# A Randomized Trial of Real-Time Geriatric Assessment Reporting in Nonelectively Hospitalized Older Adults with Cancer

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*Disclosures of potential conflicts of interest may be found at the end of this article.*

**Key Words.** Geriatric assessment • Geriatric oncology • Cancer and aging

## Abstract

***Background.*** Hospitalized older adults have significant geriatric deficits that may lead to poor outcomes. We conducted a randomized trial to investigate the effectiveness of providing clinicians with a real-time geriatric assessment (GA) report in nonelectively hospitalized older patients with cancer.

***Subjects, Materials, and Methods.*** We developed a web-based software platform for administering a modified GA (Cancer 2005;104:1998–2005) to older (>70 years) nonelectively hospitalized patients with pathologically confirmed malignancy. Patients were randomized to have their GA report provided to their treating clinicians (Intervention arm) or not provided (Control arm).

***Results.*** Our study included 135 patients, median age 76 years, 52% female, 75% white, 21% black, 79% greater than high school education, 59% married, and 17% living alone. All patients had at least one GA-identified deficit, including physical function deficits (90%), cognitive impairment (22%), >5 comorbidities (28%), polypharmacy (>9 medications; 38%), weight loss ≥10% in the past 6 months (40%), anxiety (32%), or depression (30%). There was no difference between the Intervention (6%) and Control arms (9%) in the proportion of patients who were referred by their clinical team for an intervention to address a deficit ($p$ = .53).

***Conclusion.*** Many older nonelectively hospitalized patients with cancer have geriatric deficits that are amenable to evidence-based interventions. Real-time GA reports provided to the care team prior to discharge did not influence provider referral for such interventions. There is a need for systems-level interventions to address deficits in this vulnerable patient population. ***The Oncologist*** 2020;25:488–496

**Implications for Practice:** Geriatric deficits are common in hospitalized older adults with cancer and lead to poor outcomes. Addressing modifiable deficits represents an appealing way to improve outcomes. Widespread geriatrician consultation is impractical owing to resource and personnel constraints. This work tested whether prompt delivery of a mostly self-administered, web-based geriatric assessment report to clinicians improved referral rates for evidence-informed interventions. It confirmed frequent geriatric deficits and high readmission rates in this population but found that real-time geriatric assessment reporting did not influence provider referral for evidence-informed interventions on geriatric assessment identified deficits. These findings highlight the need for systems-level intervention to improve outcomes in this vulnerable patient population.

## Introduction

Cancer is largely a disease of aging, with most new cases diagnosed in older persons [1]. As the U.S. population ages, the absolute number of older adults with cancer will increase [2]. Older patients with cancer are commonly hospitalized for factors related to their cancer, cancer therapy, or comorbid illnesses [3]. Hospitalized older patients with cancer have a high burden of baseline age-related impairments and can develop new deficits during hospitalization [4]. These deficits can accumulate, can worsen with each hospitalization [3], and may lead to increased disability, functional decline,

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institutionalization, poor quality of life (QoL), and increased risk of mortality [5, 6]. To maximize cancer care outcomes and potentially reduce unnecessary readmissions in older hospitalized patients with cancer, it is important for timely identification of deficits to occur and actions to be taken to address these deficits.

Geriatric assessment (GA) can identify occult age-related impairments that are associated with poorer quality of life, reduced treatment tolerance, and shortened survival in older patients with cancer [7–10]. Some GA-identified deficits are potentially modifiable through timely interventions, such as referral to physical therapy or occupational therapy when recurrent falls are identified. Timely interventions, in turn, may improve cancer prognosis and QoL [11, 12]. Among studies evaluating GA in the inpatient setting, the focus has been on electively hospitalized patients with cancer, where time and resources may be available to address deficits ahead of time [13], or on specialized acute care for elders units, which may not be widely available or well suited to the needs of complex medical and surgical oncology patients requiring chemotherapy or specialized postoperative care [3, 14].

In routine practice, older patients with cancer are often hospitalized for nonelective reasons and admitted to diverse hospital settings predicated on bed availability and hospital practice. In this vulnerable patient population, using GA to identify patient deficits and encourage timely intervention on GA-identified deficits represents a potentially scalable, "real-world" mechanism for improving outcomes in older patients with cancer. The inpatient setting presents a unique opportunity for intervention, given the availability and ease of access to supportive services to address multiple deficits during a single hospital encounter. Preliminary work by our group has demonstrated the feasibility of conducting GA in nonelectively hospitalized older patients with cancer [4]. Secondary objectives of the study included describing GA-identified deficits, assessing the extent to which clinicians recognized and addressed deficits, and determining 30-day readmission rates. Our pilot study found that these patients have a high burden of functional deficits (53% reported physical function deficits, 63% instrumental activities of daily living [IADL] deficits, 34% falls, and 12% depression; 31% had ≥10% weight loss, and 12% screened positive for cognitive impairment), which are inadequately documented (clinician documentation ranged from 20% to 46% for various deficits), evaluated, and addressed by clinicians. Our prior study also found readmission rates (29%) in patients with deficits that were almost double the overall average among Medicare beneficiaries [4].

In our previous study, GA results were not provided to treating clinicians. Therefore, the logical next step was to provide clinicians with a "real-time" GA report with specific recommendations for referrals to auxiliary/supportive service and to evaluate the impact of these timely reports and associated referrals on key outcomes. We have conducted a randomized trial with the objective of testing whether a real-time GA report that identifies deficits and recommends proven interventions leads to improved outcomes compared with usual hospital care in older nonelectively hospitalized adults with cancer. Our primary objective is to compare the rate of referral for intervention on GA-identified deficits in the Intervention and Control groups.

## Subjects, Materials, and Methods

We conducted a two-arm randomized controlled trial to assess the impact of providing clinicians with a brief, user-friendly, real-time GA report including recommendations for evidence-informed interventions on the care of older nonelectively hospitalized patients with cancer. The primary objective of the study was to compare the rate of referral for intervention on GA-identified deficits in the Intervention and Control groups. We explore readmission rates in both groups.

### Geriatric Assessment Reporting in Real Time (GARRT)

The GA used in our study was developed by Hurria and colleagues [15] and has been widely used in both clinical trial and practice settings [9, 16]. It includes validated measures of function, cognition, comorbidity, nutrition, and psychosocial functioning (supplemental online Appendix 1). The GA was modified to include additional important patient-reported variables and for safety of administration in the inpatient setting (Table 1). Specifically, the Timed Up and Go test was removed from the GA because it was found to be impractical and potentially unsafe in the inpatient setting. The Medical Outcome Study measure [17] was replaced with the Older Americans Resources and Services activity of daily living (ADL) physical function measure, which enables a more detailed appraisal of ADLs. The Patient Health Questionnaire (PHQ-9) depression screen was added to thoroughly assess this mood disorder. Two questions from the Patient-Reported Outcomes Measurement Information System global health measure were added to capture QoL information.

A web-based software program was developed at the University of North Carolina by PRO-Core (https://pro.unc.edu) to administer the GA electronically via mobile tablet or computer. GA measures were electronically scored according to well-established, validated criteria. Evidence-informed cut points were derived from the literature and used to identify patient deficits [9]. Evidence-informed interventions were recommended for each GA-identified deficits. GA data were uploaded to a database "cloud" for analyses in real time (immediately upon completion of the questionnaire by the study participant). The software generated a GA report summarizing GA deficits with appropriate recommendations for evidence-informed interventions. Supplemental online Appendix 1 presents an example of a GARRT report provided to a treating clinician, showing deficits and recommended interventions.

### Patients and Procedures

#### *Eligibility Criteria*

Eligible patients were 70 years and older with pathologically confirmed malignancies who were within 72 hours of a nonelective admission to the University of North Carolina Hospitals. All patients were currently on active cancer directed therapy, had received such therapy within that past 6 months, or were expected to begin therapy within the next 6 months. Patients were excluded if they were diagnosed with acute leukemia or high-grade lymphoma; had less than 6 weeks' estimated life expectancy; were enrolled or planned to be enrolled on hospice; were postsurgery or admitted to the intensive care unit; or had no GA-identified deficits.

Medical and surgical admission lists for general medicine, hospitalist, family medicine, geriatric medicine, neurology,

**Table 1.** Geriatric assessment measures and associated referral recommendations (interventions)

| Domains | Measures | Items | Administration | Range | Cutoffs | Referrals |
|---|---|---|---|---|---|---|
| Function | Karnofsky Performance Status [21] | 1 | Interviewer | 0–100 | ≤80 | Physical and/or occupational therapy |
| | Activities of Daily Living [22] | 7 | Self-administered | 0–14 | <14 | |
| | Instrumental Activities of Daily Living [22] | 7 | Self-administered | 0–14 | <14 | |
| | Karnofsky Self-Reported Performance [23] | 1 | Self-administered | 30–100 | ≤80 | |
| | No. of falls in the last 6 months [24] | 1 | Self-administered | N/A | ≥1 | |
| | Social Activity Limitation Measure (MOS) [25] | 4 | Self-administered | 0–100 | ↑ score = less limited | |
| Comorbidity | No. of comorbid conditions (including vision and hearing loss) [26] | 15 | Self-administered | N/A | ≥4 | Formal geriatric consultation |
| Polypharmacy | No. of medications taken daily [27] | 1 | Self-administered | N/A | ≥9 | Clinical pharmacist |
| Cognition | Blessed Orientation Memory Concentration Test [28] | 6 | Interviewer | 0–28 | ≥11 | Memory disorders clinic |
| Psychiatric | PHQ-9 Depression Inventory [29] | 9 | Self-administered | 0–27 | ≥10 | Psychosocial support team |
| | 13-Item Mental Health Index (MHI-13) [17] Depression and Anxiety subscores [30–32] | 13 | Self-administered | T-score | T ≥ 57.8 T ≥ 55.1 | |
| Psychosocial | Social Support Survey (MOS) [25] | 12 | Self-administered | 0–100 | ↑ score = ↑ support | Psychosocial support team |
| | PROMIS Global Health / Quality of life measures [33] | 2 | Self-administered | Excellent–Poor | Fair or poor | |
| Nutritional | Body mass index [34] | 1 | Interviewer | N/A | <18.5 | Nutritionist |
| | Unintentional weight loss in 6 months [35] | 1 | Self-administered & Interviewer | N/A | ≥10% body weight | |

Abbreviations: MOS, Medical Outcomes Study; N/A, not applicable; PHQ-9, Patient Health Questionnaire; PROMIS, Patient-Reported Outcomes Measurement Information System.

physical medicine and rehabilitation, psychiatry, and urology were customized with criteria-specific screening parameters to aid in the efficient and accurate identification of potentially eligible patients. Treating clinicians of potential study participants were identified based on authorship of recently entered clinical notes and/or orders and approached by research staff for their assent to approach identified patients. Patients provided written informed consent meeting all institutional, state, and federal guidelines (NCT03951090). Trained research staff administered the GA to consented participants and provided assistance such as reading the questionnaire items or recording responses, if needed. Height, weight, and demographic data were abstracted from the electronic medical record (EMR).

### *Randomization*

A randomization schedule was developed by the study statistician, and study participants were randomized to have their GA report provided (Intervention group) to the treating clinician within 24 hours of administration or not provided to the clinician (Control group). Treating clinicians were defined as an attending physician, fellow, resident, intern, nurse practitioner, or physician assistant member of the patient's primary care team. Treating clinicians for Control group participants were notified if a patient screened positive for cognitive impairment or suicidal ideation but otherwise were not provided with any further information regarding GA-identified deficits or specific recommendations for interventions. For participants in the Intervention arm, the GA report was primarily hand delivered to treating clinicians, but e-mail delivery was also allowed in the event that hand delivery was not feasible.

### *Electronic Medical Record Review*

Research staff reviewed the EMR to identify readmissions and referrals to supportive services as evidenced by written documentation and/or clinician orders as well as patient encounters with ancillary services with documentation of a referral. To account for readmission or referrals outside of our health care system, a follow-up phone survey within 30 days of discharge was used to directly elicit from patients whether they had received supportive services at an outside institution after discharge.

### *Clinician Satisfaction*

Within 30 days of receiving the GA report, Intervention group clinicians were asked to complete a survey evaluating their satisfaction with the GA report.

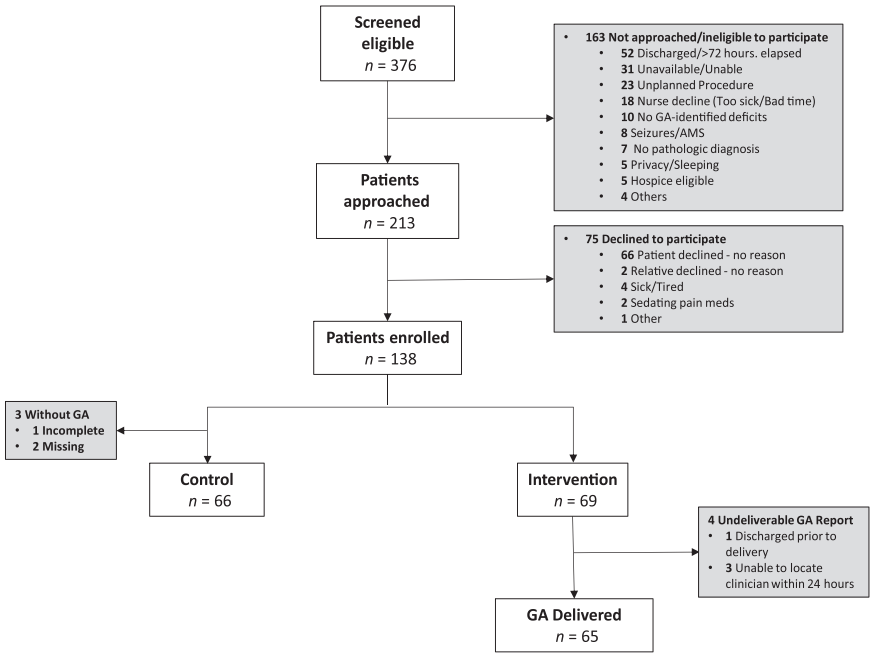


**Figure 1.** Consort diagram.
Abbreviations: AMS, altered mental status; GA, geriatric assessment.

### Statistical Analysis

In our previous study [4], 91% of patients had at least one GA-identified deficit; thus, we assumed that few patients in the current study would have no deficits. Therefore, patients with no GA-identified deficits were deemed ineligible. In our prior study, we found that referrals for GA-identified deficits ranged from 8% for psychosocial support services for patients reporting depression to 52% for physical and/or occupational therapy in patients with IADL impairment [4]. Therefore, assuming a 20% difference (10% in Control vs. 30% in Intervention arm) in the percentage of referrals between the arms, a Fisher's exact test with a .05 two-sided significance level was planned, in order to have 80% power to detect this 20% difference with a sample size of 69 in each group. Descriptive statistics were used to characterize the sample and GA-identified deficits. SAS statistical software version 9.3 (SAS Institute Inc., Cary, NC; http://www.sas.com) was used for analyses.

## Results

### Recruitment

Over a 2-year period (April 25, 2016, to April 7, 2018), 376 patients screened eligible for participation in the study (Fig. 1). Of these, 163 were not approached because of pragmatic reasons including hospital discharge; unavailability or unable (away from the hospital unit, etc.) to participate in the study; provider-related reasons such as difficulties in discerning the appropriate clinician within the medical team owing to extensive consulting and clinician notes; clinician reluctance to approve patient participation because of perceived additional responsibility and liability concerns; nursing staff concerns about the timing of approach (bad time) or patient welfare (too sick); and eligibility-related reasons including no pathologic cancer diagnosis, no GA-identified deficits, or falling outside of the 72-hour eligibility window. Of the remaining patients who were approached for study participation, 75 declined participation (65% participation rate). Lack of interest, time, and ability and perceived lack of direct benefit by some patients were the main reasons for declining participation. The remaining 138 patients were randomized to Control (66) or Intervention group (69 patients). Three patients in the Control group had incomplete or missing GA data.

### Patient Characteristics

Patient characteristics are summarized in Table 2. The median age was 76 years (range 70–92), 52% female, 75% white, and 21% black, the latter reflecting the population distribution of the state [18]. Most patients had college or higher degrees (58%) and were married (60%). The most frequent cancer diagnosis was genitourinary malignancy (22%), although there was wide variation in tumor types. Most patients came from a personal home setting and were admitted to the hospital during the active phase of cancer treatment. The most common reason for admission was complications of systemic therapy, although 46% were admitted for a variety of disparate reasons (e.g., atrial fibrillation, altered mental status; supplemental online Table 1). The majority of patients were recruited from the inpatient oncology service, but patients from a broad base of medical and surgical services were also included.

### Geriatric Assessment–Identified Deficits

The GA revealed high levels of baseline deficits despite a median self-assessed and interviewer-assessed Karnofsky Performance Status (KPS) of 70% in the Intervention arm and 80% in the Control arm (Fig. 2). Physical function deficits were common, with 90% versus 91% of patients reporting deficits in at least one physical function measure, including one or more IADL deficits (68% vs. 70%), ADL deficits (44%

vs. 77%), and one or more falls (35% vs. 38%) in the Intervention and Control arms, respectively. Patients screened positive for cognitive impairment (22% vs. 35%), depression (PHQ-9: 33% vs. 20%; 5-item Mental Health Index (MHI-5): 33% vs. 27%), and anxiety (29% vs. 33%) in the Intervention and Control arms, respectively. Weight loss was a common finding, with 42% of patients in the Intervention arm and 41% in the Control arm reporting greater than 10% weight loss in the past 6 months. More than half of enrolled patients (58%) had five or more GA-identified deficits.

### GA Reporting and Referrals for Intervention

In the Intervention group, the GA report was successfully hand delivered (two by e-mail) to 94% of treating clinicians. Eighty-eight percent of GA reports were delivered within 24 hours of completion. In most cases, the GA was delivered to the attending physicians (41%) or the senior residents (25%). In other cases, the GA was delivered to junior residents (9%), interns (9%), or other members of the clinical team (10%).

All patients had at least one deficit requiring referral, but only 6% of patients in the Intervention group and 9% of patients in the Control group were referred for evidence-informed interventions. There was no difference in rate of referrals between the Control and Intervention group ($p$ = .53; Table 2). The proportion of referrals made to address GA-identified deficits in both groups varied by domain: physical function (3% vs. 2%), cognitive impairment (1% vs. 3%), polypharmacy (0% vs. 2%), and nutritional deficits (3% vs. 5%; Table 3). No referrals were made for patients with GA-identified anxiety and depression. Patients both with and without GA-identified deficits were referred for multidisciplinary intervention (Fig. 3).

### Discharge and Readmission

The average length of hospital stay for study participants was 5.30 days (SD 6.82, range 1–41) in the Control group and 5.28 days (SD 4.41, range 1–28) in Intervention group ($p$ = .96). The majority of patients lived independently at home prior to admission (90% Control and 97% intervention; Table 1). Whereas most patients returned home without additional support after discharge (72% Control and 73% Intervention), some patients were discharged with home hospice (5% Control and 1% Intervention) or transitioned to skilled nursing facilities (22% Control and 19% Intervention) or inpatient hospice (0% Control and 3% Intervention). Three patients died while hospitalized: one in the Control group and two in the Intervention group.

Complete readmission data were available for 93 of 135 patients (69%). Forty-eight patients (52%) were readmitted within 30 days of discharge (30% in the Control group and 41% in the Intervention group). Most patients were readmitted within the University of North Carolina health care system (89% Control and 85% Intervention). Patients were readmitted to a broad range of medical and surgical services (oncology 26%, medicine 29%, surgery 16%, gynecology 11%, other 21%). The most common reason for readmission was complications of systemic therapy (17% Control and 15% Intervention), although patients were admitted for a variety of reasons (supplemental online Table 2) in the Control (61%) and Intervention (69%) arm. Patients with >4 medical comorbidities were more likely to be readmitted (50% more than four comorbidities vs. 30% four or fewer comorbidities; $p$ = .04). Readmission was not associated with physical function deficits—patient/provider KPS, ADL/IADL impairment and falls ($p$ = .99), polypharmacy ($p$ = .58), nutrition deficits (weight loss >10% and BMI <18.5), or psychosocial dysfunction (MHI depression/anxiety subscales and PHQ-9; $p$ = .28).

### Clinician Satisfaction

Nine of fifty-two clinicians completed the satisfaction survey. Four clinicians felt that the report provided useful information, two did not find the report useful, and three could not recall whether the report provided new information. Five clinicians felt that the report was very or somewhat helpful, two felt that it was neither helpful nor unhelpful, and two did not recall receiving a report. Five clinicians expressed an interest in receiving the GA report for all of their older patients with cancer, whereas four had no opinion.

## Discussion

To our knowledge, this is the first study that investigates whether real-time reporting of results and recommendations from a geriatric assessment is feasible for older nonelectively hospitalized patients with cancer. Despite multiple barriers to patient participation and competing health care concerns, we were able to recruit a large cohort of older nonelectively hospitalized patients with cancer who completed a user-friendly GA. We successfully reported the results from the GA to 94% of treating clinicians, mostly (88%) within 24 hours. The study's recruiting success is attributed to an automated screening process and receptivity of patients and medical providers to study participation. Similar to our previous study, we observed high levels of deficits in all geriatric assessment domains despite patient and research staff perception of preserved function as assessed by KPS [4, 9]. We found no evidence that providing clinicians with the GA report altered their management in terms of referrals of patients for evidence-informed multidisciplinary interventions. This is concerning, as all patients showed evidence of at least one deficit (physical function deficits, cognitive impairment, anxiety, depression, and weight loss), all of which could lead to further functional decline, disability, and poor quality of life and may potentially contribute to readmission, institutionalization, morbidity, or mortality. Such deficits could be easily addressed by simple multidisciplinary intervention such as referral to physical therapy given the widespread availability of such ancillary services and the time available to evaluate patients in the inpatient setting.

Reasons for the lack of referrals for intervention on GA-identified deficits are not clear, although prior research has documented low rates of referral for evidence-informed interventions in older patients with cancer with falls [19]. Our prior work has shown low rates of documentation (53%) for such deficits [4], suggesting at least in the Control group that clinicians may be unaware or not focused on such deficits. Among the few clinicians who responded to the clinician survey, there was a sense from several clinicians that the report did not provide new or useful information. Despite well-documented evidence, it is possible that some clinicians were simply uninformed of the potential benefits of

**Table 2.** Patient characteristics

| Characteristics | Total (*n* = 135), % | Intervention (*n* = 69), % | Control (*n* = 66), % |
|---|---|---|---|
| Age, median (range), years | 76 (70-92) | 75 (70–90) | 77 (70–92) |
| >85 | 5 | 4 | 6 |
| 81–85 | 21 | 16 | 26 |
| 76–80 | 34 | 41 | 27 |
| 70–75 | 40 | 39 | 41 |
| Male | 48 | 51 | 45 |
| Female | 52 | 49 | 55 |
| White | 75 | 77 | 73 |
| Black | 21 | 20 | 21 |
| Other/Unknown | 4 | 3 | 6 |
| Less than high school education | 21 | 23 | 20 |
| High school graduate | 21 | 22 | 20 |
| College or higher education | 58 | 55 | 61 |
| Married | 59 | 55 | 64 |
| Live alone | 17 | 14 | 20 |
| Median KPS (self-assessed) | 70 | 70 | 80 |
| Median KPS (interviewer) | 80 | 80 | 80 |
| Tumor type[a] | | | |
| Breast | 12 | 9 | 15 |
| Lung | 9 | 12 | 6 |
| Gastrointestinal: colorectal | 8 | 7 | 10 |
| Gastrointestinal: noncolorectal | 2 | 1 | 2 |
| Genitourinary | 22 | 24 | 24 |
| Gynecologic | 5 | 4 | 5 |
| Hematologic | 1 | 0 | 2 |
| Other | 42 | 42 | 39 |
| Admission unit | | | |
| Oncology | 38 | 39 | 36 |
| Medicine | 22 | 24 | 20 |
| Surgery | 10 | 11 | 8 |
| Gynecology | 14 | 9 | 19 |
| Other | 17 | 17 | 17 |
| Reason for initial admission | | | |
| Infection | 6 | 6 | 7 |
| New diagnosis | 1 | 1 | 0 |
| Surgical complication | 6 | 3 | 8 |
| Disease progression | 6 | 6 | 7 |
| Complication of systemic therapy | 10 | 10 | 10 |
| Hematologic complication | 4 | 4 | 3 |
| Falls | 6 | 6 | 7 |
| Bowel obstruction | 3 | 3 | 3 |
| Pain management | 12 | 12 | 12 |
| Other[b] | 46 | 48 | 43 |
| Treatment phase | | | |
| Before treatment | 9 | 9 | 8 |
| During treatment | 70 | 70 | 70 |
| After treatment | 21 | 21 | 22 |

(continued)

**Table 2.** (continued)

| Characteristics | Total (*n* = 135), % | Intervention (*n* = 69), % | Control (*n* = 66), % |
|---|---|---|---|
| Patient admitted from | | | |
| Home | 94 | 97 | 90 |
| Nursing home | 5 | 3 | 7 |
| Assisted living facility | 1 | 0 | 2 |
| Other | 1 | 0 | 2 |
| Median number of GA-identified deficits (range) | 5 (1–11) | 5 (1–11) | 5 (1–10) |
| Frequency of GA-identified deficits | | | |
| 1 | 9 | 10 | 8 |
| 2 | 10 | 10 | 11 |
| 3 | 12 | 14 | 9 |
| 4 | 11 | 14 | 8 |
| 5 | 22 | 14 | 30 |
| 6 | 12 | 14 | 9 |
| 7 | 12 | 9 | 15 |
| 8 | 2 | 4 | 0 |
| 9 | 6 | 3 | 9 |
| 10 | 2 | 3 | 2 |
| 11 | 1 | 3 | 0 |

[a]Genitourinary: bladder, kidney, prostate cancer. Gynecologic: endometrial cancer. Noncolorectal: pancreatic cancer. Hematologic: low-grade lymphoma, chronic leukemia, and myeloma. Other: thyroid cancer and melanoma, Merkel cell, mesothelioma, head and neck.
[b]See supplemental online Table S1 for other reasons for admission.
Abbreviations: GA, geriatric assessment; KPS, Karnofsky Performance Status.

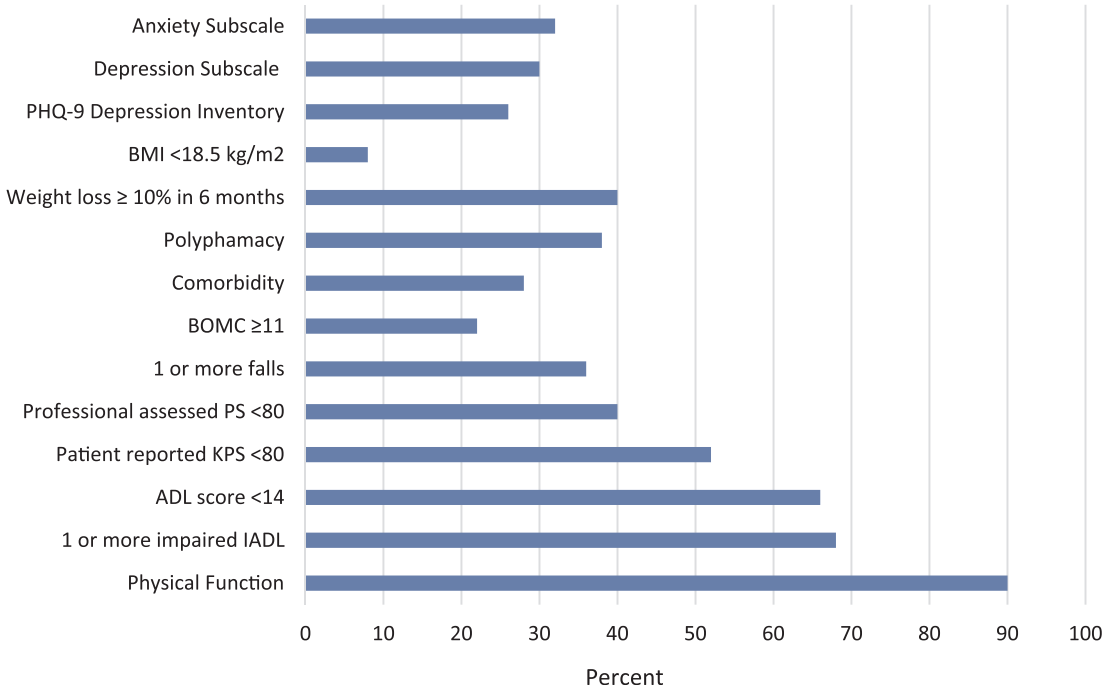


**Figure 2.** Percentage of all patients with deficits identified in each GA domain. Deficits defined based on cutoff values in Table 1. Abbreviations: ADL, activities of daily living; BMI, body mass index; BOMC, Blessed Orientation Memory Concentration Test; IADL, instrumental activities of daily living; KPS, Karnofsky Performance Status; PHQ-9, Patient Health Questionnaire; PS, performance status.

GA, although the response rate is too low to make any meaningful conclusions. It is possible that our analysis of the intervention's impact was diluted by a high rate of referrals in the Control group—referrals without prior receipt of a GA report or referrals in the absence of known deficits. For example, it is common practice for patients without known physical function deficits to be referred to physical therapy to facilitate discharge planning [4]. However, this diluting

**Table 3.** Geriatric assessment–identified deficits

| Geriatric assessment deficit | Intervention (*n* = 69) | | Control (*n* = 66) | |
|---|---|---|---|---|
| | Pts with deficits, *n* (%) | Referrals, *n* (%) | Pts with deficits, *n* (%) | Referrals, *n* (%) |
| Total | 69 (100) | 4 (6) | 66 (100) | 6 (9) |
| Physical function | 62 (90) | 2 (3) | 60 (91) | 1 (2) |
| Patient-reported KPS <80% | 37 (54) | 2 (3) | 33 (50) | 1 (2) |
| Professional-assessed KPS <80% | 30 (43) | 1 (1) | 24 (36) | 0 (0) |
| IADL score <14 | 47 (68) | 2 (3) | 46 (70) | 1 (2) |
| ADL score <14 | 37 (54) | 2 (3) | 51 (77) | 1 (2) |
| 1 or more falls | 24 (35) | 0 (0) | 25 (38) | 0 (0) |
| Cognitive impairment | 15 (22) | 1 (1) | 23 (35) | 2 (3) |
| Polypharmacy | 24 (35) | 0 (0) | 27 (41) | 1 (2) |
| Nutritional | 29 (42) | 2 (3) | 27 (41) | 3 (5) |
| Weight loss ≥10% in 6 months | 28 (41) | 1 (1) | 25 (38) | 1 (2) |
| BMI <18.5 kg/m$^2$ | 3 (4) | 1 (1) | 7 (11) | 0 (0) |
| Psychosocial | 34 (50) | 0 (0) | 32 (48) | 0 (0) |
| Mental Health Index Anxiety Subscale ≥6 | 20 (29) | 0 (0) | 22 (33) | 0 (0) |
| Mental Health Index Depression Subscale ≥12 | 23 (33) | 0 (0) | 18 (27) | 0 (0) |
| PHQ-9 Depression Inventory ≥10 | 23 (33) | 0 (0) | 13 (20) | 0 (0) |

Abbreviations: ADL, activities of daily living; BMI, body mass index; IADL, instrumental activities of daily living; KPS, Karnofsky Performance Status; PHQ-9, Patient Health Questionnaire; pts, patients.

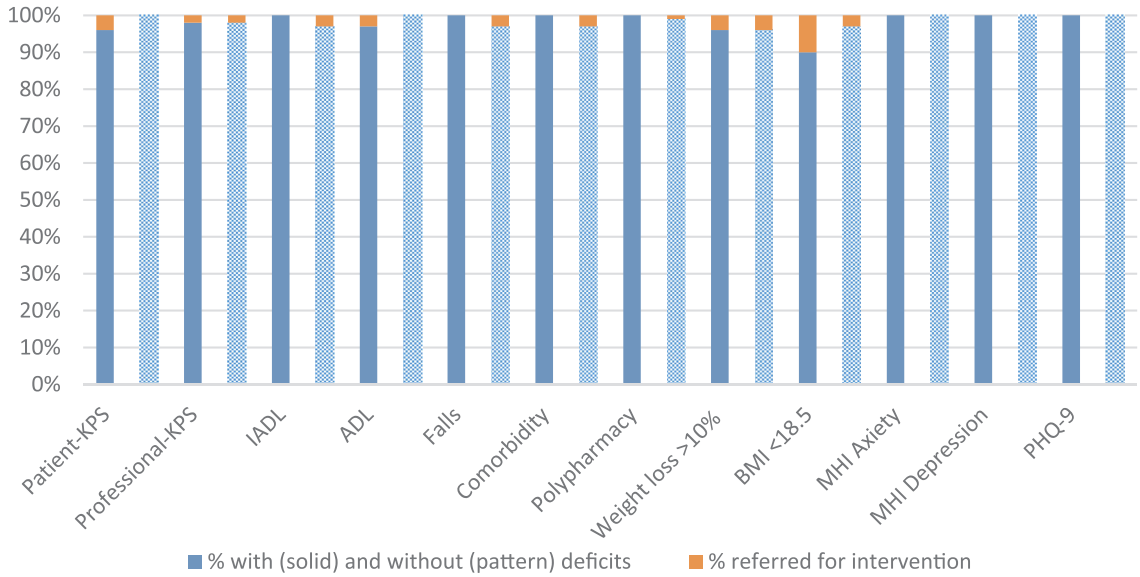


**Figure 3.** Proportion of referrals among patients with and without deficits.
Abbreviations: ADL, activities of daily living; BMI, body mass index; IADL, instrumental activities of daily living; KPS, Karnofsky Performance Status; MHI, Mental Health Index; PHQ-9, Patient Health Questionnaire.

effect seems unlikely given the low rates of referral in both Intervention and Control groups. Another possible reason for low referral rates is clinicians deciding that their patients may have been too sick to benefit from the suggested interventions. However, this does not seem likely because only 3% of patients were discharged to hospice. Finally, it is also possible that the GA report was not adequately considered by busy clinicians who simply do not have the time to read or act on the report and recommendations. We anticipate that in the years ahead this problem may only get worse because of the booming older adult population and increasing demands on clinician time without increased resources.

Our study found high readmission rates in both the Control and Intervention groups, which is about twice that of our institutional average (17.6%) and of Medicare beneficiaries (17%–23%) [20]. In fact, the rate might be even higher than we were able to document owing to missing readmission data. This finding has profound implications as older adults can acquire new deficits with each hospitalization that can

lead to functional decline and poor health-related quality of life [5, 6]. We found that patients with >4 comorbid medical illnesses were most likely to be readmitted. This finding suggests that enhanced communication with the outpatient care team and close follow-up for continued optimization of medical comorbidities after hospital discharge may be a strategy to decrease readmission.

## Conclusion

In the current medical climate, it is unlikely that clinicians caring for older inpatients with cancer will be able to devote the needed time to adequately assess older patients with cancer for deficits that can be readily identified through a brief GA. To do so would require going beyond current best practices addressing the urgent medical needs of elderly patients when they are admitted to the hospital. To adequately do this will require resources that support a systems-level team approach in which trained staff can assess and appropriately refer older patients with deficits [11] and are incentivized to do so.


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## Disclosures

The authors indicated no financial relationships.

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