbing one flight of stairs? ☐ Not limited at all ☐ Limited a little ☐ Limited a lot
5. Can you get to places out of walking distance...

   ☐ Without help (drive your own car, or travel alone on buses or taxis);

   ☐ With some help (need someone to help you or go with you when traveling); or

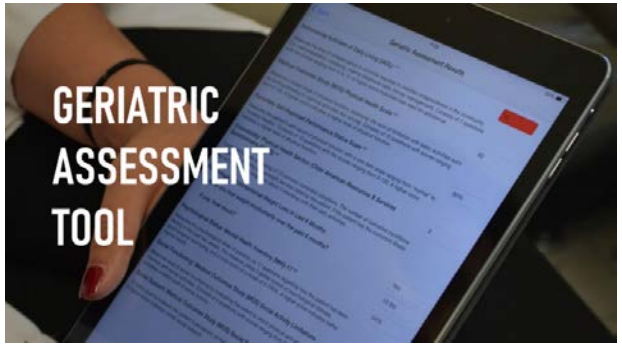
   ☐ Are you unable to travel unless emergency arrangements are made for specialized vehicle like an ambulance?

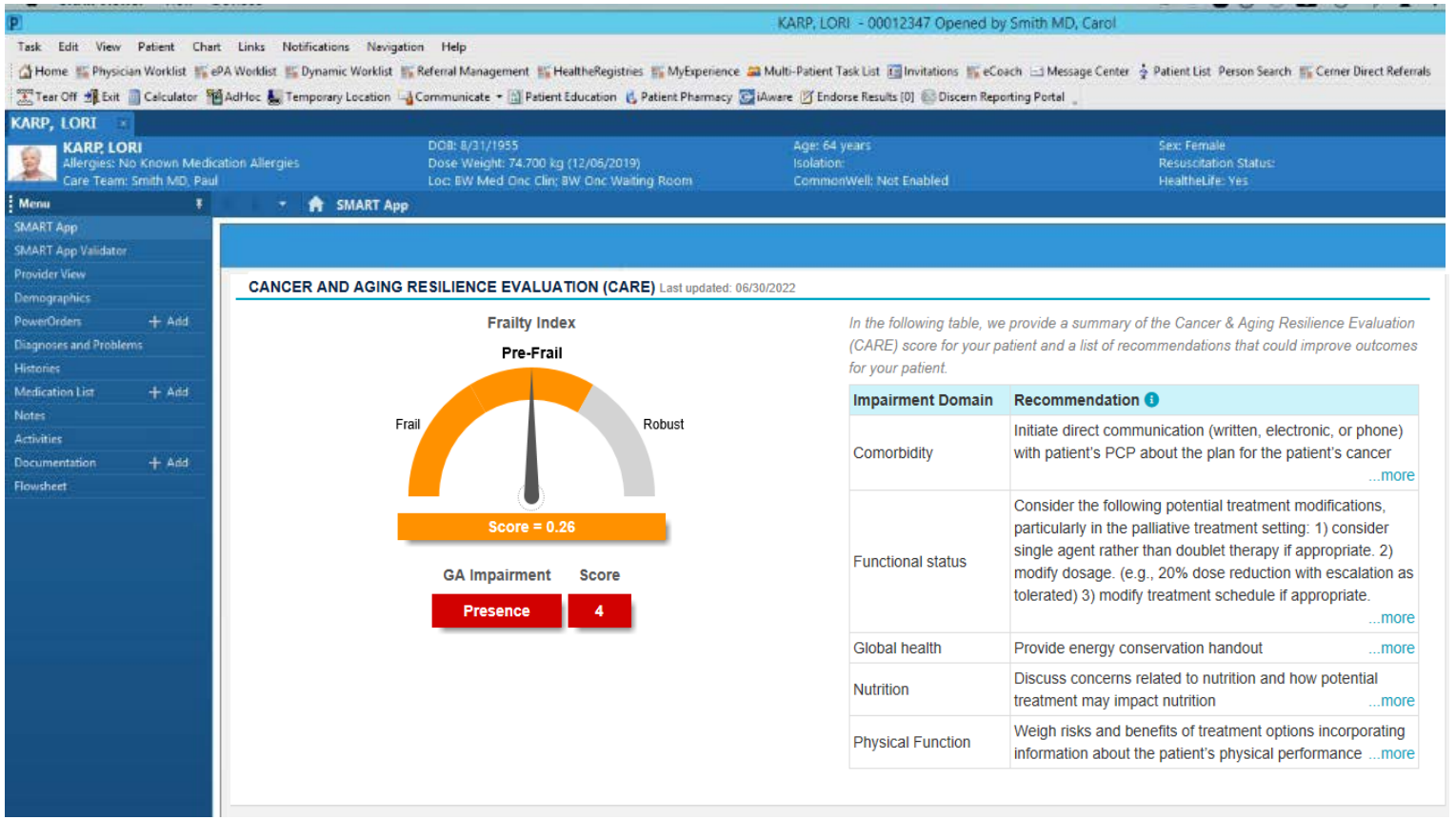
CARE
Cancer & Aging Resilience Evaluation

CARE 2.0 (web enabled) = WeCARE

Dashboard
integrated into EMR

Electronic CARE



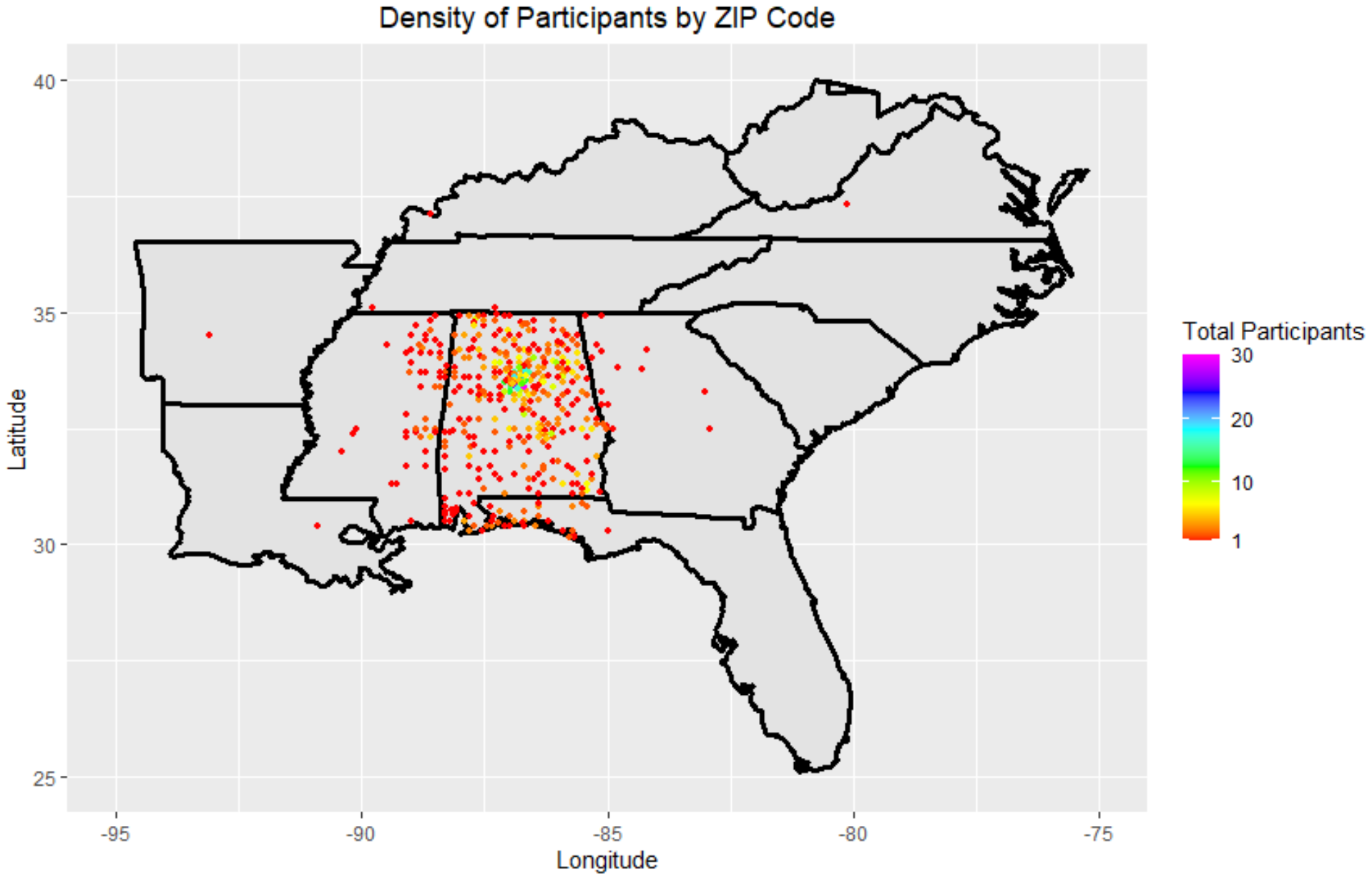


carevive

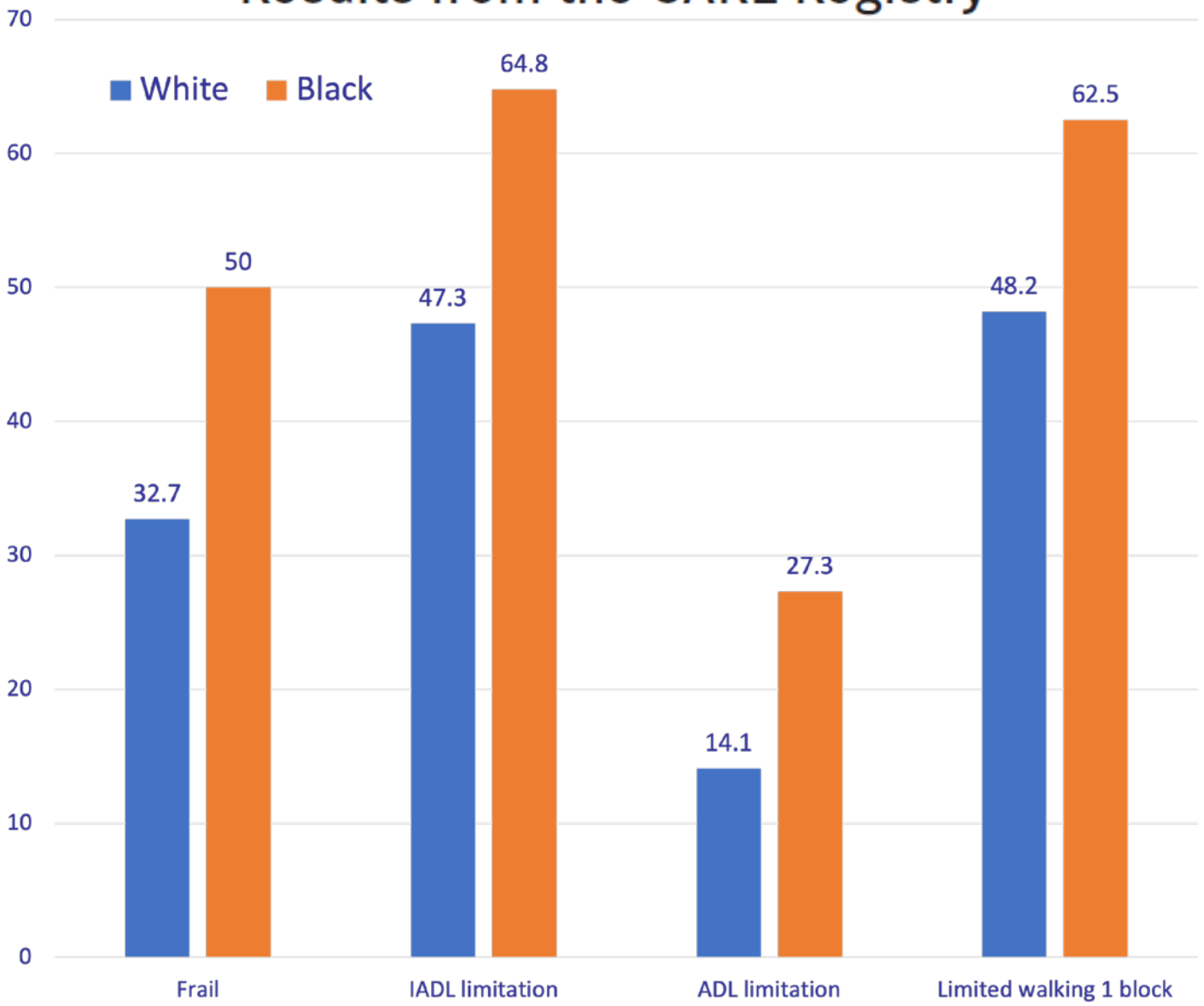
CARE Data

- Cross-sectional survey
- Linkage to Mortality (99%)
- CT image extraction (~80%)
- In those undergoing treatment
  - Toxicity and Hospitalization abstraction
  - Repeat assessment at 3-4 months

CARE
Cancer & Aging
Resilience Evaluation


Density of Participants by ZIP Code
40
35
30
25
Latitude
-95
-90
-85
-80
-75
Longitude
Total Participants
30
20
10
1

Racial disparities in frailty and geriatric assessment impairments in older adults with cancer in the Deep South: Results from the CARE Registry



2.6 higher adjusted odds of frailty

Williams *et al*. Cancer. 2022

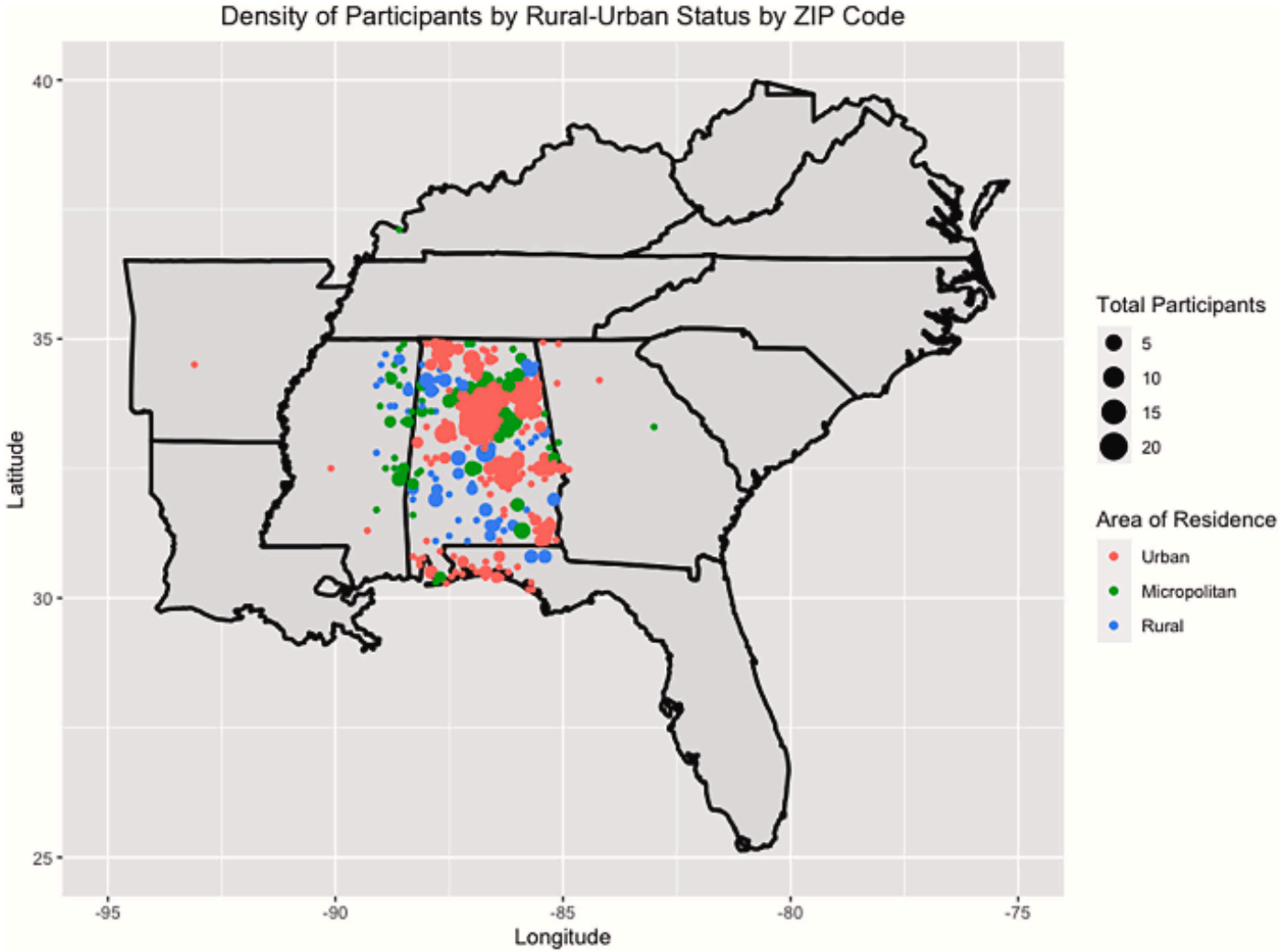
Racial disparities in frailty and geriatric assessment impairments in older adults with cancer in the Deep South: Results from the CARE Registry

Comorbid Condition	Race, No. (%)		*P*
	NH White	NH Black	
Arthritis	157 (36.9)	46 (35.9)	.699
Circulatory issues	85 (20.0)	27 (21.1)	.494
Diabetes	129 (30.4)	44 (34.4)	.229
Hypertension	229 (53.9)	93 (72.7)	<.001
Depression	82 (19.3)	25 (19.5)	.695
Emphysema	33 (7.8)	11 (8.6)	.558
Glaucoma	19 (4.5)	16 (12.5)	<.001
Heart disease	88 (20.7)	20 (15.6)	.363
Stomach or intestinal problems	150 (35.3)	36 (28.1)	.278
Osteoporosis	42 (9.9)	7 (5.5)	.200
Chronic liver/kidney disease	81 (19.1)	25 (19.5)	.751
Stroke	34 (8.0)	9 (7.0)	.815
≥3 comorbidities	218 (51.3)	68 (53.1)	.440

Abbreviation: NH, non-Hispanic.

Williams *et al*. Cancer. 2022

Association of unmet basic resource needs with frailty and quality of life among older adults with cancer—Results from the CARE registry



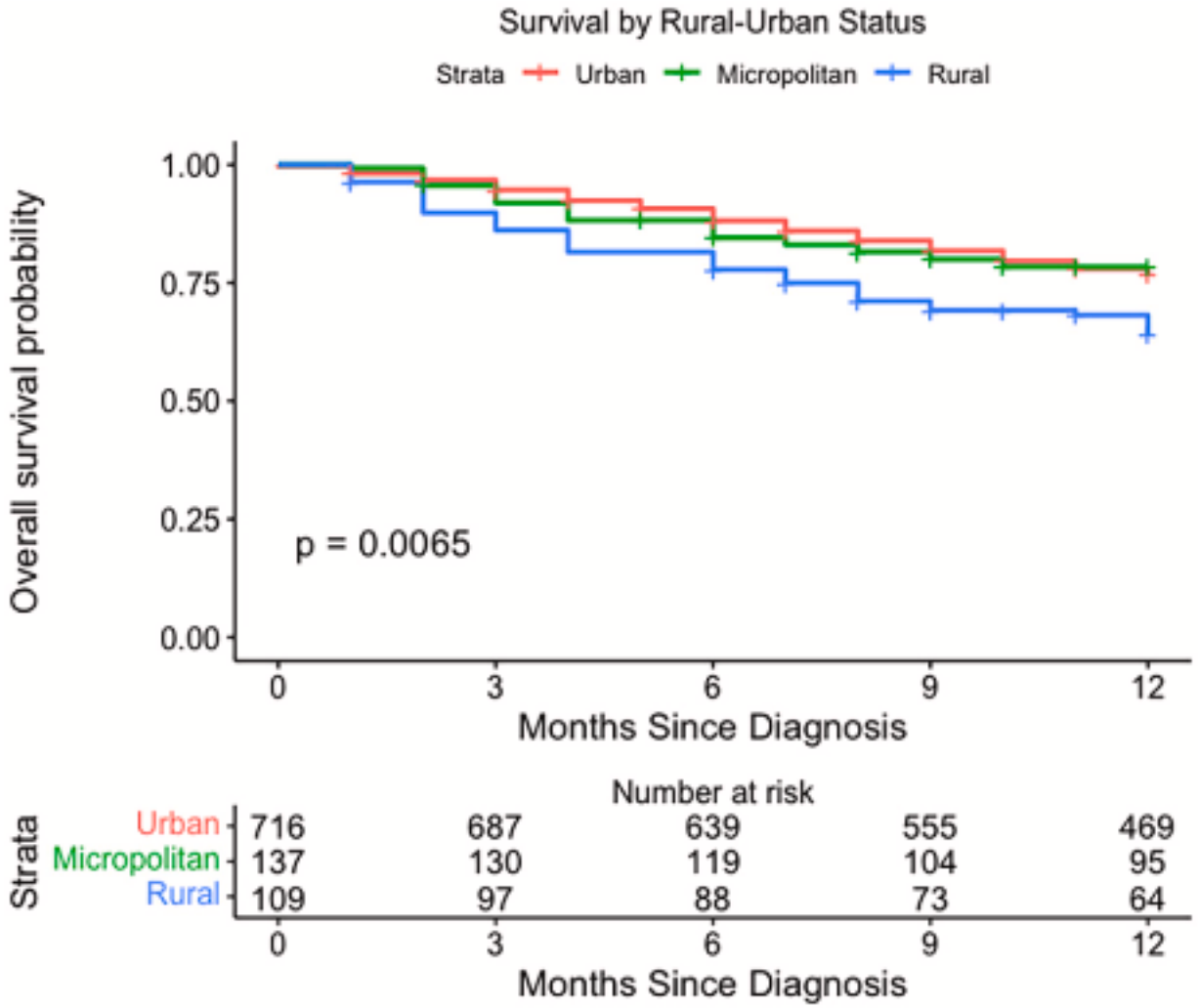
Fowler *et al*. Journal of Geri Onc. 2023

Association of unmet basic resource needs with frailty and quality of life among older adults with cancer—Results from the CARE registry

1.83 times higher hazard of 1-year mortality (95% CI: 1.27, 2.64)

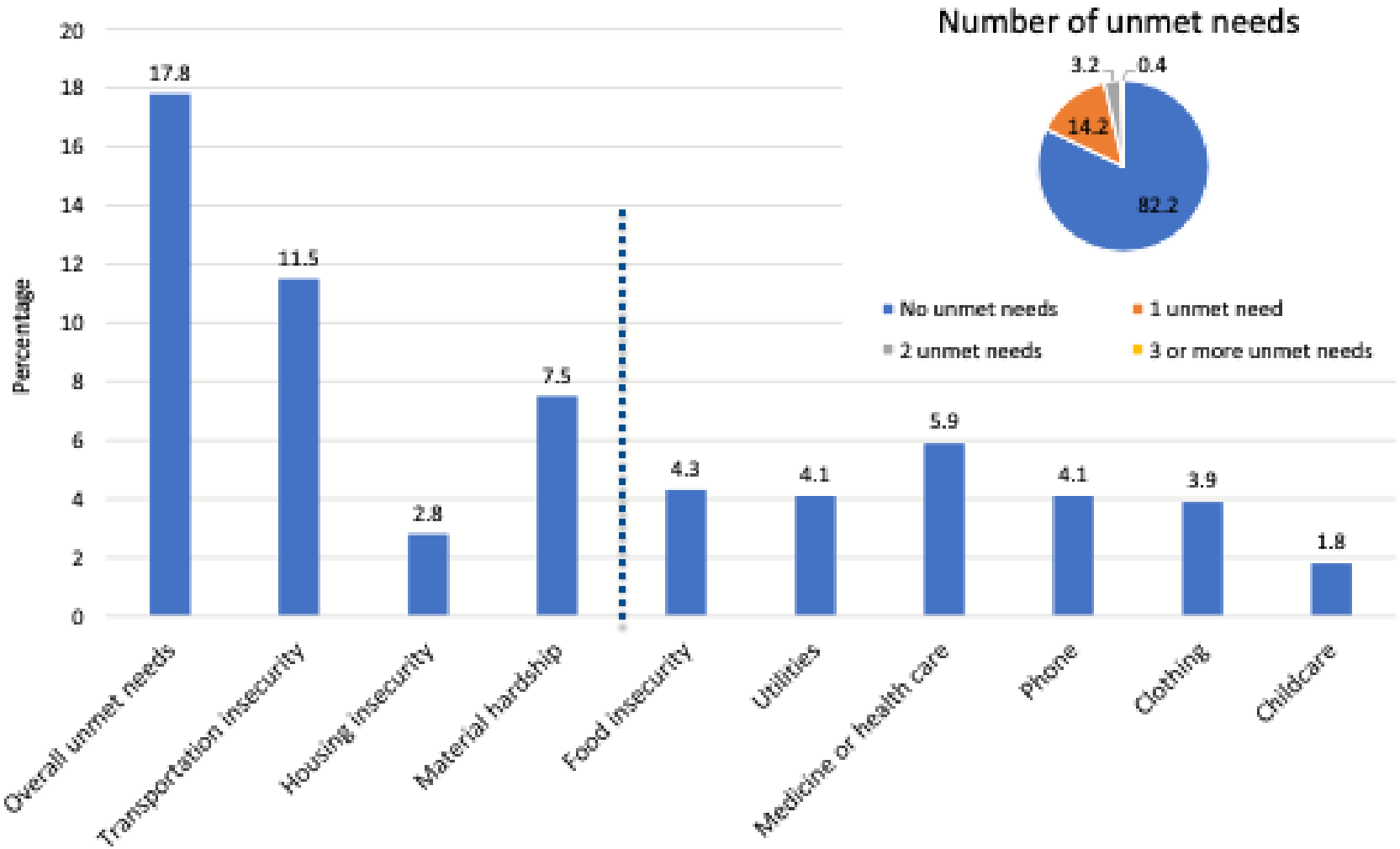
Baseline outcome and geriatric assessment (GA) domain characteristics by rural-urban residence.

Variable	Total	Urban 853 (88.7)	Rural 109 (11.3)	p-value
Outcomes				
Survival Time, mean (SD)	10.1 (3.2)	10.2 (3.1)	9.3 (3.8)	**0.022**
Death, One-Year, n (%)	226 (23.5)	188 (22.0)	38 (34.9)	**0.003**
Frailty, n (%)	286 (31.1)	248 (30.4)	38 (36.9)	0.177
GA Impairments[b]				
Report 1+ falls, n(%)	171 (19.8)	149 (19.4)	22 (22.2)	0.511
ECOG PS ≥ 2, n(%)[a]	276 (30.6)	235 (29.4)	41 (40.2)	**0.026**
Report limitations walking one block, n(%)	463 (51.0)	402 (49.8)	61 (60.4)	**0.045**
IADL dependence, n(%)[a]	504 (54.6)	440 (53.7)	64 (62.1)	0.103
ADL dependence, n(%)[a]	179 (19.2)	160 (19.3)	19 (18.5)	0.831
≥3 comorbidities, n(%)	441 (50.2)	384 (49.3)	57 (57.6)	0.121
Polypharmacy, n(%)[a]	188 (21.2)	156 (19.8)	32 (31.7)	**0.006**



Fowler *et al*. Journal of Geri Onc. 2023

Association of unmet basic resource needs with frailty and quality of life among older adults with cancer—Results from the CARE registry



Williams *et al*. Cancer Medicine. 2023

Association of unmet basic resource needs with frailty and quality of life among older adults with cancer—Results from the CARE registry

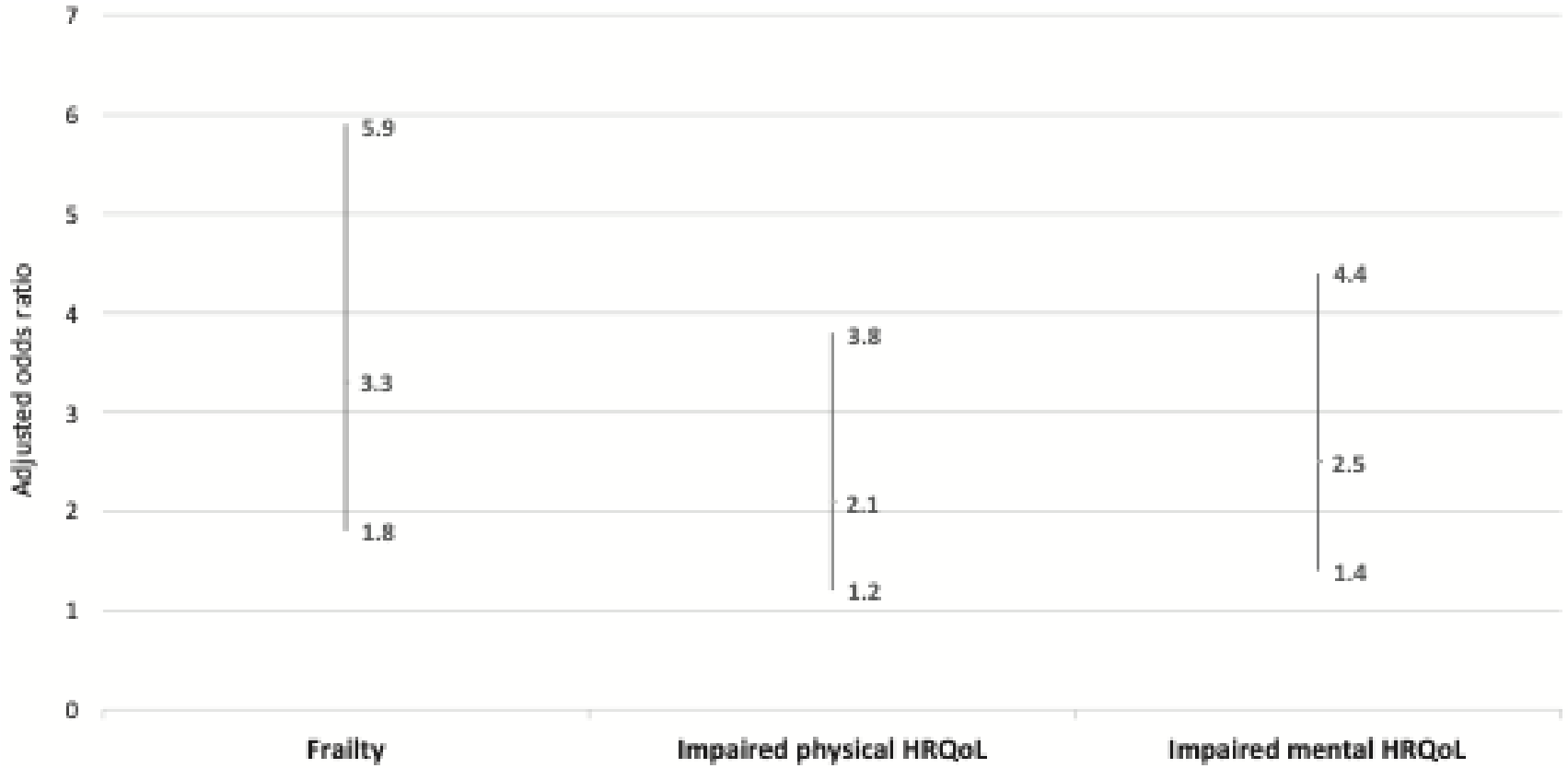


FIGURE 2 Multivariable logistic regression of the association between basic unmet needs with frailty and reduced physical and mental health-related quality of life.

Williams *et al*. Cancer Medicine. 2023

Population Level

Social Determinants of Health (SDH)

The Social Determinants of Health (SDH) Core enables UAB investigators to measure the effect of social and environmental risks for disease etiology, progression, management, and outcomes, and test interventions that ameliorate their effect. Our services facilitate innovative investigations of genome-sociome-exposome pathways to health and disease through integrated data, methodologies, and expertise from social science, spatial and environmental science, clinical and translational science, genomics, informatics, and epidemiology.

Our Core works to advance research on the impact of Social Determinants of Health, working with teams as they consider the circumstances in which people are born, live, work, and age. To learn more, continue scrolling or click one of the topics below to skip to that section.

Population Level

Linked to census block and tract

- Social Vulnerability Index (SVI)
- Area Deprivation Index (ADI)
- Medically Underserved Areas
- Food Atlas Access

Low Income, Low Access (LILA)

Risk of Frailty Based on Low Income, Low Access (LILA) Designation of Census Tract		
	Prevalence Ratio [PR] (95% CI)	Prevalence Ratio [PR] (95% CI)
LILA Measure	Model 1	Model 2
Any LILA Designation	**1.41 (1.19, 1.68)**	**1.26 (1.06, 1.51)**
LILA 1 and 10	**1.35 (1.10, 1.64)**	**1.28 (1.05, 1.56)**
LILA 0.5 and 10	**1.33 (1.10, 1.59)**	**1.22 (1.02, 1.46)**
LILA 1 and 20	**1.33 (1.08, 1.64)**	**1.28 (1.04, 1.57)**
LILA Vehicle and 20	1.15 (0.94, 1.40)	1.04 (0.85, 1.27)
LI Only	**1.29 (1.09, 1.54)**	1.13 (0.95, 1.35)

LI defined as: a census tract with poverty rate ≥20% or median family income ≤80% of the State-wide median family income OR located in a metropolitan area with median family income ≤80% of the metropolitan area median family income. LA 1 and 10 defined as: if ≥500 people or ≥33% of the population in the tract is >1 mile from a food store for an urban area or >10 miles for a rural area. LA 0.5 and 10 defined as: if ≥500 people or ≥33% of the population in the tract is >0.5 mile from a food store for an urban area or >10 miles for a rural area. LA 1 and 20 defined as: if ≥500 or ≥33% of the population in the tract is >1 mile from a food store for an urban area or >20 miles for a rural area. LA vehicle and 20 defined as: if at least 100 households were more than 0.5 mile from a food store without access to a vehicle or ≥500 or ≥33% of the population live >20 miles from a food store regardless of vehicle access[14]

Models were modified Poisson with robust variance estimation controlling for clustering at the census tract level

Model 1: adjusted for age, race/ethnicity, sex, cancer type, cancer stage

Model 2: adjusted for variables in Model 1 plus education and marital status

Fowler *et al*. Cancer. Under revision

SVI and Frailty

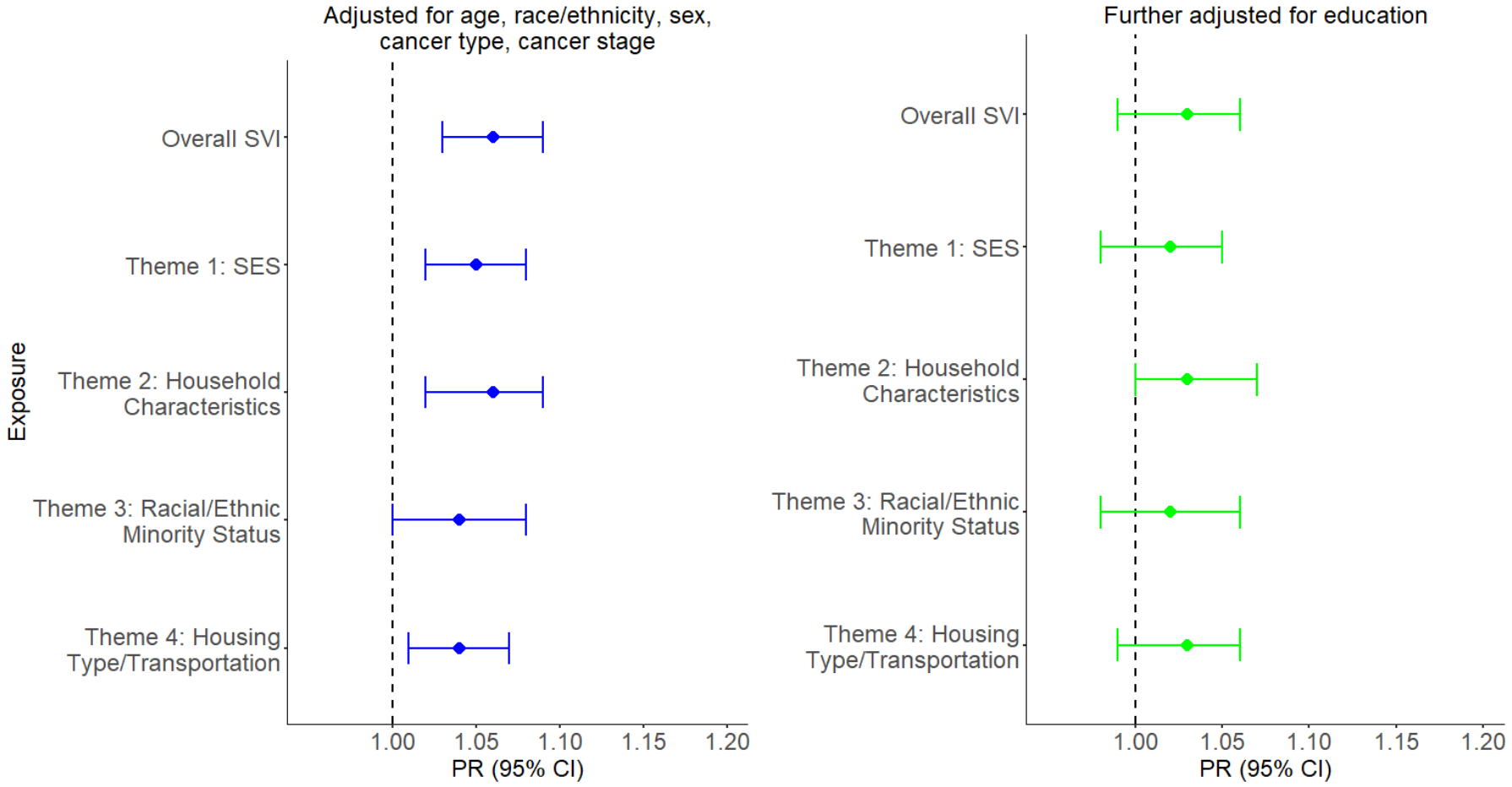


Figure 1. Association between SVI and Frailty. PR corresponds to 10% increase in SVI

SVI and Geriatric Impairments

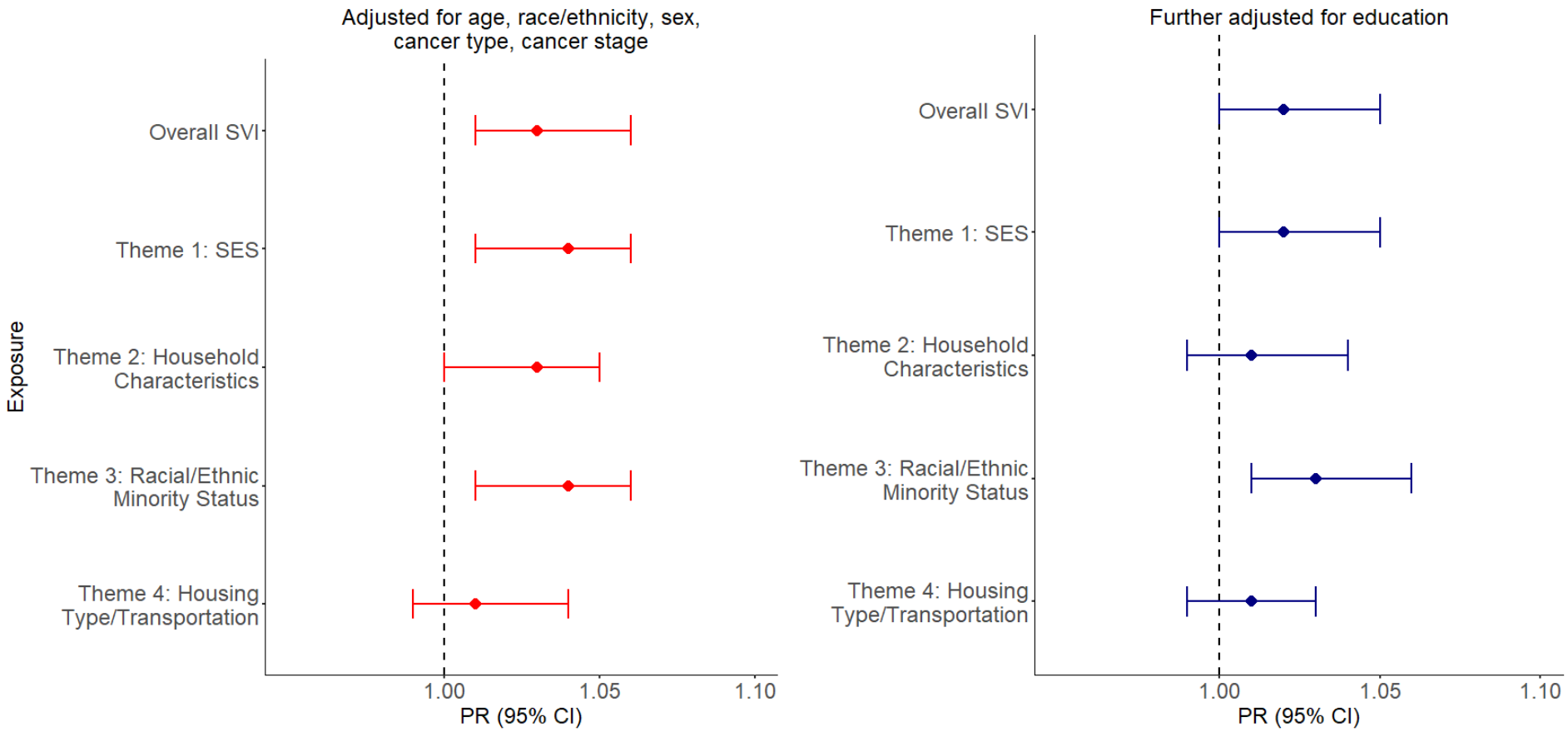
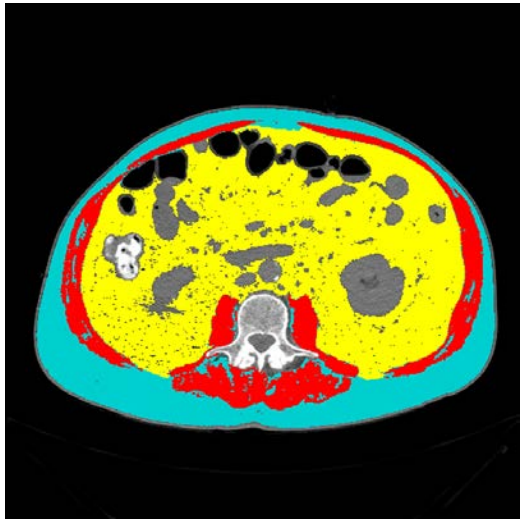


Figure 2. Association between SVI and Total GA Impairments. PR corresponds to 10% increase in SVI

Racial Differences in Body Composition

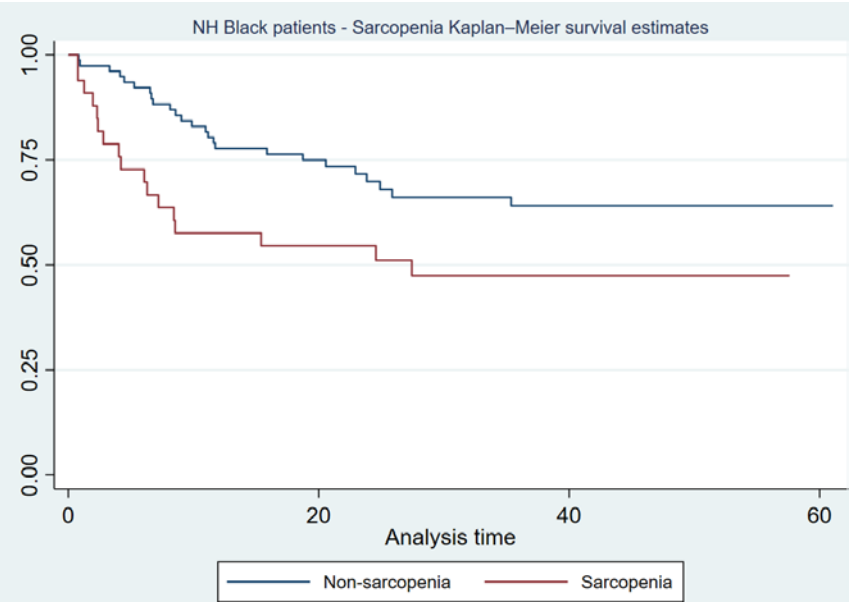


Variable	All patients	Non-Hispanic white	Non-Hispanic Black	p value
BMI – mean (SD) Obese	27 (6) 117 (23%)	26.4 (6) 91 (23%)	27 (7) 26 (24%)	0.18 0.96
SMI – mean (SD) Sarcopenia Sarcopenic obese	41 (10.7) 284 (57%) 31 (6%)	40.7 (10) 222 (58%) 22 (6%)	41.8 (14) 62 (56%) 9 (8%)	0.17 0.74 0.32
SMD - mean (SD) Myosteatosis	38.5 (11.5) 210 (39%)	38 (11) 174 (42%)	40 (12) 36 (29%)	0.01 0.007
SMG – mean (SD) Low SMG	1586 (659) 237 (48%)	1556 (624) 192 (50%)	1691 (759) 45 (41%)	0.03 0.09
VAT - mean (SD) High VAT	202 (111) 256 (49%)	197 (101) 191 (48%)	217 (137) 65 (53%)	0.04 0.35
VATD - mean (SD) High VATD	-93 (17) 251 (48%)	-94 (15) 181 (45%)	-90 (20) 70 (57%)	0.01 0.03
SAT - mean (SD) High SAT	180 (114) 262 (50%)	196 (117) 224 (57%)	124 (82) 38 (31%)	0.001 0.001
SATD - mean (SD) High SATD	-83 (15) 247 (48%)	-84 (14) 174 (44%)	-79 (16) 73 (59%)	0.0009 0.002

Aleixo *et al*. ASCO annual meeting. 2023

Racial Differences in Body Composition

Variable	Hazard ratio (CI)	P value	Adjusted Hazard ratio (CI)[a]	P value
Sarcopenia [b]				
- All patients	1.23 (0.67- 2.29)	0.49	1.42 (0.69-2.90)	0.34
- New cutoff [1]	1.96 (1.05-3.63)	0.03	2.66 (1.30-5.46)	0.007
Myosteatosis [d]				
- All patients	0.94 (0.51-1.75)	0.86	1.14 (0.55-2.38)	0.72
- New cutoff	1.44 (0.82-2.55)	0.20	1.89 (0.94-3.77)	0.07



Aleixo *et al*. ASCO annual meeting. 2023

Conclusion

- A Practical Geriatric Assessment can be integrated into clinical care with the dual goals of
  - Improving personalized care for older patients
  - Developing an annotated database to examine and answer future geri-onc related questions
- Individual Level and Population Level Social Determinants of Health are important and should be leveraged to better understand health inequaties

Acknowledgments

DCH Health System

UAB SCHOOL OF MEDICINE
Institute for Cancer Outcomes and Survivorship

NATIONAL CANCER INSTITUTE

American Cancer Society®

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