Updates in Geriatric Oncology

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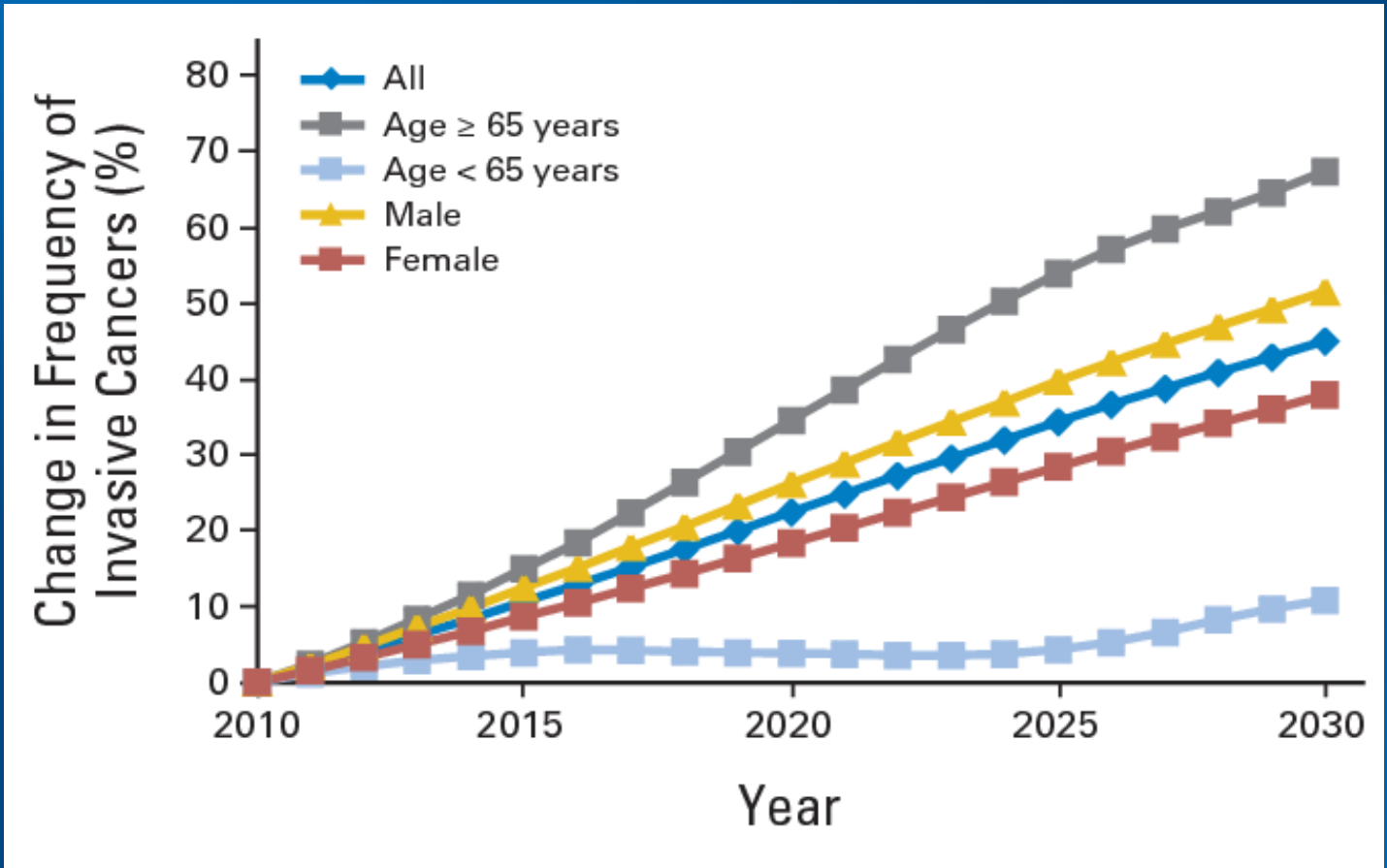
Increasing Number of Older Patients with Cancer



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Pal S.K., Hurria A. JCO (2010)

All Older Patients with Cancer are Not the Same

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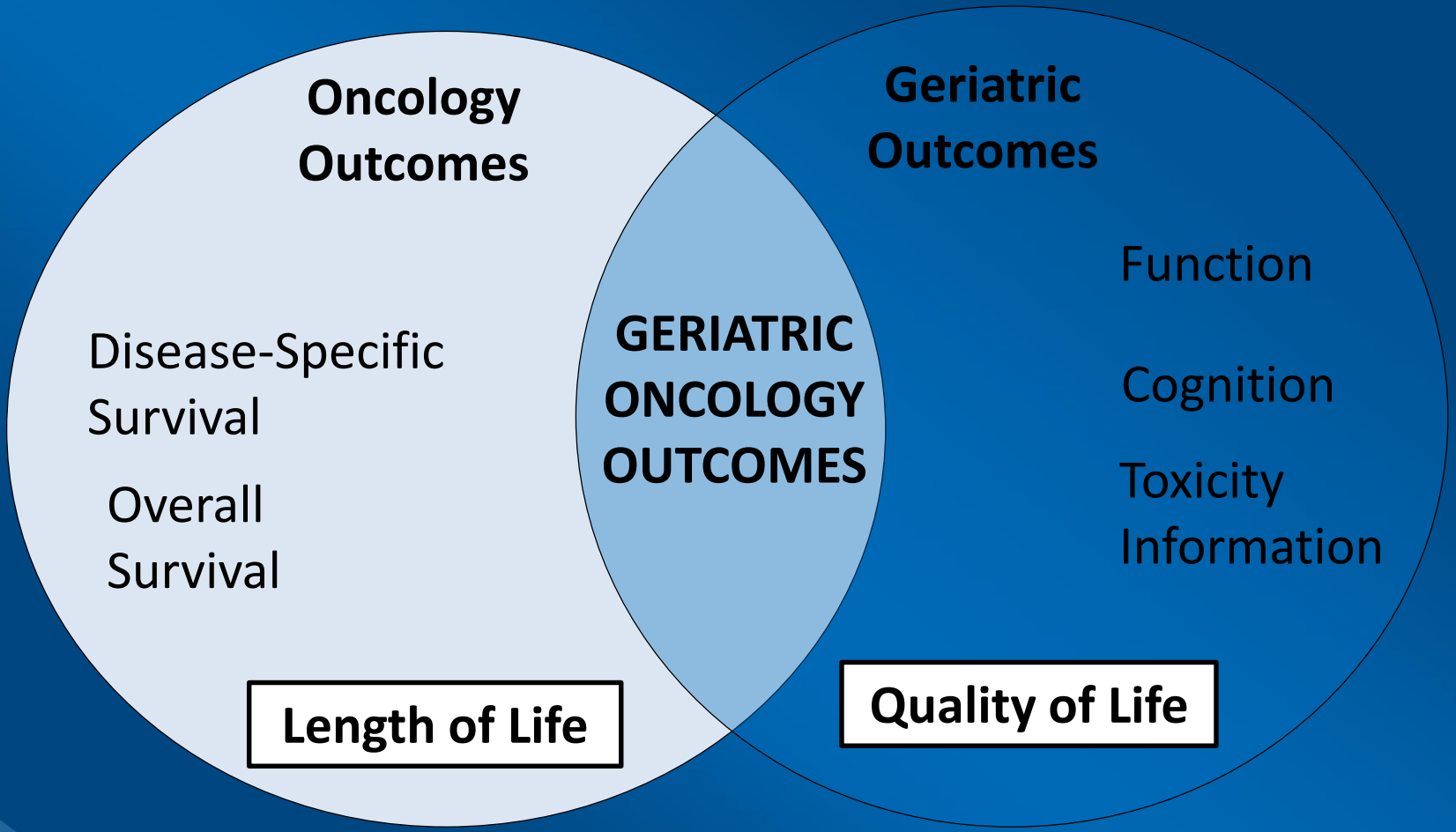
Geriatric Oncology



Williams GR, Mackenzie A, Magnuson A, et al. Journal of geriatric oncology 2016;7:249-57.

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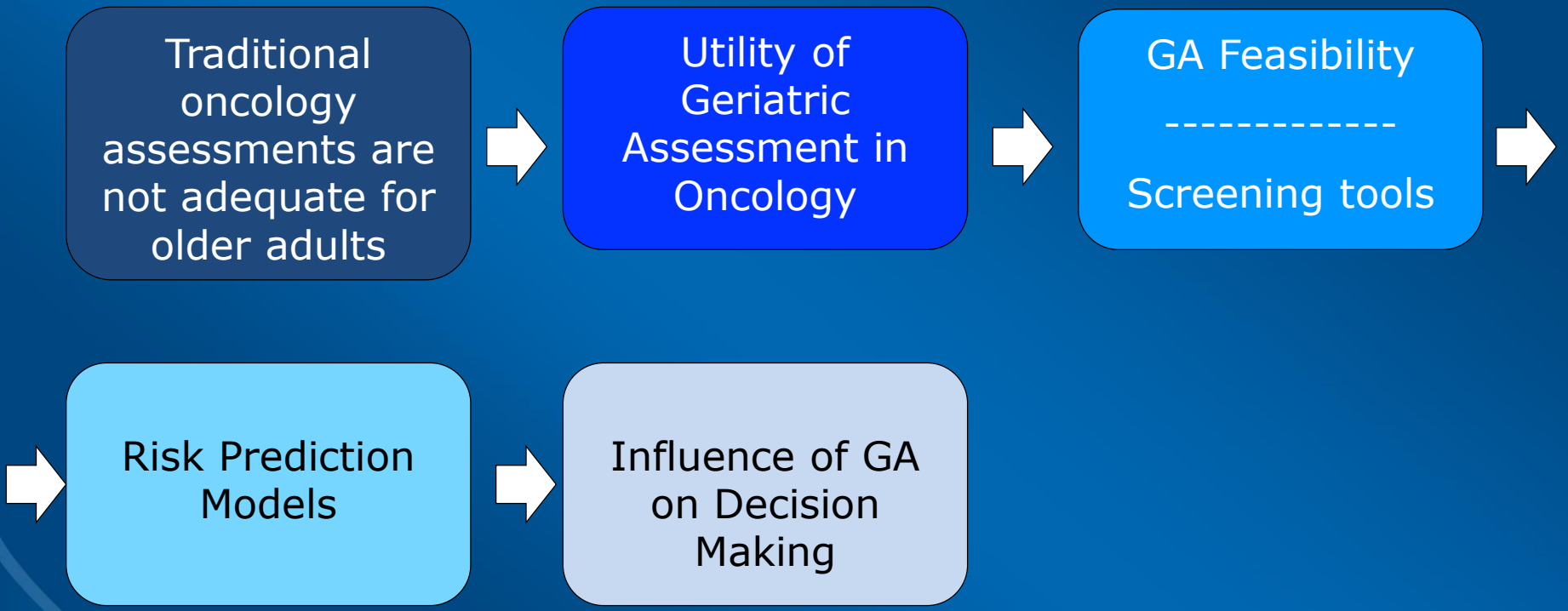
The Evolution of Geriatric Oncology



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

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Mohile, et al, JCO, 2018

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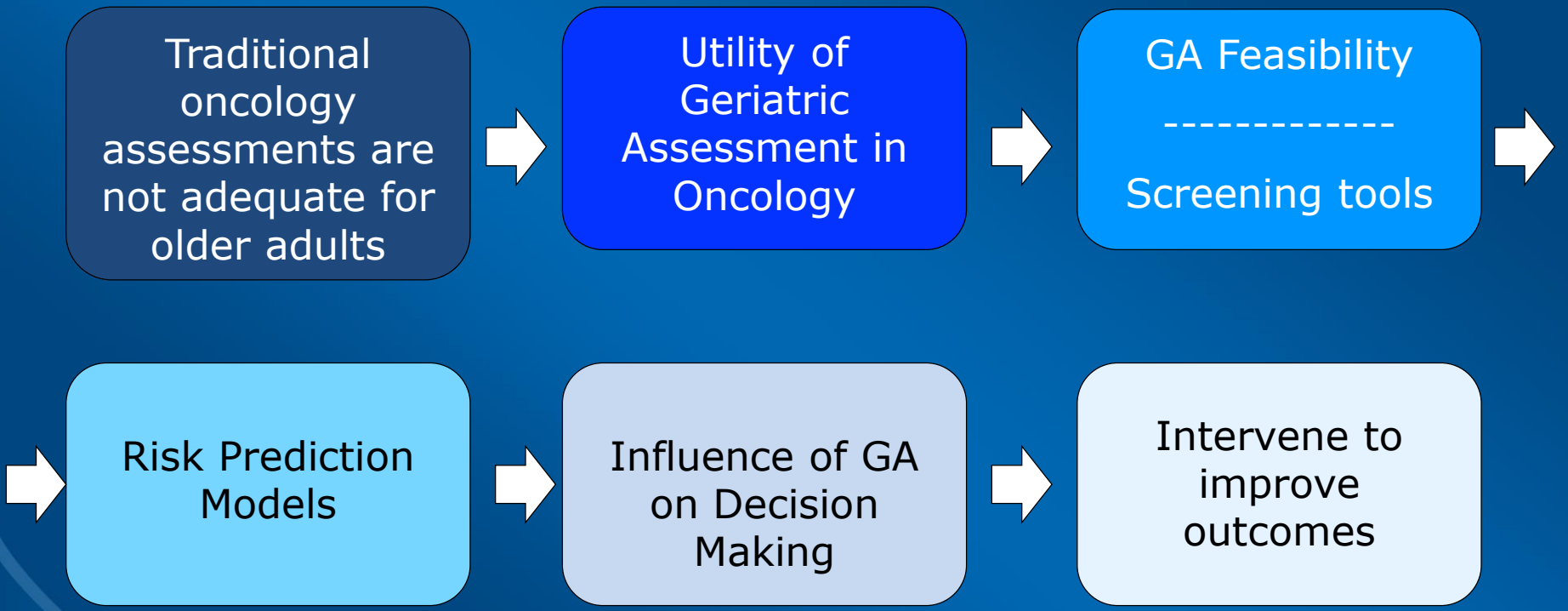

GA to Improve Communication

- To improve **communication** about age-related concerns of older patients with advanced cancer and their caregivers
  - Direct communication about age-related concerns in clinical encounters
  - Patient satisfaction with communication about age-related concerns
- Providing a summary of geriatric assessment results with recommendations for GA-guided interventions
  - Has potential to improve communication about age-related concerns of older patients with cancer and their caregivers

PI: Mohile;
Funding: PCORI
Mohile, et al. JAMA Onc, 2019

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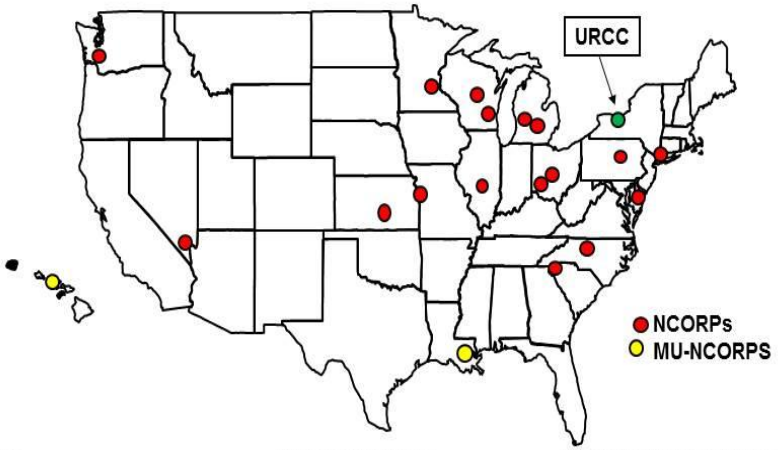
University of Rochester NCORP Research Base

University of Rochester Cancer Center NCORP Research Base

Map of Affiliates – 2016



Aurora NCORP
Cancer Research Consortium of West Michigan
Columbus NCORP
Dayton Clinical Oncology Program
Delaware/Christiana Care NCORP
Geisinger Cancer Institute NCORP
Greenville NCORP of the Carolinas
Gulf South MU NCORP
Hawaii MU NCORP
Heartland Cancer Research NCORP
Kansas City NCORP
Metro-Minnesota NCORP
Michigan Cancer Research Consortium
Nevada Cancer Research Foundation NCORP
Northwell NCORP
Pacific Cancer Research Consortium
SCOR NCORP
Wichita NCORP
Wisconsin NCORP

The 2017 URCC NCORP Research Base Annual Meeting with 20 NCORP Affiliates

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Accrual: 305 oncologists,
541 patients,
414 caregivers

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Patient and Caregiver Eligibility Criteria

Patients

- Age ≥70 years
- Diagnosis of advanced solid tumor or lymphoma
- Have ≥1 GA Impairment (other than polypharmacy)
- Will see their oncologist for next ≥3 months and willing to participate in study visits
- Have decision-making capacity, or, if not, oncologist has obtained consent from health-care proxy
- Able to read and understand English

Caregivers

- One caregiver was chosen by the patient to enroll using the question:
  - "Is there a family member, partner, friend, or caregiver (age 21 or older) with whom you discuss or who can be helpful in health-related matters?"
- Caregivers not required for patients to participate
- Able to provide informed consent
- Able to read and understand English

COMMUNICATING ABOUT AGING AND CANCER HEALTH
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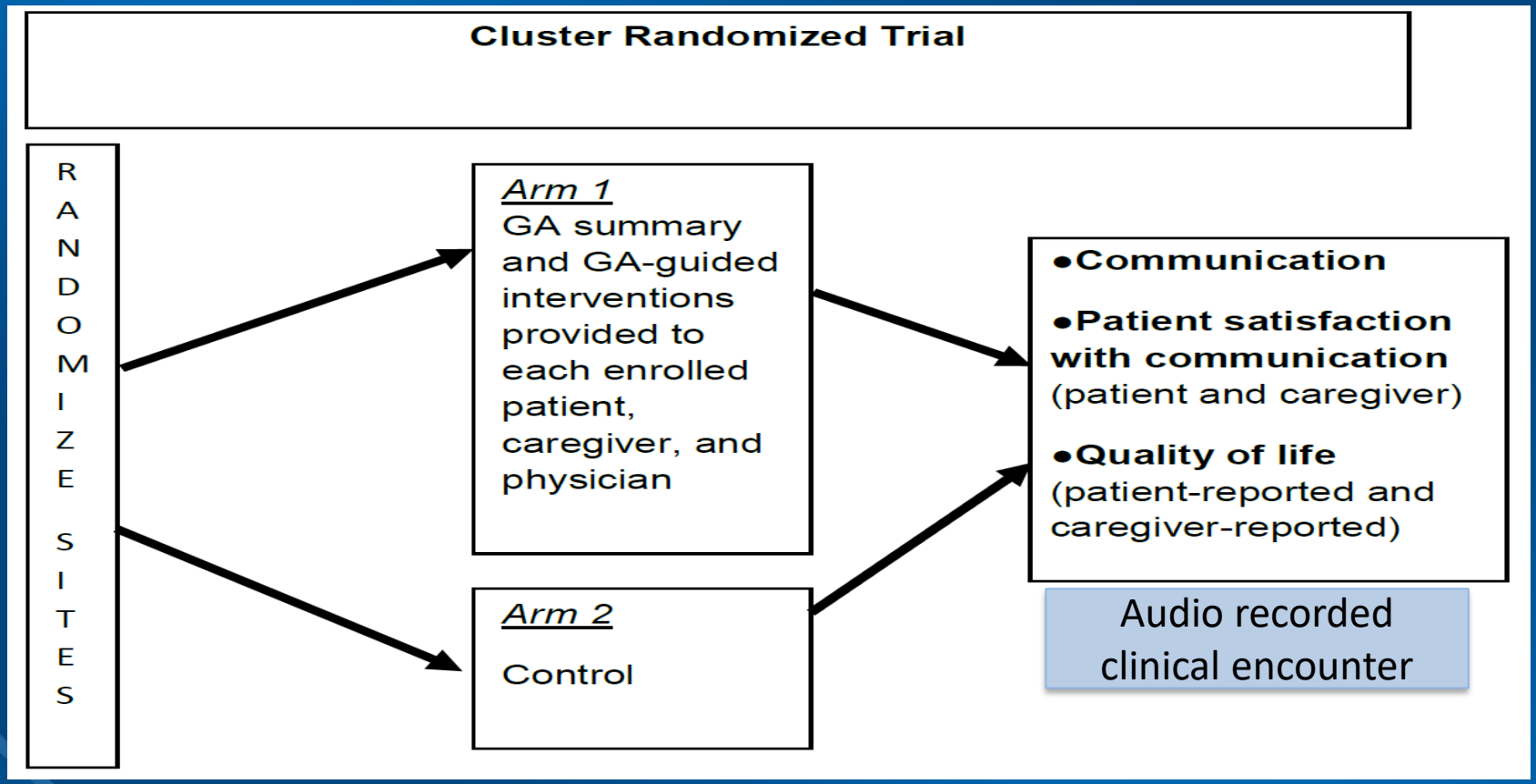
Study Design and Eligibility



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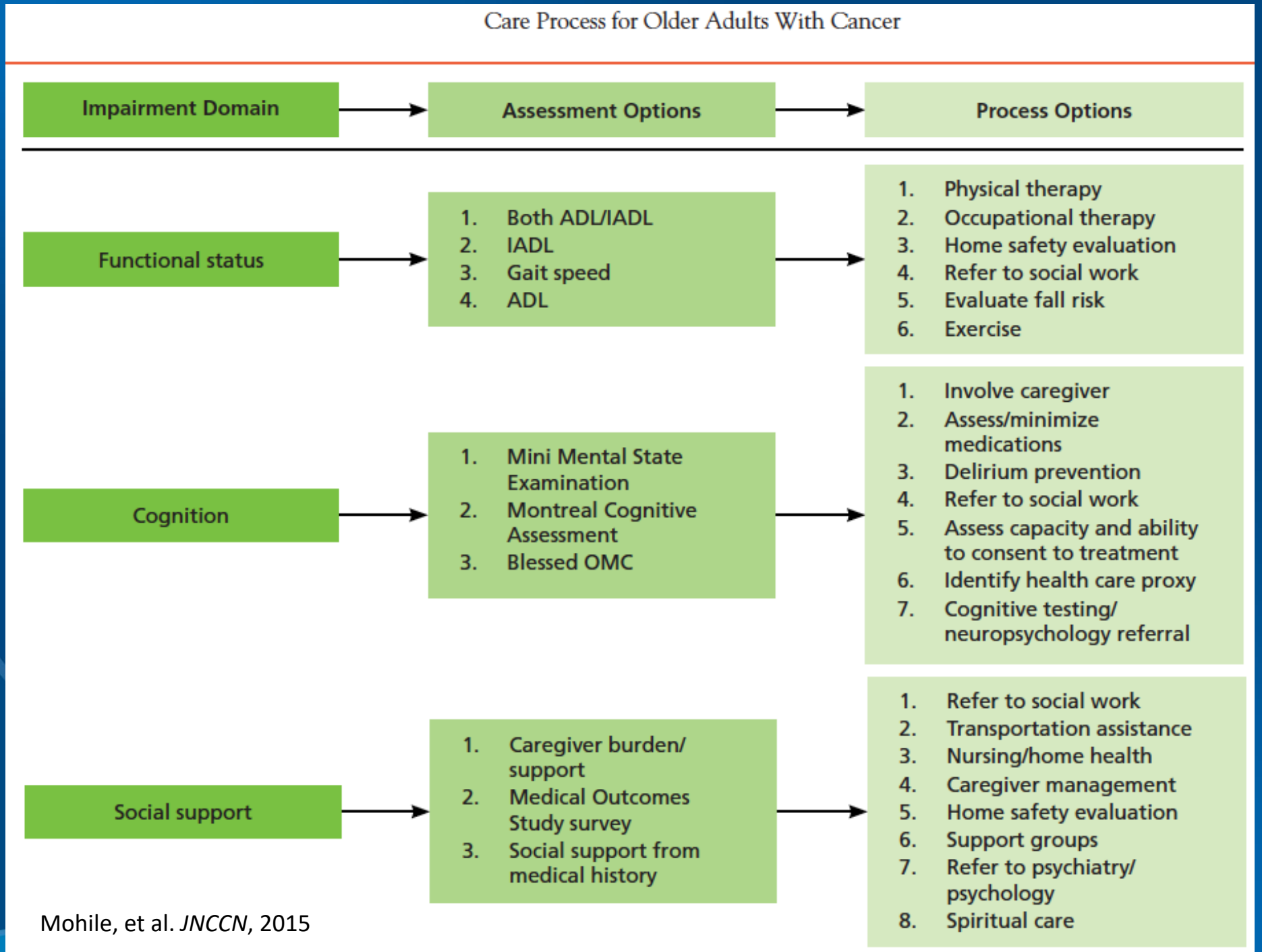

Mohile, et al. *JNCCN*, 2015

GA-guided Communication Recommendations

Did you or your staff complete any of the following with the patient during the clinic consultation (study visit)?	Completed		Not Completed	
	Yes	No	Not Appropriate	Patient Declined
1. Discuss patient's concerns about cognition.	☐	☐	☐	☐
2. Elicit input and perspectives from caregiver(s) about the patient's cognition.	☐	☐	☐	☐
3. Assess decision-making capacity.	☐	☐	☐	☐
• Elicit health care proxy information and input if the patient lacks decision-making capacity.	☐	☐	☐	☐
4. Carefully weigh risks and benefits given limited data and potential for further cognitive impairment and functional impairment.	☐	☐	☐	☐

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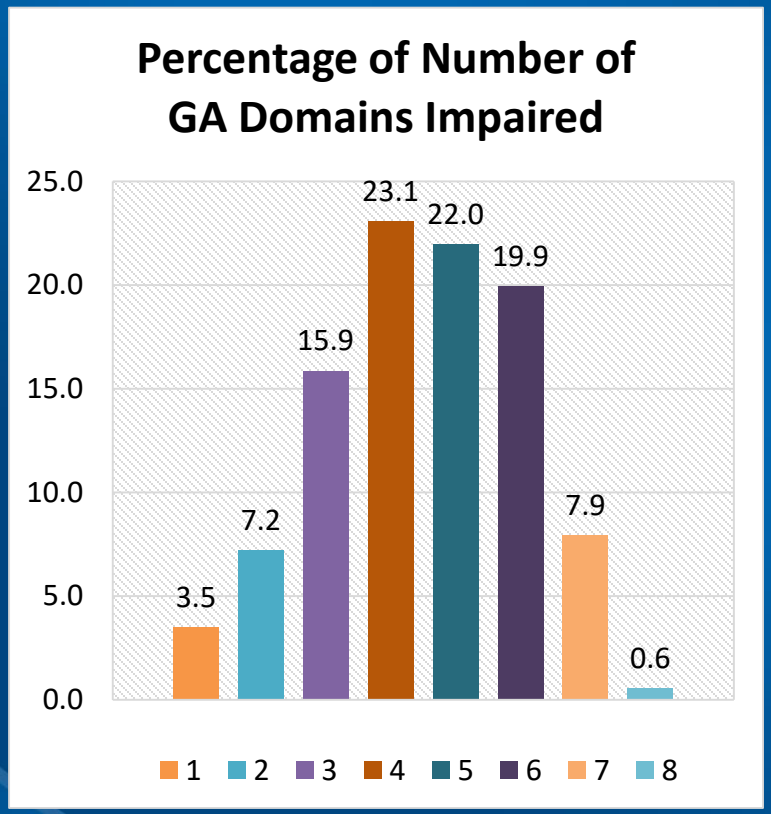
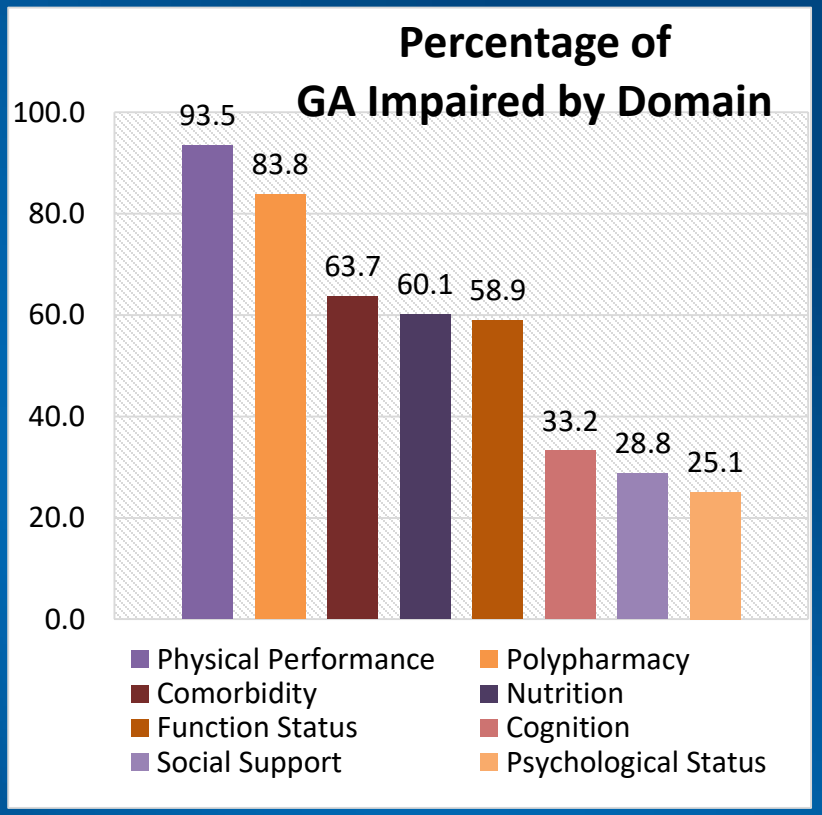
GA domains for all patients (N=541)

Mean age: 76.6 (Range 70-96)





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Mohile et al, ASCO 2018; JAMA Onc 2019

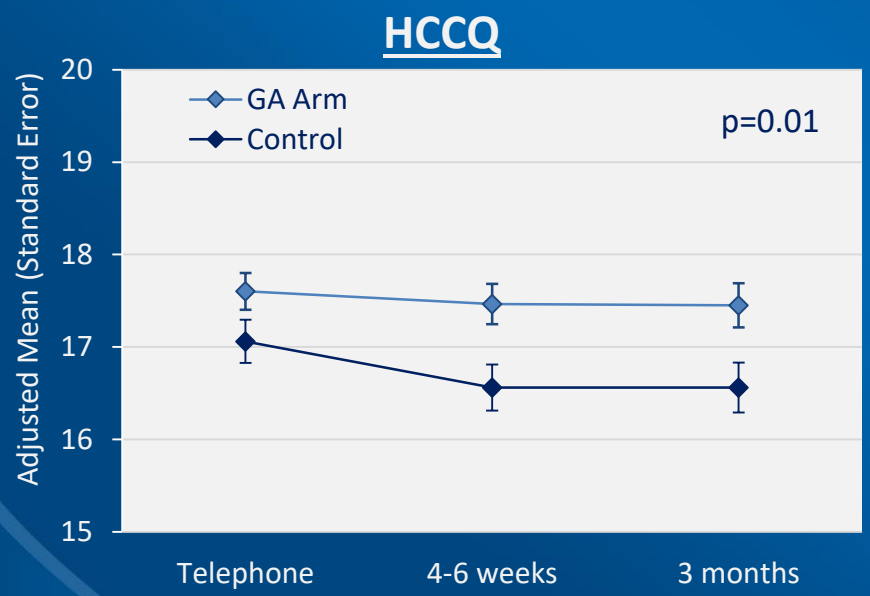
Improving the Care of Older Adults with Cancer is Important: Oncologists Want Guidance

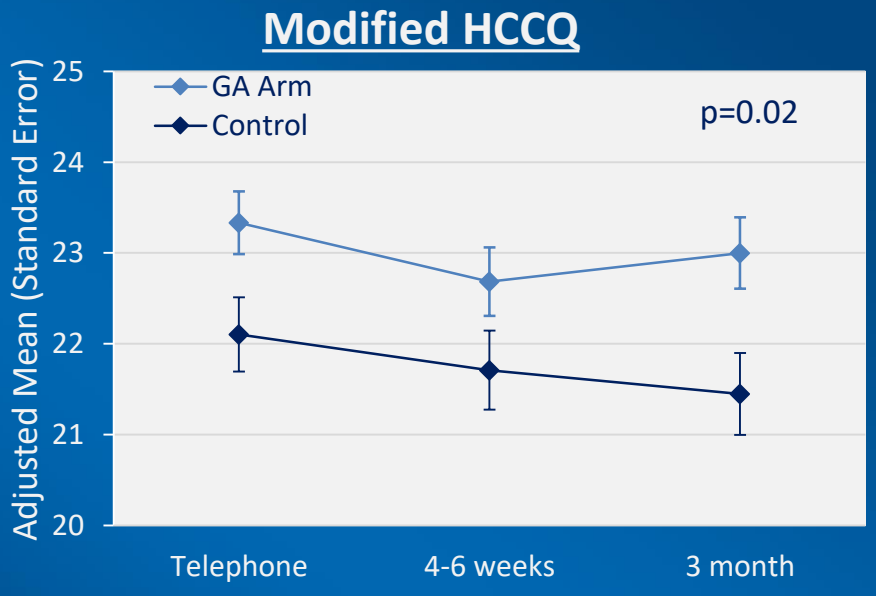
n=305 community oncologists	Agree (%)	Disagree (%)	Neutral (%)
I believe that the medical care of older adults with cancer needs to be improved	89%	3%	8%
I would appreciate additional training in topics related to the care of older adults with cancer	79%	4%	17%
I routinely ask my patients if they have a history of recent falls	70%	14%	16%
I frequently order home safety evaluations for my older patients	41%	35%	25%
I frequently enlist the help of a social worker	31%	37%	32%
I use standardized geriatric assessment tools to help me make decisions about my patients	23%	49%	29%

Mohile et al. JNCCN; 2018

GA Improves Patient and Caregiver Satisfaction with Communication

-Health Care Climate Questionnaire
(5 questions, scale: 0-20)
-Health Care Climate Questionnaire modified for age-related concerns (modified)
(7 questions, scale: 0-28)





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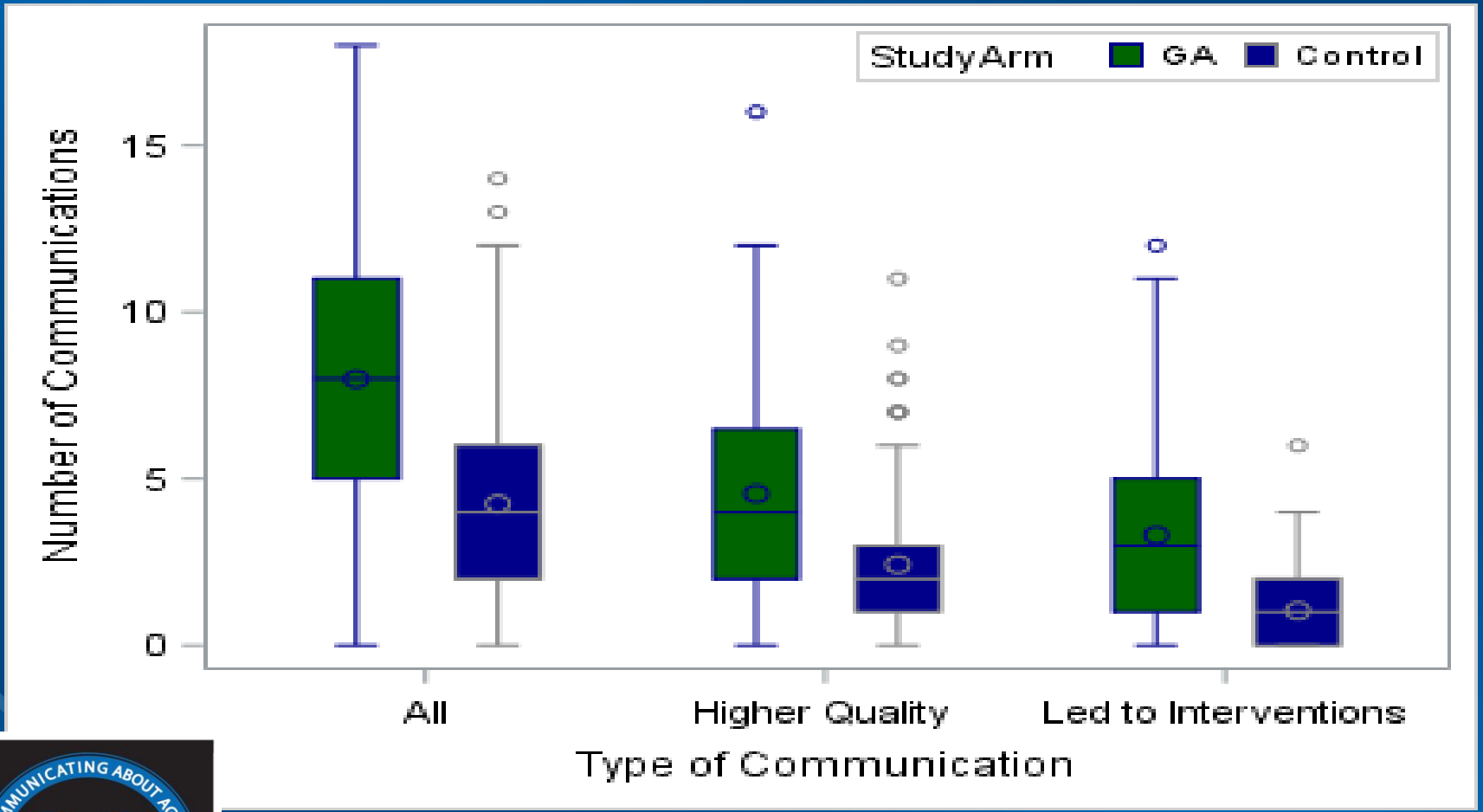
Mohile et al.; JAMA Onc, 2019

GA Improves Communication about Age-Related Concerns



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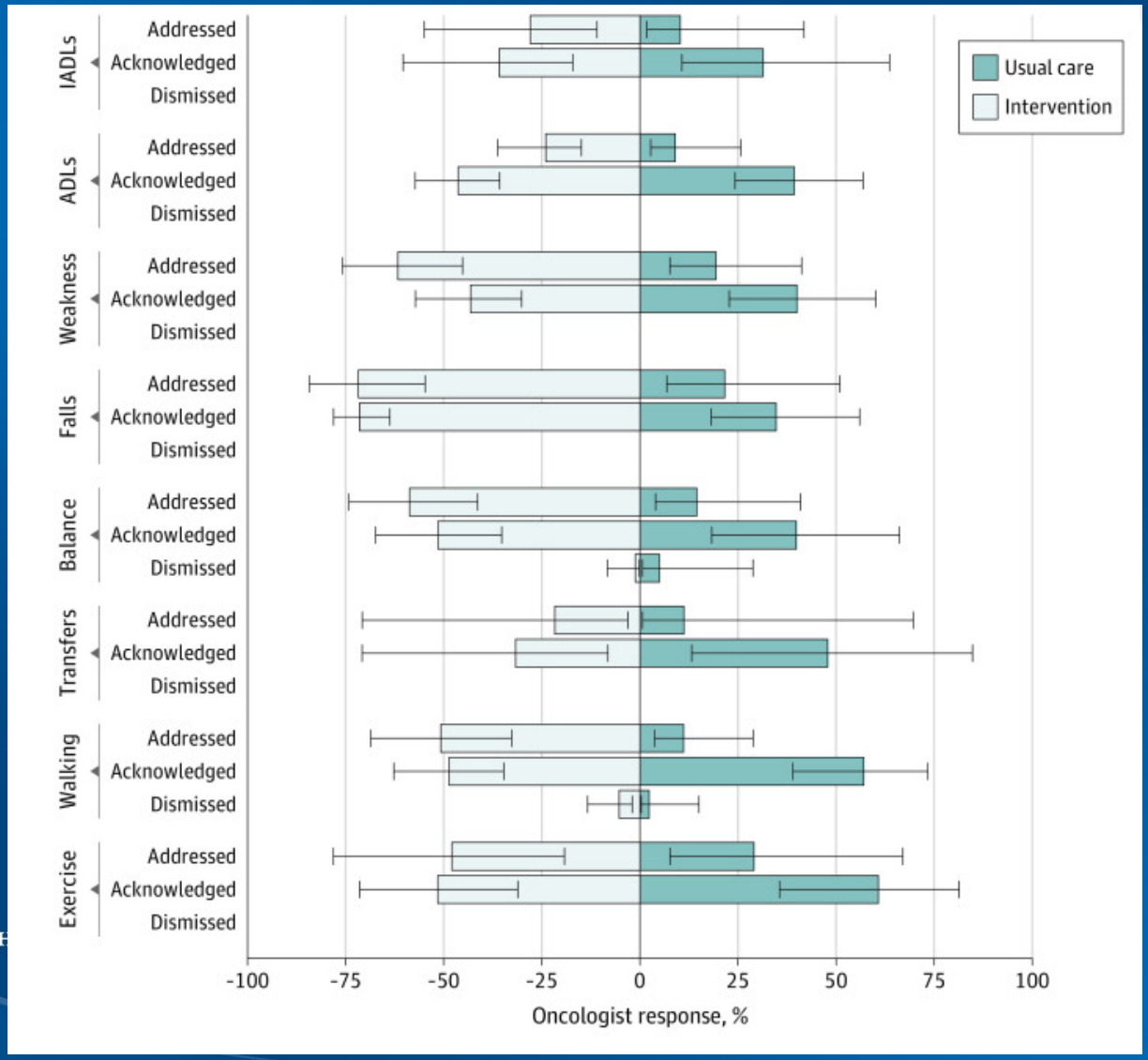
Mohile et al, ASCO 2018; JAMA Onc 2019

Geriatric Assessment Improves Conversations about Geriatric Domains

Function and Physical Performance Conversations



Battaglia-Jensen et al., JNCCN 2022

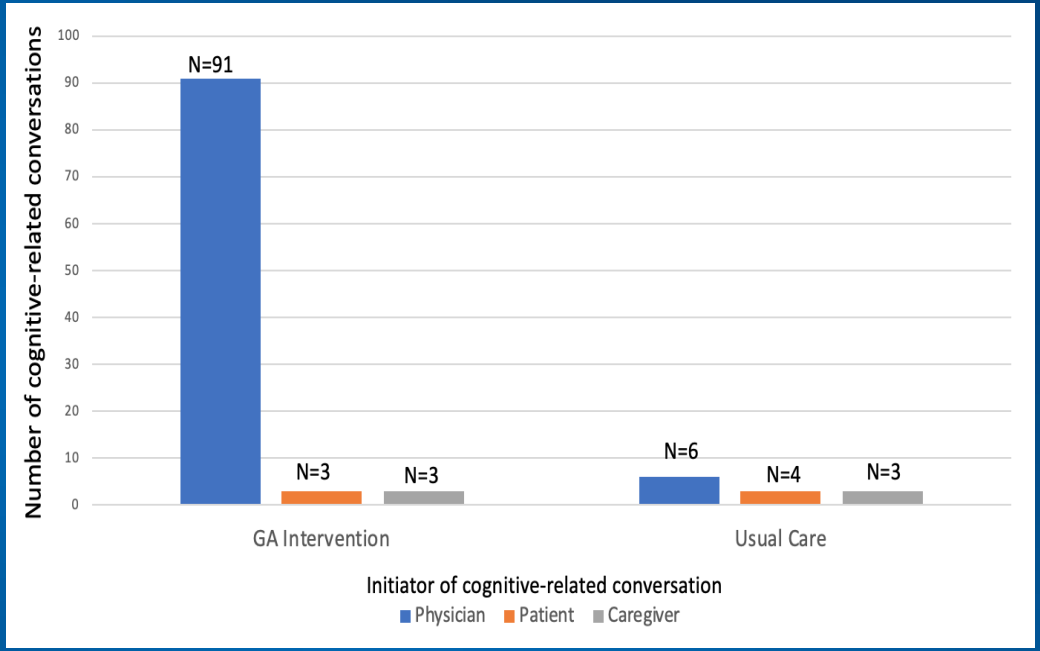
Communication About Cognition

Of the 175 patients with abnormal cognitive screen:

- Mean age: 78 years
- Male: 54.3%
- >HS Education: 61.4%
- Condition:
  - 101=Intervention arm
  - 74=Usual Care

Conversations about cognition were more likely in the GA intervention arm

- 63.4% vs 12.1%; p<0.0001
- Majority oncologist initiated (overall 88.2%)



Patients randomized to the intervention were significantly more likely to have the cognitive conversation initiated by the oncologist (OR 20.22; 95% CI 3.66-111.78).

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Magnuson, ASCO 2021

Quality of Cognitive Conversations

Oncologist discussing cognitive concerns with older patients with cancer and their caregivers. All patients in examples had an abnormal cognitive screening evaluation.
P=Patient; C=Care Partner; D=Doctor

Example #1: Limited exploration of caregiver and patient cognitive concerns and how cognitive problems affect function and independence.

C: *But her – her memory has not been real good before she had cancer to start* with.
P: *And now it's worse.*
C: *I'd noticed that, you know, couple years. And it's not getting any better.*
D: *Aha.*

Example #2: Incorporating cognition as a potential treatment risk but limited integration of cognitive-related goals in the context of cancer treatment decision-making.

D*: When you get sick, when you go through a lot of stress, particularly chemotherapy, this could get unmasked. Memory problems. Even dementia. This may be temporary because of the stresses you are going through but it becomes manifest whenever you are going through treatment…*
P: *That's not permanent, is it?*
D. *Yes, so that weakness that you have? You may actually lose track of time. Lose sleep. And then you may actually feel like you are confused sometimes but it should bounce back. It may get better.*

Example #3: Caregiver uncertainty about expressing cognitive concerns.

D (to caregiver): *Okay, have you noticed anything? Gone bonkers on you?*
C: *She's been – no.*
D: *Okay.*

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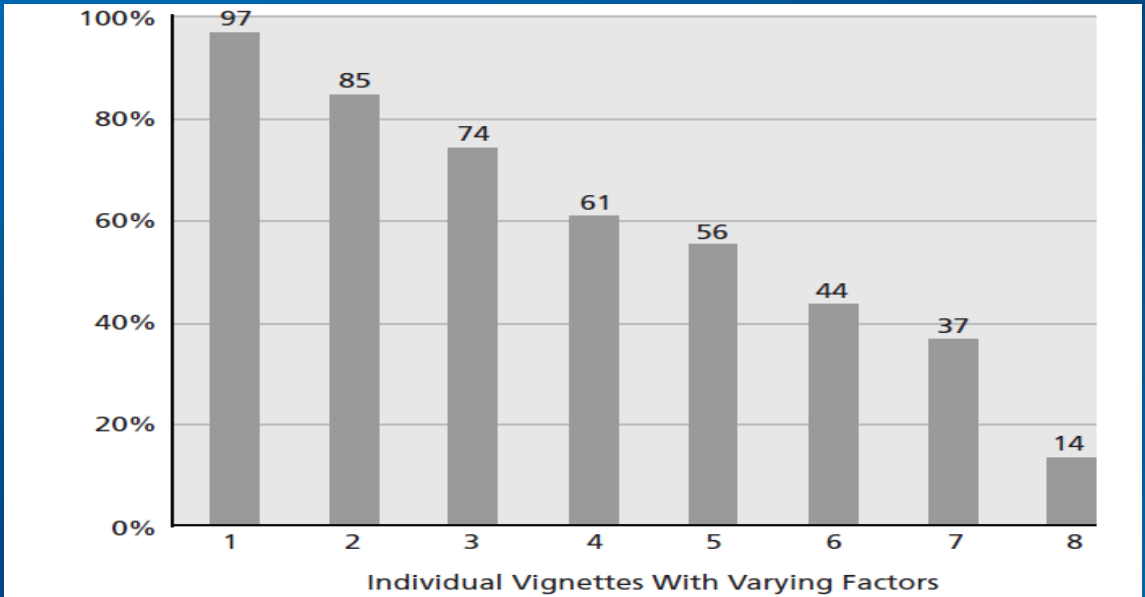
Magnuson, SIOG, 2019

How does the Geriatric Assessment Influence Oncologist Decision-Making?

Percentage of Oncologists who Recommend Chemotherapy for an Older Vignette Patient with Advanced Pancreatic Cancer



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Mohile, Magnuson et al. JNCCN; 2018

Treatment Decisions

Patient Characteristic	Comparison	OR (95%CI)	p-value
		(1.58 to 5.80)	
Cognition	Not impaired vs impaired	8.56 (4.20 to 17.44)	<.0001*

23% of oncologists surveyed reported using elements of geriatric assessment in clinical practice

GA to Reduce Treatment Toxicity

- **Primary Aim:**
  - To evaluate if providing a GA summary with recommendations for management to oncologists reduces **grade 3-5 toxicity** (CTCAE) in patients aged 70+ starting a new regimen with chemotherapy and/or other agents which cause toxicity for advanced cancer
- **Secondary Aims:**
  - **Survival** at 6 months
  - **Treatment decisions**
  - Functional and Physical Performance

CTEP, NCI CTCAE v3.0
General Descriptions of Grade

0	No adverse event or within normal limits
1	Mild Adverse Event (minor; no specific medical intervention; asymptomatic laboratory findings only, radiographic findings only; marginal clinical relevance)
2	Moderate Adverse Event (minimal intervention; local intervention; noninvasive intervention [packing, cautery])
3	Severe and undesirable Adverse Event (significant symptoms requiring hospitalization or invasive intervention; transfusion; elective interventional radiological procedure; therapeutic endoscopy or operation)
4	Life-threatening or disabling Adverse Event (complicated by acute, life-threatening metabolic or cardiovascular complications such as circulatory failure, hemorrhage, sepsis. Life-threatening physiologic consequences; need for intensive care or emergent invasive procedure; emergent interventional radiological procedure, therapeutic endoscopy or operation)
5	Fatal adverse event

PI: Mohile
Funding: NCI
Mohile et al. ASCO, 2020; Lancet 2021

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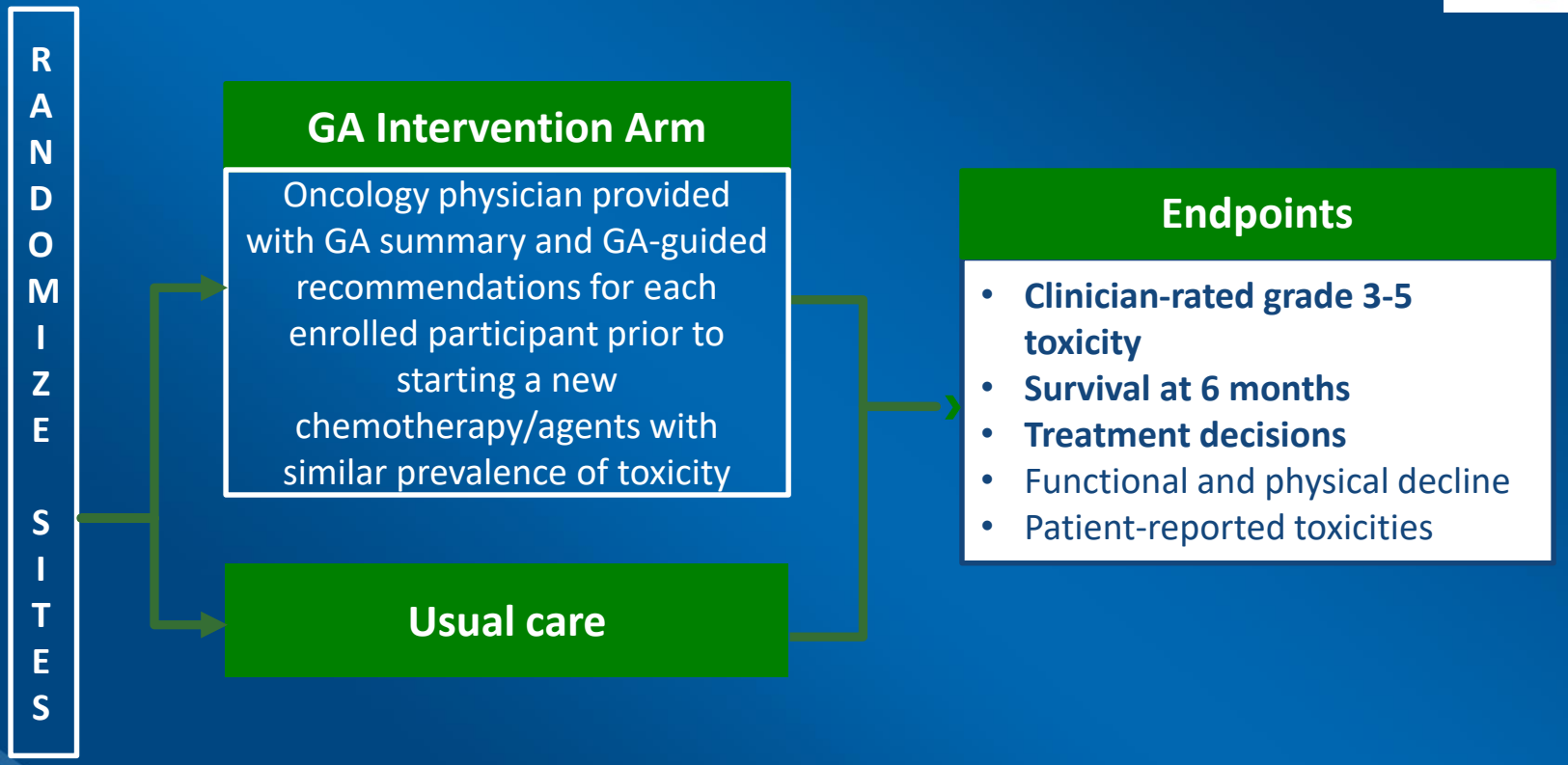
Study Schema

Geriatric Assessment for Patients 70+



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Patient Eligibility and Characteristics

- Age ≥70 years
- Diagnosis of advanced solid tumor or lymphoma
- Have ≥1 GA Domain Impairment (other than polypharmacy)
- Starting a new chemotherapy regimen or another regimen with high risk of toxicity
- Have decision-making capacity, or, if not, oncologist has obtained consent from health-care proxy

	GA Intervention	Usual Care	
	N or Mean (% or SD)	N or Mean (% or SD)	P value
Age	77.2 (5.7)	77.2 (5.2)	0.98
Female	145 (41.5%)	166 (45.0%)	0.35
Race/Ethnicity			<0.01
Non-Hispanic White	281(80.5%)	347 (94.0%)	
African American	40 (11.5%)	12 (3.3%)	
Cancer Type			<0.01
Gastrointestinal	133 (38.1%)	114 (30.9%)	
Genitourinary	56 (16.0%)	53.0 (14.4%)	
Lung	63 (18.1%)	116 (31.4%)	
Stage IV	304 (87.1%)	324 (87.8%)	0.11
Cancer Treatments			0.53
Chemotherapy	305(87.4%)	328 (88.1%)	
Non-chemotherapy	44(12.6)	41(11.1%)	
Prior chemotherapy	104 (30.8%)	81 (22.7%)	0.02

GAP 70+ A BRIDGE TO REDUCE TOXICITIES GERIATRIC ASSESSMENT FOR PATIENTS 70+

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Mohile et al. ASCO, 2020

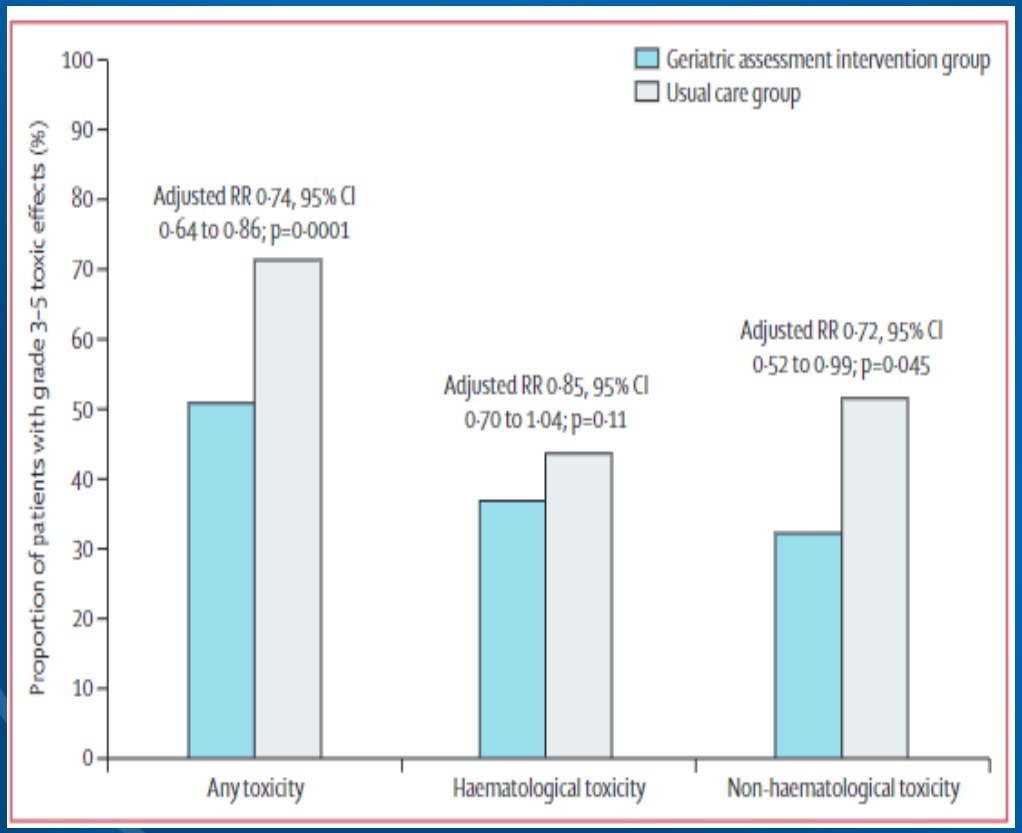
Domains	Tools	Descriptions	Definitions of impairment	Prevalence of the most common GA-guided management recommendations chosen by oncologists in the intervention arm
Physical performance (n=314/349 impaired in intervention arm)	Timed "Up and Go"	Assess mobility over 3 meters; longer time indicates worse performance	> 13·5 seconds	- Conduct frequent toxicity checks (86·0%) - Provide fall counselling hand-out/information (86·0%) - Provide information on exercise and exercise prescription (83·.4%) - Provide hand-out on energy conservation (82·5%) - Medication Review: minimize psychoactive meds including those used for supportive care (36·6%); minimize duplicative medications (47·8%) - Treatment modification: consider modification of treatment dose or choice. Examples: 1) consider single agent rather than doublet therapy if appropriate (33·4%): 2) modify dosage (e.g., 20% dose reduction with escalation as tolerated)(46·8%); 3) modify treatment regimen (e.g., use an option with demonstrated safety and efficacy in older and/or frail adults)(49·4%) - Referrals: refer to 1) physical therapist (outpatient or home-based depending on eligibility for home care) (23·6%); 2) occupational therapist (11·1%); 3) aide services (14·3%); 4) personal emergency response information (19·7%); 5) vision specialist if difficulties (12·1%) - Physical Examination: check orthostatic blood pressure (29·3%) and decrease or eliminate blood pressure meds if blood pressure is low or low normal (21·3%)
	Short Physical Performance Battery	Assess balance, gait speed, and strength; higher score indicates better performance (range 0-12 points)	≤ 9 points	
	Falls History	Assess the number of falls	Any history of falls in the prior 6 months	
	OARS Physical Health	Assess any limitation in activities (e.g. climbing several flights of stairs, walking more than a mile) as a result of his/her health (options: a lot, a little, not at all)	If the patient answered any question as "a lot"	

GA Intervention

Management Recommendations Example: Physical Performance

Recommendations	Recommended		Implemented?	Implemented by	
	Yes	No	Enter Reason Code	Physician	Staff
1. Referrals:					
A. Physical Therapy (outpatient or home-based depending on eligibility for home care): request gait/assistive device evaluation, strength and balance training.	☐	☐	☐	☐	☐
B. Occupational therapy (if eligible for home care, OT referral to do safety evaluation).	☐	☐	☐	☐	☐
C. Aide services (SW may be able to assist).	☐	☐	☐	☐	☐
D. Personal Emergency Response information (PERS) especially if alone at any time while receiving treatment (SW may be able to assist).	☐	☐	☐	☐	☐

Any Grade 3-5 CTCAE Toxicity in 3 Months



- **Any Grade 3-5 Toxicity**
  Adjusted Risk Ratio: 0.74
  95% CI: (0.63-0.87), P < 0.01
  Clustering effect: P = 0.15
- **Any Grade 3-5 Hematologic Toxicity**
  Adjusted Risk Ratio: 0.85
  95%CI: (0.69-1.05), P = 0.13
  Clustering effect: P = 0.30
- **Any Grade 3-5 Non-hematologic Toxic**
  Adjusted Risk Ratio: 0.73
  95% CI: (0.53-0.996), P = 0.047
  Clustering effect: P < 0.01

A BRIDGE TO REDUCE TOXICITIES
GAP 70+
GERIATRIC ASSESSMENT FOR PATIENTS 70+

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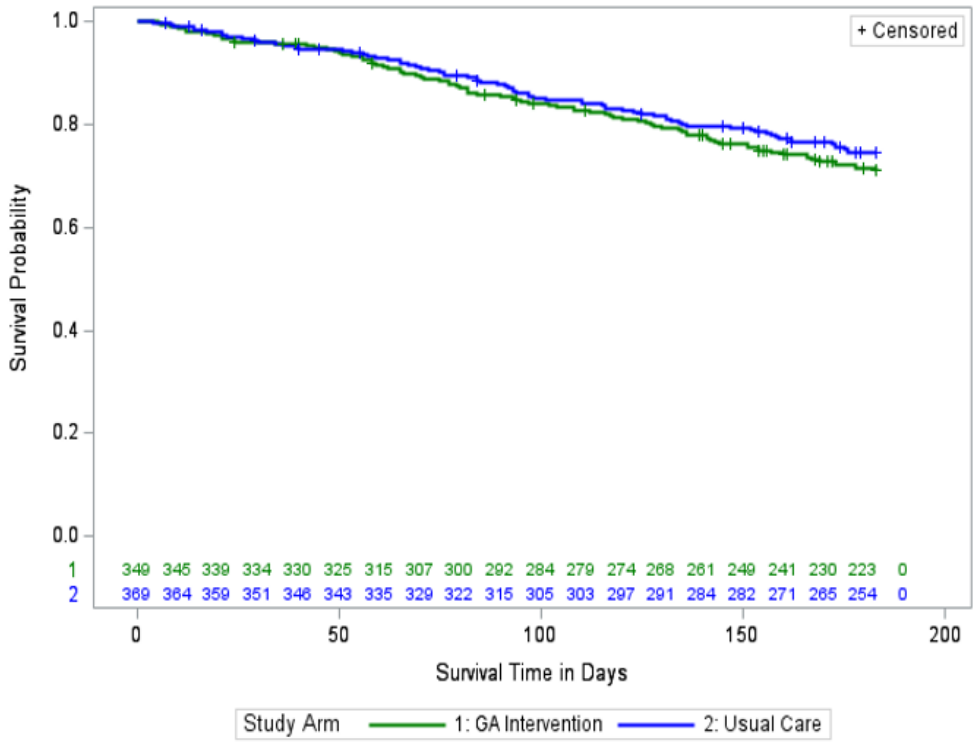
Mohile et al., Lancet 2021

Survival



- **Survival at 6 month based on Kaplan Meier Estimates**

  GA Intervention: 71.3% (66.2%- 75.9%)

  Usual Care: 74.3% (69.5%-78.6%)

  P = 0.33

- Adjusted Hazard Ratio: 0.87

  95% CI: (0.65-1.15), P = 0.33

  Clustering effect: P = 0.04

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Mohile et al. ASCO, 2020; Lancet 2021

Mechanism

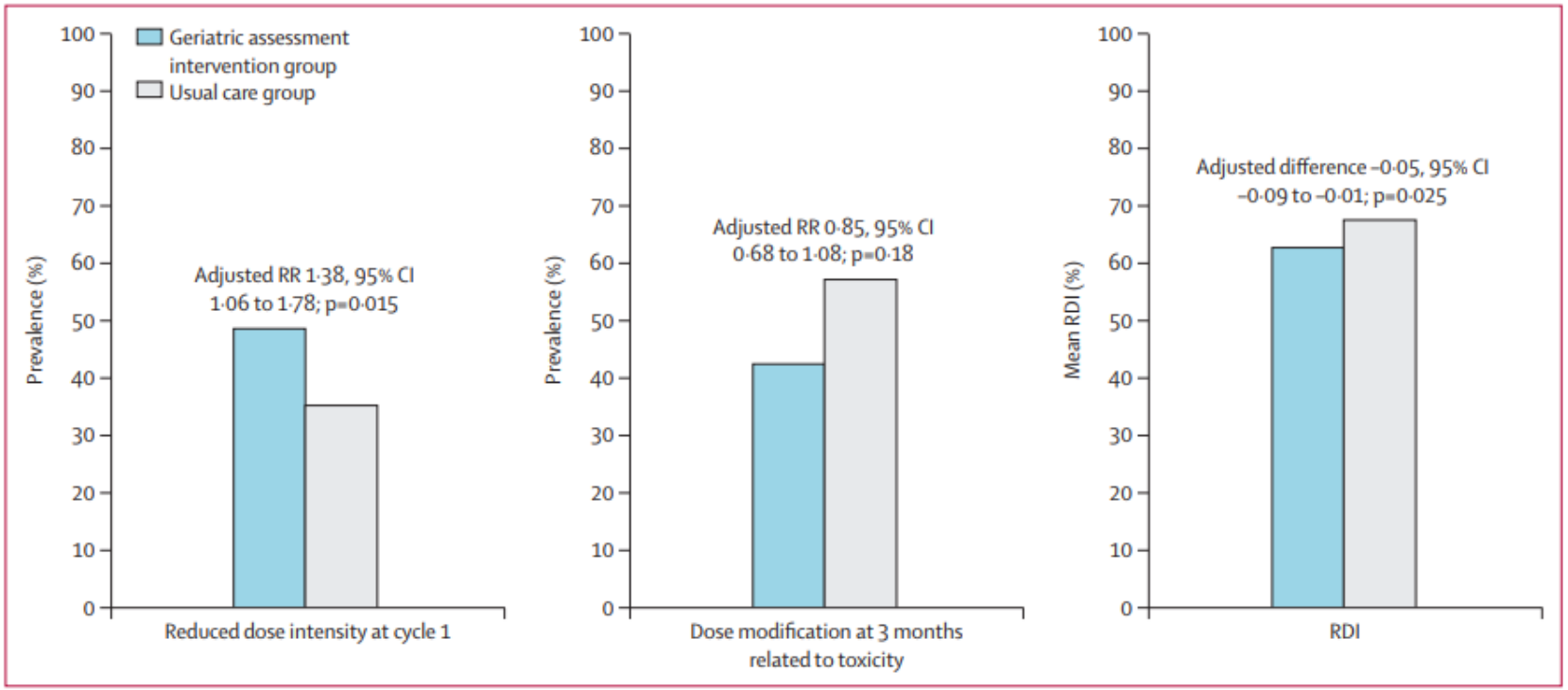


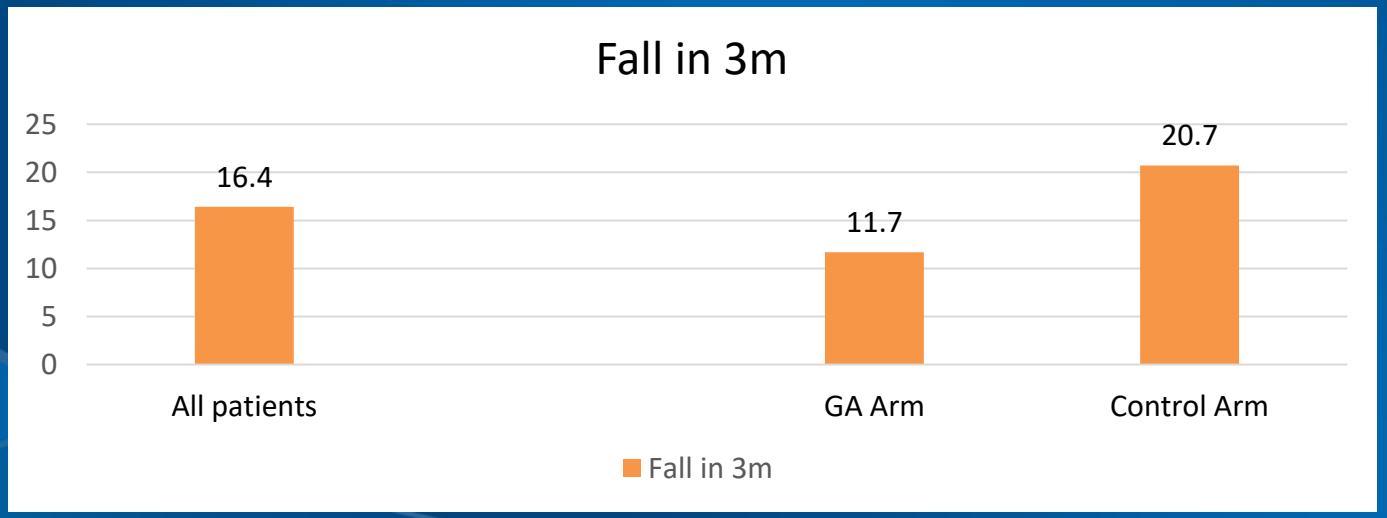
***Figure 3*: Treatment intensity by study group**

(A) Prevalence of reduced treatment intensity at cycle 1. (B) Prevalence of dose modifications over 3 months. (C) RDI over 3 months. RDI=relative dose intensity. RR=risk ratio.

Mohile et al., Lancet 2021

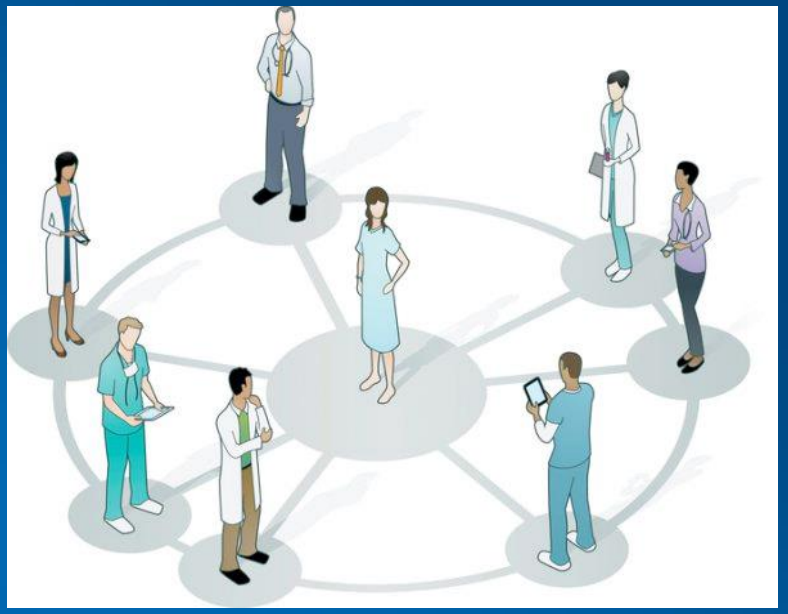
GA Intervention Improves Falls over 3 months

All Events: 103/627=16.4% GA Arm: 35/298=11.7% Control Arm: 68/329=20.7%	**Risk Ratio**	**95% CI**	**P-value**	**P-value for cluster effect.** Do results differ by site?
Unadjusted	0.58	(0.40-0.84)	0.004	N/A
Clustered Standard error	0.58	(0.45 - 0.75)	P<0.001	N/A
Bootstrap Standard error	0.58	(0.40 - 0.84)	0.004	N/A



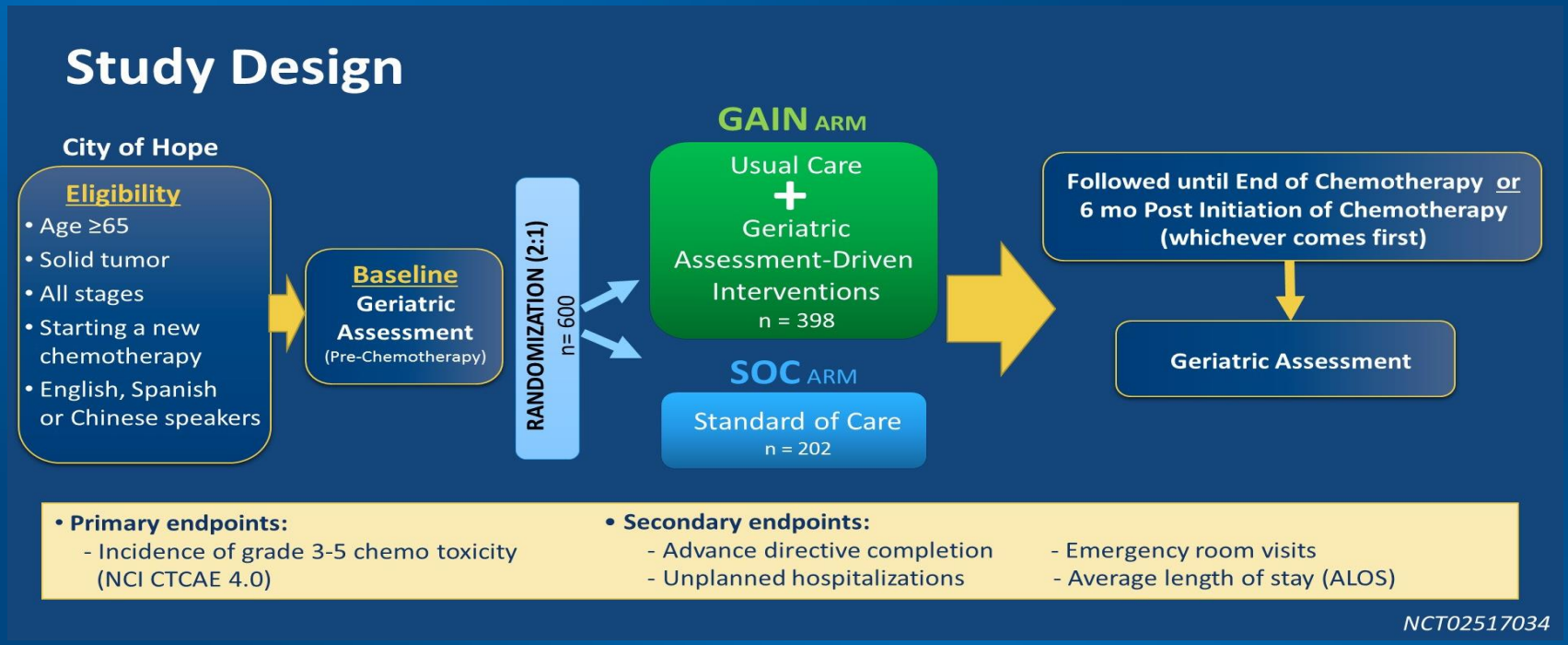
Alternative Models of Care

Infuse geriatrics principles indirectly



Direct involvement of geriatrics expertise in oncology care model

GAIN Trial



- Prospective randomized trial
- Single US cancer center
- Enrolled patients aged 65+ with solid malignancy starting new chemo
- Randomized patients to GAIN vs SOC

Li, et al. JAMA Oncology, 2021

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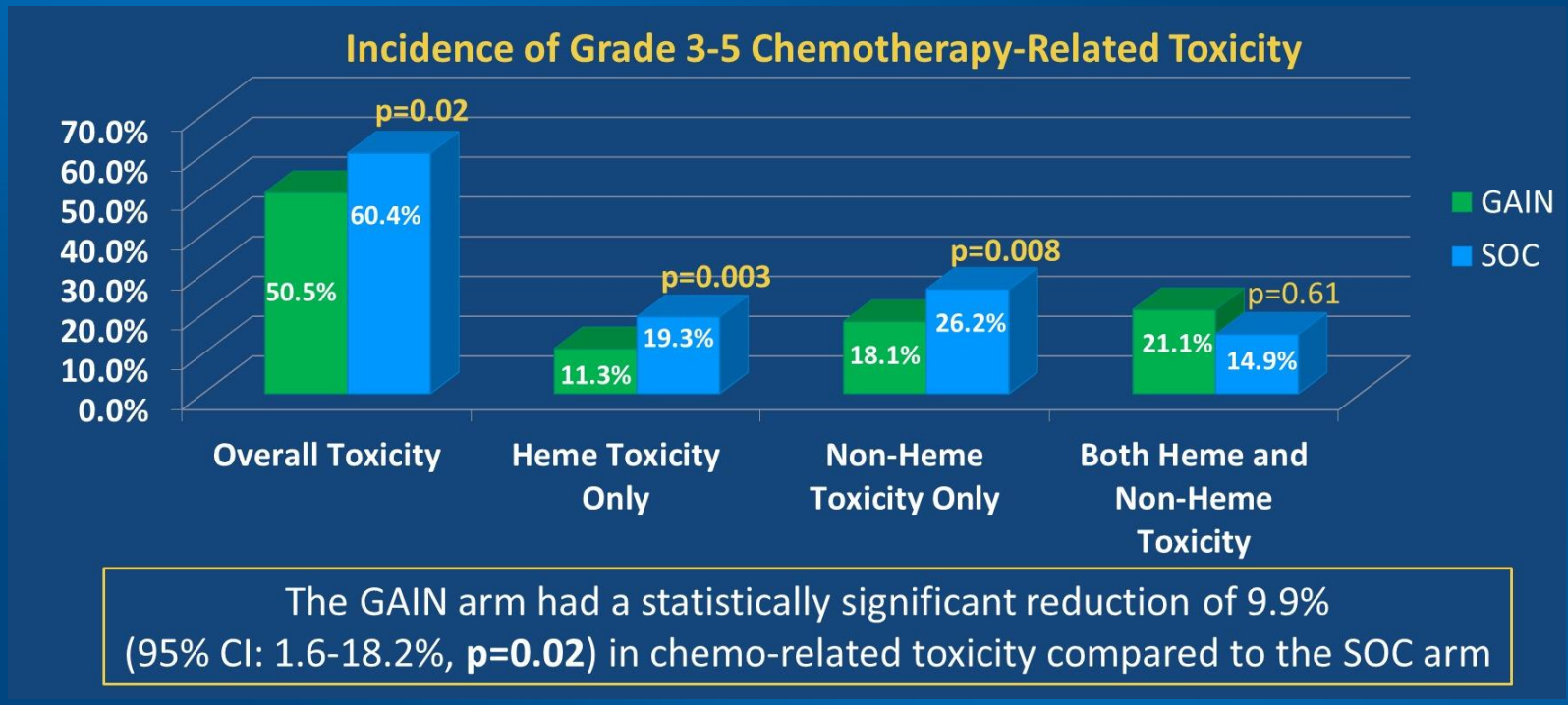
GAIN
GA and Interventions

Figure 2. Geriatric Assessment–Driven Intervention (GAIN) Used in This Study

Domain	Deficit	Interventions
Functional status	• Limitations in activities of daily living and/or instrumental activities of daily living • History of falls • Timed Up and Go >13 s • Lack of energy	• Exercise prescription • Evaluate fall risk • Home safety evaluation • Gait strengthening • Reiki therapy
Comorbidities	• Presence of comorbid conditions • Hearing/visual impairments	• Management with treating physician or primary care • Referrals as appropriate • Pharmacy review of medications
Psychological status	• Feeling sad or depressed • Anxiety • Feeling nervous/worried	• Social work counseling • Psychiatry referral • Psychology referral • Chaplaincy referral • Support programs
Social activity	• Interference of physical or emotional problems on social activity	• Evaluation of physical/emotional concerns • Social work referral • Occupational therapy
Social support	• Lack of social support identified • Patient lives alone	• Counseling • Social work referral • Home safety evaluation • Support programs • Community resources
Nutrition	• Weight loss ≥5% • Body mass index ≤21 or ≥30 • Problems with eating or feeding	• Diet recommendations • Supplements • Oral care • Physical/occupational therapy for food intake problems
Cognition	• Abnormal cognitive screening • Confusion • Memory loss/impairment	• Assess decision-making capacity • Involve caregivers • Review of medications • Delirium prevention • Cognitive testing
Polypharmacy	• ≥5 Prescribed medications • ≥1 Over-the-counter medication • ≥1 Herb/vitamin supplement	• Recommendations regarding drug interactions, potentially inappropriate medications, duplicative medications

Li, et al. JAMA Oncology, 2021

Results: Primary Aim



The GAIN arm had a statistically significant reduction of 9.9% (95% CI: 1.6-18.2%, **p=0.02**) in chemo-related toxicity compared to the SOC arm

Li D et al. J Clin Oncol 38: 2020 (suppl; abstr 12010)

Li, et al. JAMA Oncology, 2021

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Geriatric Assessment-Driven Interventions ↓ Toxicity Risk

GAIN STUDY (n = 605) – JAMA Oncology

Key finding:

- GA-driven INterventions (GAIN) **reduced grade 3+ chemo-related toxicity (↓10%)**
- **Improved advance directive completion in older adults with cancer (↑24%)** compared to standard of care (SOC).
- Survival no different at 12 months.

GAP70+ STUDY (n = 718) – Lancet

Key finding:

- A GA summary with management recommendations provided to the oncologist prior to the start chemo **reduces grade 3+ toxicity (↓20%)** over 3 months.
- Survival no different at 6 months.
- **Falls and polypharmacy ↓.**

Li, et al. JAMA Oncology, 2021

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GA systematic review and meta-analysis

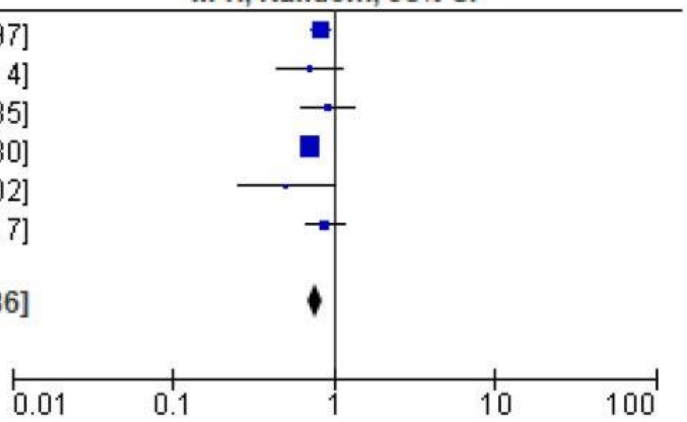
17 RCTs (6 including toxicity outcome)

Risk of treatment toxicity:

Study or Subgroup	CGA Events	CGA Total	Usual care Events	Usual care Total	Weight	Risk Ratio M-H, Random, 95% CI
Li 2021	203	402	123	203	33.2%	0.83 [0.72 to 0.97]
Lund 2021	20	71	28	71	4.5%	0.71 [0.45 to 1.14]
Magnuson 2018	21	37	21	34	6.5%	0.92 [0.62 to 1.35]
Mohile 2021	177	349	263	369	42.5%	0.71 [0.63 to 0.80]
Nadaraja 2020	9	48	17	46	2.1%	0.51 [0.25 to 1.02]
Puts 2022	54	153	65	162	11.3%	0.88 [0.66 to 1.17]
Total (95% CI)		**1060**		**885**	**100.0%**	**0.78 [0.70 to 0.86]**
Total events	484		517			

Heterogeneity: Tau² = 0.00; Chi² = 5.82, df = 5 (*P* = .32); *I*² = 14%

Test for overall effect: Z = 4.92 (*P* < .00001)



No differences observed in mortality, hospitalization, early treatment discontinuation, initial or subsequent dose reduction

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Anwar, et al. JNCI, 2023

Study	Design	Population	Intervention Delivery	Management Strategy	Outcomes
Mohile et al. -community oncology practices affiliated with University of Rochester NCORP Research Base	Cluster randomization by oncology practice COACH: n=542; GAP n=700	age 70+ with advanced solid tumor malignancies	**GA summary results and recommendation given to oncology team**	Established protocol based on Delphi consensus panel and guidelines	**COACH: Communication, Satisfaction; GAP70+: Chemo toxicity (Gr3+),** Survival, Function POSITIVE
Li et al. -City of Hope	2:1 Patient randomization n=600	age 65+ with any stage solid tumor malignancies starting a new chemo regimen (any line)	**Study NP in collaboration with the primary oncologist and clinic nurse to follow up**	Established protocol based on multidisciplinary team input and triggers based on GA results	**GAIN:** Endpoints: **Chemo toxicity (Gr3+); Rate of hospitalization; Change in functional status; Change in psychosocial status** POSITIVE
Soo et al. -mult-center study in Australia	1:1 Patient randomization N=150	age 70+ with cancer planned for chemotherapy, targeted therapy, and immunotherapy	**Geriatrician-led longitudinal co-management**	Clinical expertise	**QoL;** function, mood, nutrition, health utility, treatment delivery, healthcare utilization and survival POSITIVE
Puts et al. -multi-center study of centers in Canada	Patient randomization n=350	age 70+ with most solid tumor malignancies starting first/second line chemotherapy	**Geriatric oncology with nurse follow up**	Established protocol based on Delphi consensus and guidelines	**QoL;** Cost-effectiveness; Function; Chemo tox; Satisfaction; Cancer tx changes; Survival NEGATIVE

ASCO Guideline update

ASCO Special Articles

Practical Assessment and Management of Vulnerabilities in Older Patients Receiving Systemic Cancer Therapy: ASCO Guideline Update

William Dale, MD, PhD[1]; Heidi D. Klepin, MD, MS[2]; Grant R. Williams, MD, MSPH[3]; Shabbir M.H. Alibhai, MD[4]; Cristiane Bergerot, PhD[5]; Karlynn Brintzenhofeszoc, PhD, MSW[6]; Judith O. Hopkins, MD[7]; Minaxi P. Jhawer, MD[8]; Vani Katheria, MS[9]; Kah Poh Loh, MBBCh BAO, MS[10]; Lisa M. Lowenstein, PhD[11]; June M. McKoy, MD, MPH, JD, MBA[12]; Vanita Noronha, MD[13]; Tanyanika Phillips, MD[14]; Ashley E. Rosko, MD[15]; Tracy Ruegg, PhD, ANP[16]; Melody K. Schiaffino, PhD[17]; John F. Simmons Jr, MD[18]; Ishwaria Subbiah, MD[19]; William P. Tew, MD[20]; Tracy L. Webb, PA-C[21]; Mary Whitehead, BFA[22]; Mark R. Somerfield, PhD[23]; and Supriya G. Mohile, MD, MS[10]

DOI https://doi.org/10.1200/JCO.23.00933

Dale, et al. JCO, 2023

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PROs,
Symptom science

Polypharmacy,
Data Science

Aging biomarkers,
health equity,
frailty interventions

ED-based
cancer care
interventions

Communication,
advanced care
planning

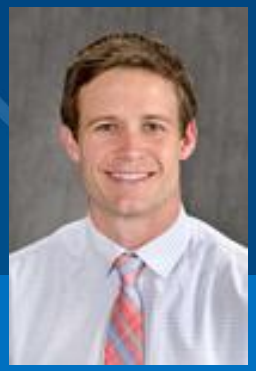
Cancer
caregiver
interventions

GA-guided cancer
treatment modifications

Where are we going?

GA in survivorship
(among everything else)

Mental health and
social support
interventions



GA implementation
in oncology

Cancer-related cognitive
decline, dementia and cancer
interface

Digital health interventions,
exercise interventions,
decision-making

Social support,
treatment tolerability

University of Rochester Geriatric Oncology Research Program

https://www.urmc.rochester.edu/labs/geriatric-oncology.aspx

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