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Research Letter to Editor

Implementation and evaluation of a nurse-led geriatric oncology model of care for older adults with lung cancer

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1. Introduction

Adults aged 65+ years are expected to account for 60 % of all new cancer diagnoses by 2035 [1]. In Australia, the median age of people with lung cancer is 72 years [2]. Cancer in older adults can be challenging to treat due to a limited evidence-base from under-representation in clinical trials [3], and high prevalence of comorbidities [4] that may increase treatment toxicities and be a competing cause of mortality. Older people may also have a multiplicity of geriatric syndromes including polypharmacy, cognitive impairment, malnutrition, reduced mobility, anxiety, and depression that may impact treatment delivery and/or toxicity.

Routine oncology assessment of patients does not include specific assessment of geriatric domains. A systematic review has found that geriatric assessment (defined as a multidimensional health assessment across medical, social, and functional domains) of older people improves treatment completion rates, reduces high grade chemotherapy toxicity, reduces unplanned hospitalisations and emergency department presentations, and improves quality of life [5]. Many international oncology societies, including the European Organisation for Research and Treatment of Cancer [6] and the American Society of Clinical Oncology [7], recommend geriatric assessment of older patients prior to therapy. However, this has not been widely adopted, with only 21 % of oncologists surveyed doing this routinely [8].

We previously implemented a medical-led geriatric oncology model of care (ML-GOMOC) for older people with lung cancer, which included geriatric screening using a validated tool (G8) [9] and a comprehensive geriatric assessment based on G8 scores [10]. Based on predefined measures, ML-GOMOC was not found to be feasible or acceptable. This was in part due to limited geriatric resources. Therefore, we proposed a nurse-led GOMOC (NL-GOMOC). The aim of this study was to design, implement, and evaluate NL-GOMOC for older people with lung cancer.

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2. Materials and Methods

Input from stakeholders including radiation and medical oncologists, geriatrician, lung cancer nurse, allied health staff, administrative staff, information technology staff, and two older consumers was sought for the codesign. This was informed by learnings from the ML-GOMOC and qualitative research of unmet needs of older patients with lung cancer [11]. Eligible people were those referred with a new diagnosis of lung cancer, aged 65+ years or 50+ years if of Aboriginal or Torres Strait Islander descent (aligned with Australian Government definitions of older people). A new nursing role was created to implement this GOMOC. Patient-centred care pathways were developed within existing resources for referrals.

This research-funded role was advertised for a clinical nurse specialist in a relevant field (geriatrics, oncology, palliative care). Clinical nurse specialists have at least three years post-graduate experience in a specific field and a relevant post-graduate degree. They are skilled at providing complex clinical care, take on leadership roles, and are a nurse role model. The employed nurse was an oncology clinical nurse specialist who upskilled in geriatric assessments by attending geriatric outpatient clinics and liaising with the geriatrician for a month prior to commencing oncology patient assessments.

Following implementation, data was collected prospectively on the NL-GOMOC including number of eligible patients screened, assessed, issues identified, and referrals recommended. This was compared with the outcomes of the previous ML-GOMOC. Ethics approval was obtained from the South-Western Sydney Local Health District human research ethics committee (2023/ETH00187).

3. Results

3.1. Model codesign

The model is shown in Fig. 1. Eligible patients were identified through automated weekly reports, nurse screening of clinic lists, and oncologists identifying patients. The nurse scheduled a one-hour appointment to assess the patient using a suite of validated screening tools covering geriatric domains. The aim was to do this immediately before or after the oncology appointment. Based on assessment results, patients could be referred to allied health for supportive measures immediately post-assessment or for a comprehensive geriatric assessment at a multidisciplinary aged care cancer service (MACCS) clinic.

The MACCS clinic assessment was identical to the previous ML-GOMOC [10]. It was planned for the geriatrician to conduct a comprehensive geriatric assessment including standardised measures of cognition, mood, and comorbidities, as well as a medications history. The physiotherapist assessed mobility aid use, falls history, and performed standardised tests. The occupational therapist assessed home environment, existing equipment, performance in instrumental activities of daily living, and energy conservation to minimize fatigue and dyspnoea.

Patients were discussed at a lung cancer geriatric oncology multidisciplinary team meeting (MDM) attended by the nurse, treating medical and radiation oncologists, lung cancer care coordinator, and allied health clinicians. The oncologist first presented the patient with their medical history and proposed oncology plan. The nurse then presented their assessment and referrals made. The case was then discussed to finalise the management plan and generate any additional referrals if necessary. Following the meeting, a letter to the patient's general practitioner (GP) was auto-created based on notes written by the nurse and approved by the oncologist on a template within MOSAIQ electronic medical records. The nurse scheduled a telephone review with the

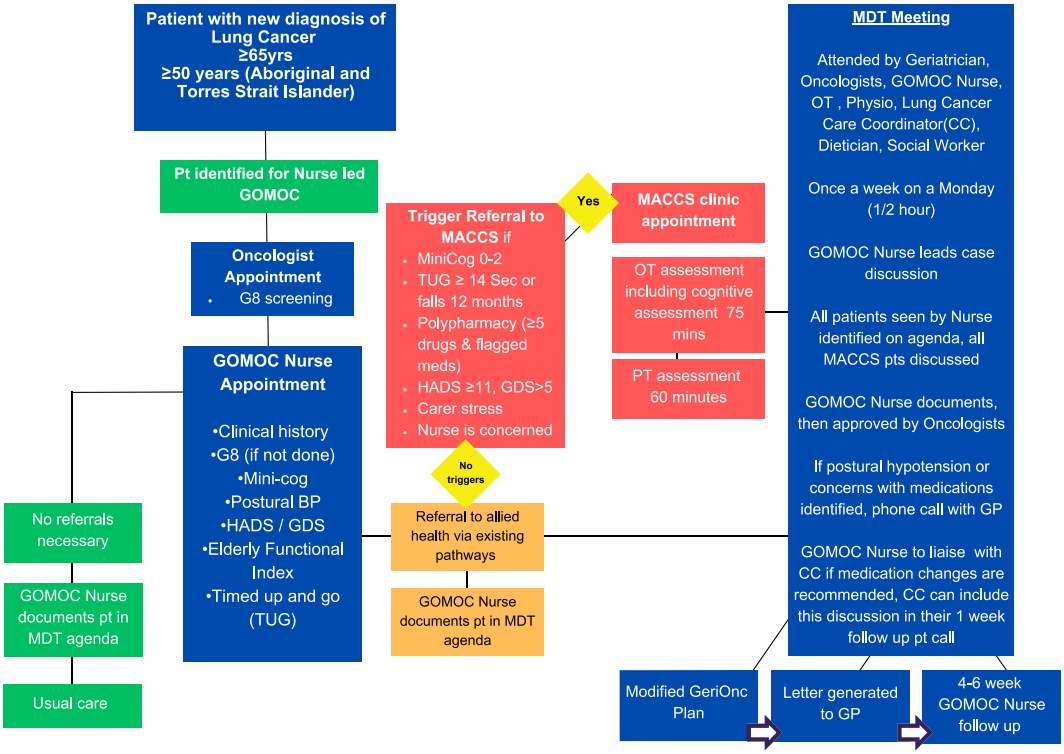

Fig. 1. Nurse-led geriatric oncology model of care (NL-GOMOC).
Fig. 1 footnotes: Electronic versions of Geriatric-8 (G8) screening, Mini-Cog test, Hospital Anxiety and Depression Scale (HADS), Geriatric Depression Scale (GDS), Elderly Functional Index were created in MOSAIQ. Systematic data fields were used to record postural blood pressure (BP) and Timed Up and Go (TUG). MACCS – multidisciplinary aged care cancer service, MDT – multidisciplinary team, OT – occupational therapist, PT – physiotherapist, CC – care coordinator, GP - general practitioner.

patient four weeks later to check if recommendations had been implemented.

3.2. Model implementation

The model was implemented in radiation and medical oncology clinics at Liverpool Hospital NSW, Australia, a university affiliated hospital with a comprehensive cancer centre. Electronic versions of all tools were created in MOSAIQ electronic medical records. (Fig. 1) MOSAIQ was also used to generate automated screening reports, referrals to allied health, MACCS clinic, letters to GPs, and recording of MDM notes.

3.3. Model outcomes

From June 2023 to May 2024, 168 patients were screened with 113 meeting the eligibility criteria; 100 (88 %) of the eligible patients were assessed by the nurse. Reasons for lack of assessment were rapid deterioration ($n = 4$), decline (n = 4), nurse leave ($n = 2$) and other ($n = 3$). On average, two patients per week were seen. Fifty-eight (58 %) were seen on the same day as their oncology appointment and 69 (78 %) of 88 patients undergoing anti-cancer treatment were seen prior to treatment. Characteristics of patients are shown in Table 1. Pre-frailty or frailty was identified in 70 % of patients based on G8 score and 40 % of patients based on the clinical frailty scale. Charlson comorbidity scores were high, reflecting the older age and cancer diagnosis in the cohort.

The full set of recommended tools were not used on all patients as appointments were sometimes shortened due to patient fatigue, interpreter availability, or competing appointments. The most common issues identified were nutrition in 62 % (61/98), polypharmacy in 40 % (40/100), depression in 18 % (18/98), and mobility in 17 % (17/97). Twelve percent (12/100) had cognitive impairment, 11 % (10/87) had anxiety or borderline anxiety and 8 % (8/99) had postural hypotension. Seventy-eight percent of all patients were referred to at least one allied health professional including dietitians (51 %), occupational therapists (37 %), social workers (35 %), physiotherapists (30 %), speech pathologists (8 %), and clinical psychologists (4 %). Of the remaining 22 patients, five met criteria for referrals but four declined and one was already linked to services.

All patients were discussed at the geriatric oncology MDM with a letter sent to their GP regarding the outcome of this meeting. On average, two patients were discussed at each MDM. Twenty-five (25 %) patients were referred for a combined assessment at the MACCS clinic and 18 (72 %) were reviewed. Reasons for not being seen included failure to attend ($n = 2$), decline ($n = 1$), already receiving allied health services (n = 2), and only receiving single fraction radiotherapy (n = 2).

Table 1
Study population.

Characteristic		
Age ($n = 100$)	Median	73 years
	Range	65–87 years
Sex (n = 100)	Male	69 (69 %)
	Female	31 (31 %)
Interpreter required (n = 100)	Yes	46 (46 %)
	No	54 (54 %)
Stage of lung cancer (n = 100)	Stage I-II	33 (33 %)
	Stage III	25 (25 %)
	Stage IV	42 (42 %)
G8 score ($n = 98$)	≤14	69 (70 %)
	>14	29 (30 %)
Clinical Frailty Scale ($n = 89$)	1–3	54 (60 %)
	4–5	30 (34 %)
	≥6	5(6 %)
Charlson comorbidity score (n = 100)	4–5	14 (14 %)
	6–8	40 (40 %)
	>8	46 (46 %)

Due to the geriatrician leaving the hospital just prior to commencement of NL-GOMOC, clinic assessments were performed by a physiotherapist and an occupational therapist, who extended their appointment to include formal cognitive testing. If patients required a referral to a geriatrician, the nurse facilitated referral to outpatient geriatric clinics via their GPs. Seven patients were referred to a geriatrician via their GP.

The proportion of patients screened (100 % vs 85 %), assessed (88 % vs 59 %), and seen before treatment (78 % vs 63 %) were greater with NL-GOMOC compared with ML-GOMOC but management was modified in fewer patients (3 % vs 10 %).

4. Discussion

This study aimed to develop, implement and evaluate a new model of care for older people with lung cancer. NL-GOMOC increased the proportion of patients undergoing geriatric screening and assessment and timeliness of care compared to ML-GOMOC. However, management was modified in fewer patients, likely due to lack of specific geriatric medical input. With our previous ML-GOMOC, the geriatrician gave a specific opinion on a patient's likely tolerance of oncology treatment based on their comprehensive assessment, in particular, of patient's comorbidities, cognition, and frailty. In the NL-GOMOC, although some patients were recommended for referral to a geriatrician via their GP, this occurred weeks later and not in a timely manner to influence management. However, comparisons between NL-GOMOC and the previous ML-GOMOC should be interpreted with caution given there were only 30 patients evaluated in that model.

Hamaker et al. conducted a systematic review that found a median change in treatment of 31 % (6 % to 56 %), following geriatric assessment, usually resulting in a de-escalation of treatment [12]. Median change in treatment plan was 22 % for assessments conducted by geriatricians and 28 % for those conducted by oncologists. Interestingly, a multidisciplinary team assessment including allied health changed treatment in 54 % to 56 % of cases.

Between 8 % and 40 % of patients had specific geriatric issues identified, with the majority referred for at least one service. In Queensland, Australia, a geriatric oncology model of care conducted by nurses and allied health staff identified allied health impairments in 60 % of patients [13]. This study involved a cohort of patients aged 60+ years, primarily with breast or haematological malignancy. In contrast to our study, the most common impairments identified were mobility (23 %), malnutrition (22 %), polypharmacy (18 %), and mood and depression (16 %), likely reflecting differences in cancer types.

The Royal Marsden Hospital, United Kingdom, has a model of care where tumour stream-specific nurses perform geriatric screening, with subsequent discussion at an MDM to determine which patients need comprehensive geriatric assessment [14]. Eligible patients are those aged 70+ years who are planned for systemic therapy. Of a cohort that included 23.4 % patients with lung cancer, they found that 86.5 % of patients had at least one geriatric impairment on screening. Similar to our study, 86.5 % of patients were referred to at least one service, most commonly physiotherapy, occupational therapy, and dietetics.

Geriatric assessment is particularly important in patients with lung cancer due to their older median age and the high prevalence of comorbidities. Forty-five percent of patients with lung cancer are frail and this is associated with a three-fold increase in mortality [15]. In this study, 40 % to 70 % of patients were identified as potentially frail or frail depending on the scale used. Most patients had high Charlson comorbidity index scores, which correlates with poorer survival. However, the standard criteria for oncologists to assess fitness for therapy is usually Eastern Cooperative Oncology Group performance status and baseline blood tests. A far more nuanced approach is needed in older patients, who may appear well, but have reduced physiological reserve to withstand toxic cancer treatments.

This study is limited by the lack of a geriatrician embedded within the service. Although their role was defined in the model of care, staff

changeover meant this position was not filled, hence a comprehensive geriatric assessment not performed for those patients referred to MACCS clinic. This may have resulted in the minimal impact on cancer treatment. However, the aim of geriatric screening and assessment is not simply to influence cancer treatment, but to assess all geriatric domains that may impact on cancer treatment and put supportive care interventions in place to improve tolerance to treatment. This latter aim can be successfully achieved by a specialist nurse.

5. Conclusion

NL-GOMOC increased the proportion of older patients with lung cancer undergoing geriatric screening and assessment. Multiple issues were identified, leading to allied health referrals using existing pathways and identifying those who would benefit from a multidisciplinary clinic assessment.

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CRediT authorship contribution statement

Shalini K. Vinod: Conceptualization, Methodology, Investigation, Formal analysis, Writing – original draft, Supervision, Project administration, Funding acquisition. **Nicole Knox:** Conceptualization, Methodology, Investigation, Formal analysis, Writing – review & editing, Funding acquisition. **Katie Knight:** Investigation, Writing – review & editing. **Victoria Bray:** Methodology, Writing – review & editing. **Angela Khoo:** Conceptualization, Methodology, Writing – review & editing. **Elise Tcharkhedian:** Methodology, Writing – review & editing. **Josephine Campisi:** Methodology, Writing – review & editing. **Polly Dufton:** Methodology, Writing – review & editing. **Gemma McErlean:** Methodology, Writing – review & editing. **Meera R. Agar:** Methodology, Writing – review & editing, Funding acquisition. **Louise Hickman:** Methodology, Writing – review & editing, Funding acquisition.

Declaration of Competing Interest

SV has received honoraria for participating in educational activities and/or advisory boards for Astra Zeneca, Roche and Merck Sharpe & Dohme, unrelated to this research.

NK- no conflicts to declare.

KK - no conflicts to declare.

VB - no conflicts to declare.

AK - no conflicts to declare.

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LH – no conflicts to declare.

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Nicole Knox reports financial support was provided by the Australian Government as a PhD scholarship. Katie Knight reports financial support was provided by the University of New South Wales as research funding for her position as a nurse employed for the model of care. The other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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