

Research Article

Clinicians' Evaluation of Lung Cancer Clinical Quality Indicators and Comparative Performance Data in Practice

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Objective. Lung cancer is commonly diagnosed and is the leading cause of cancer-related death, morbidity, and burden of disease globally. There is an ongoing need to ensure patients receive optimal evidence-based care and to identify and reduce unwarranted clinical variation to achieve best possible outcomes. The EnRICH program has developed evidence-based clinical quality indicators to measure processes and outcomes of lung cancer care, and a feedback dashboard to report comparative performance data, which highlight variation in both care and outcomes. The aims of this study were to evaluate the acceptability and utility of the quality indicators and feedback dashboard and identify benchmarks for performance monitoring and priorities for future quality improvement interventions to address observed clinical variation. **Method.** Clinicians from lung cancer multidisciplinary teams (MDTs) at six tertiary clinical sites across regional and metropolitan NSW were invited to participate in evaluation interviews. Interviews were conducted via videoconference and recorded with consent. Data were analysed thematically using framework methods. **Results.** Thirteen clinicians participated in interviews, with representation from each clinical site and specialty. All participants considered the quality indicators to be clinically meaningful. Three main themes were identified: (i) the importance of timely, local, quality data; (ii) implementable versus nonimplementable clinical practice changes; and (iii) the need for ongoing performance monitoring. Clinicians prioritised two areas of unwarranted clinical variation that could be immediately addressed through easily implementable quality improvement interventions to positively impact patient care: (i) a process to ensure that all stage III patients are discussed by a multidisciplinary team prior to commencing treatment; (ii) a referral pathway to palliative care within eight weeks for patients diagnosed with stage IV disease. The importance of lung cancer nurse specialists for improved care coordination was highlighted. **Conclusion.** Clinicians would like to continue to receive close-to-real-time quality data for ongoing performance monitoring to identify and address unwarranted clinical variation.

1. Introduction

Lung cancer is the second most diagnosed cancer globally [1, 2]. It continues to be the most common cause of cancer-related death and is the leading cause of morbidity and burden of

disease in New South Wales (NSW), across Australia, and worldwide. The outlook for patients with lung cancer remains poor with only a 22% overall five-year survival rate. For patients diagnosed with advanced-stage disease, five-year survival is less than 5% [3, 4]. Improvements in outcomes for lung cancer have

not kept pace with improvements for other major cancers. Notwithstanding new treatments, efforts to ensure patients achieve the best possible outcomes remain focused on the delivery of optimal evidence-based care, including timely and equitable access to diagnostic testing and appropriate treatment modalities. Thus, there is an ongoing need to identify and reduce unwarranted clinical variation, that being variation which cannot be explained by the condition or the preferences of the patient, which may contribute to persisting poor outcomes [5, 6]. However, in the absence of a statewide lung cancer clinical quality registry, performance measures and data to enable ongoing assessment of lung cancer care in NSW are lacking.

The Embedding Research (and Evidence) in Cancer Healthcare (EnRICH) program [7], a prospective clinical cohort of patients presenting with lung cancer to six tertiary care sites across multiple metropolitan and regional Local Health Districts in NSW, was established in 2016 to describe the natural history and patterns of care for lung cancer and to identify gaps in evidence and practice for translational research and clinical quality improvement. To date, the EnRICH cohort includes more than 2000 patients. Clinical audit data collection is ongoing, and the EnRICH dataset includes longitudinal patient, diagnostic, treatment, and outcome data from diagnosis up to five-year follow-up, providing a unique opportunity to leverage existing research infrastructure and comprehensive research quality clinical audit data to identify clinical variation with more granularity than would be possible using routinely collected administrative data.

Funded by a Cancer Institute NSW Innovations in Cancer Control Grant, and informed by a literature review and modified Delphi process involving an expert multidisciplinary clinical advisory group [8], the EnRICH program has developed a set of lung cancer clinical quality indicators to quantitatively measure the structure, process, and quality of contemporary lung cancer service delivery and outcomes. The ten quality indicators (Table 1) span diagnostic, treatment, quality of life, and survival domains and were selected based on the criteria of being linked to evidence-based care and being reliably and accurately recorded in medical records and, therefore, readily measured. An associated interactive feedback dashboard was developed to provide comparative performance data to multidisciplinary teams (MDTs) and health services administrators (Figure 1). Performance on these quality indicators, stratified by a range of variables, is reported separately alongside the results of the broader EnRICH program [9].

The aims of this study were to evaluate the acceptability and utility of the EnRICH lung cancer clinical quality indicators and comparative feedback dashboard and identify benchmarks for performance monitoring and priorities for future quality improvement interventions to address observed clinical variation.

2. Materials and Methods

This study is reported following the Consolidated Reporting of Qualitative Studies (COREQ) guidelines [10] and adheres to the Standards for Reporting Qualitative Research (SRQR) [11].

TABLE 1: EnRICH quality indicators.

<i>Diagnosis</i>
(1). Proportion of patients diagnosed ≤ 28 days of the first investigation of symptoms suspicious of lung cancer (earliest of clinical or pathological diagnosis)
(2). Proportion of patients with a pathological diagnosis ≤ 28 days of the first investigation of symptoms suspicious of lung cancer
(3). Proportion of NSCLC patients with molecular testing (stage IV only, excl. squamous cell)
(4). Proportion of stage III patients reviewed by an MDT prior to curative treatment
<i>Treatment</i>
(5). Proportion of stage I–III patients with curative treatment ≤ 28 days of diagnosis
(6). Proportion of stage IV patients, initiating systemic treatment ≤ 28 days of diagnosis
(7). Proportion of stage I–III patients initiating curative treatment ≤ 28 days of site presentation
(8). Proportion of stage IV patients initiating systemic treatment ≤ 28 days of site presentation
<i>Quality of life</i>
(9). Proportion of stage IV NSCLC referred to palliative care ≤ 8 weeks of diagnosis
<i>Survival</i>
(10). One-year survival

2.1. Study Design. Qualitative semistructured interviews were undertaken to evaluate clinicians' perceptions of the acceptability and utility of the EnRICH lung cancer clinical quality indicators and comparative feedback dashboard, based on clinical audit data collected from the EnRICH database for 426 patients newly diagnosed with lung cancer between 1st January 2021 and 29th October 2021 at six tertiary clinical sites, namely, Chris O'Brien Lifehouse; Coffs Harbour Health Campus; Concord Repatriation General Hospital; Orange Health Service (including Bathurst and Dubbo Base Hospitals); Royal Prince Alfred Hospital; St Vincent's Hospital/The Kinghorn Cancer Centre.

2.1.1. Sample. All clinicians associated with lung cancer MDTs at the above-named clinical sites were eligible to participate in evaluation interviews. Eighteen clinicians were purposively sampled to ensure a multidisciplinary representation of all clinical specialties (surgery, medical oncology, radiation oncology, respiratory medicine, palliative care, pathology, health services executive, lung cancer nurse specialist), and metropolitan and regional geographical locations. This sample size is consistent with the results of a recent systematic review of qualitative studies using empirical data, which found thematic saturation was reached within a narrow range of nine to seventeen interviews (between 12 and 13 on average), with smaller samples required for relatively homogenous study populations (such as clinicians) and narrowly defined study objectives [12].

2.2. Data Collection

2.2.1. Semistructured Interviews. A semistructured interview schedule, including open-ended questions, was based on a priori evaluation criteria. To contextualise interview



FIGURE 1: Example of feedback dashboard overview page.

questions, and act as a recall prompt, the feedback dashboard was available for reference as required by interviewees. Interviews explored the relevance/benefits of the clinical quality indicators for the participants and their healthcare setting, including perceptions of the accuracy, acceptability, utility of the data, proposed benchmarks, and priorities for future quality improvement interventions to address observed clinical variation. Interviews were conducted by a single researcher (KG, Bachelor of Nursing (Hons), former registered nurse, MSc Public Health Research, PhD) via videoconference and audio recorded, with consent. Interviews lasted between 15 and 30 minutes. Postinterview reflections were noted immediately after each interview, and audio recordings were reviewed by the researcher a minimum of twice. The researcher was known to interviewees having previously presented the quality indicator performance data and feedback dashboard to the EnRICH lung MDTs. Interviews continued until thematic saturation (no new themes identified after three consecutive interviews) was reached [13].

2.3. Ethical Considerations. Ethical approval for this project was authorised by the Sydney Local Health District Lead Human Research Ethics Committee (RPA Zone) under protocol number X16-0447. Each participant provided informed consent to participate in the interviews and for them to be digitally recorded.

2.4. Data Analysis. Interview data were analysed using a thematic analysis approach as described by Braun and Clarke [14] to ensure rigour. Thematic analysis encourages the researcher to be immersed in the data, and it is not

bound by theories and can be an inductive process seeking rather than mapping to predetermined themes [15]; this enables the researcher to be closer to the semantic data content [14]. Following data familiarisation, topics were coded against the interview schedule and then emerging themes and subthemes were identified to create an initial thematic framework through discussion with a second author (BB, BSc (Hons I) Psychology, MSc Organisational Psychology, PGCE, PhD). Peer reviewing of themes contributes to the trustworthiness of the data and ensures that all aspects of the data were explored [16]. Data were organised according to themes, with new themes added and similar themes merged as required. Themes captured the prominent aspects of the data rather than simple quantification of the frequency of data [14]. Themes and supporting quotes were transferred to a framework matrix and managed using MS Excel.

Clinician prioritised quality improvement interventions were mapped against the NSW Agency for Clinical Innovation (ACI) Redesign Methodology Quick Wins Matrix to assess the ease of implementation and potential for impact of proposed solutions.

3. Results

Of the eighteen clinicians invited to participate in evaluation interviews, one declined (no reason given) and there was no response received from four (two e-mail reminders were sent) resulting in a total sample of 13. There was representation from each clinical site, including metropolitan and regional centres, and each clinical specialty; surgery ($n = 1$), medical oncology ($n = 4$), radiation oncology ($n = 3$), respiratory medicine ($n = 1$), palliative care ($n = 1$), pathology

($n = 1$), health services executive ($n = 1$), lung Cancer Nurse Specialist ($n = 1$). Five of the participants were based in regional centres.

3.1. Overview. Three overarching themes were identified as follows (Figure 2):

- (1) The importance of local, clinically meaningful quality indicator data
- (2) Clinical practice changes
- (3) Ongoing performance monitoring to identify and address unwarranted clinical variation

3.2. Theme 1: the Importance of Local, Clinically Meaningful Quality Indicator Data. All participants considered the quality indicators and feedback dashboard to be beneficial; data were welcomed and positively received. Local and comparative data presented in the dashboard had not been previously available to clinicians and provided insight into variations in performance. Some were surprised they were not performing as well as anticipated and noted data had generated discussion among the MDT about potential reasons and what is needed/could be done to improve performance in specific areas. In contrast, others reported that the data were on par with expected performance and consistent with internal reporting.

“...the various things you analysed are all important things so it’s a broad assessment of lung cancer management and investigation and you are covering, important things, and you have comparison between the sites” Interviewee 008

“I think it is really useful. We can see where we are trending in relation to other sites and over a period of time too” Interviewee 005

3.2.1. Subtheme 1a: Context and Case mix. Several participants mentioned potential selection bias and nuances within the data related to context (including diagnostic and treatment options available) and case mix, which should be carefully considered when reflecting on performance and considering site-specific interventions or changes to practice.

“I think as with anything like that there are always going to be confounding factors why sometimes things look better than others, but I think it’s a good way of reflecting upon on what a whole site’s practice is looking like and where the obvious deficiencies are, I think it is a valuable look” Interviewee 006

Case mix of patients, treatment options available at each clinical site, and the impact of the COVID-19 pandemic were all highlighted as having significant implications for performance against quality indicators.

“The issue is...are we really doing much worse, or do we just have an older population, more comorbidities...” Interviewee 10

“...I guess one of the things that will be affected by that is number of surgical cases...some of the sites will not have surgery. So, there will be bias in that based on staging and availability of surgery. You have to be careful...You can’t just look at one result in isolation” Interviewee 008

“...I know from personal experience that last year it was tricky to get an EBUS due to COVID, due to the aerosol...but I imagine in the next couple of years that should just automatically improve as there are less COVID risks...” Interviewee 009

Participants emphasised the need to be cautious with the interpretation of data if the audience was unfamiliar with the context and case mix of sites. This was considered especially important by participants from regional sites where patients tend to be older with a higher incidence of comorbid illness and where access to diagnostic and treatment interventions can be less easily available than in metropolitan areas. It was suggested that identifying clinical sites, rather than keeping them anonymised, would allow clinicians to understand any confounding factors, and case mix, that could potentially explain certain results.

3.2.2. Subtheme 1b: Format and Frequency. The format of the feedback dashboard was acceptable to all participants; it was clear, easy to navigate, and gave a satisfactory overview of all sites’ performance mapped against the quality indicators.

“...the format of the dashboard good, easy to use and navigate” Interviewee 001

“...it’s not overloading the person with too much information but it’s there if people want to access it.” Interviewee 009

All participants agreed it would be useful to receive data on an ongoing basis, with the optimum frequency being six to 12 months.

“Nothing changes in a hurry, minimum should be 6 months, probably annually” Interviewee 004

“Its such useful data that has been undervalued. It’s useful, we should be discussing 6–12 monthly as a department. Its critically important data. Each department should be having a hard look at themselves and identifying where you lie and what the trend is” Interviewee 003

Participants emphasised that although performance feedback was a great step, unless changes were implemented in response to data, it would be a futile exercise.

“...if you do see this data, are you going to implement a change? No point in getting data, you see something is

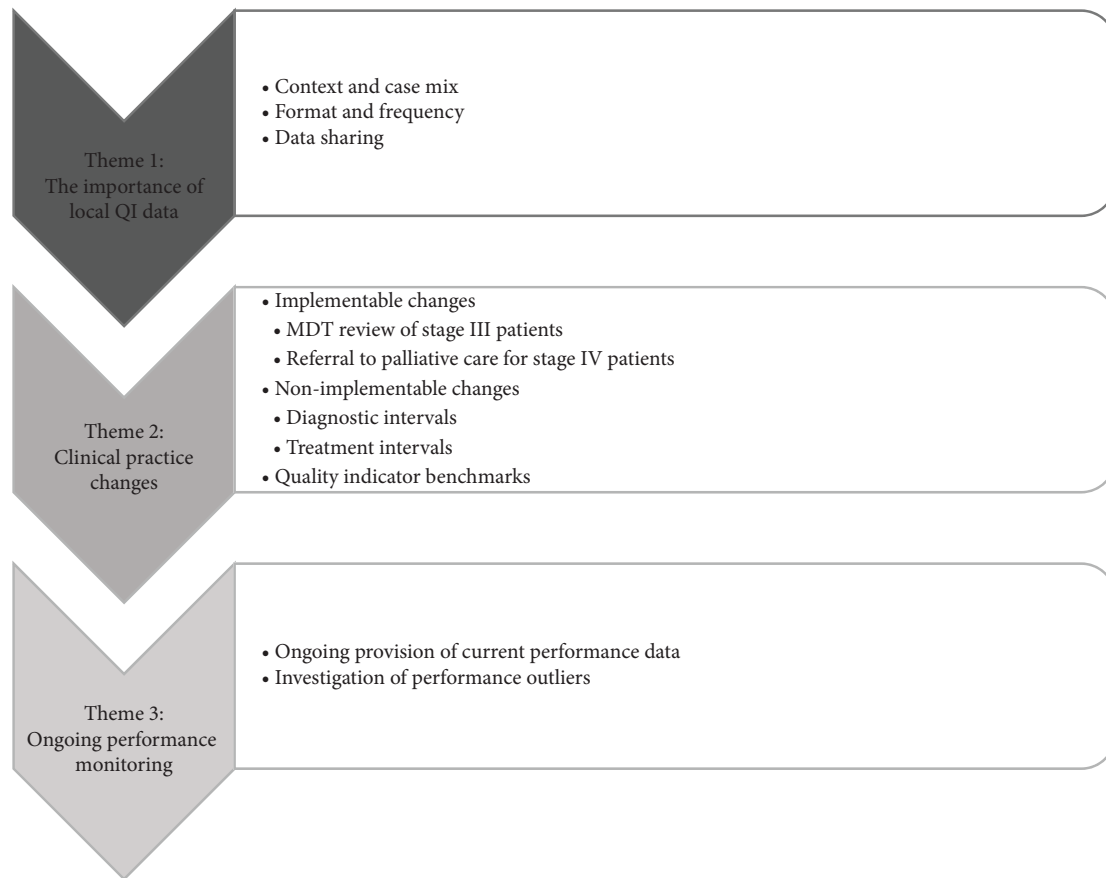


FIGURE 2: Overview of interview themes.

slightly askew and not doing anything about it...”
Interviewee 005

3.2.3. *Subtheme 1c: Data Sharing.* Most participants felt sharing data via MDTs was adequate, although a few felt data should also be provided to Directors of Cancer Services or other members of the health service executive to increase accountability. Sharing to a wider audience, including general practitioners (GPs) (to showcase the urgency of diagnosis), was mentioned but participants had reservations about the interpretation of data if circulated wider than at the local level.

“It has to be handled sensitively...you couldn’t present this without comment around the variability. I don’t think this should be put out and sites named without some documentation on our views on the reasons for the variability” Interviewee 008

3.3. *Theme 2: Clinical Practice Changes.* All 10 quality indicators were recognised as relevant to clinical practice. Participants were asked if there had been any changes as a consequence of the dashboard data, individually or within their institutions, and many commented that it had definitely made them *think* more about specific aspects of their

care processes/management but were unable to say if the dashboard had resulted in any wider changes in patterns of care to date, highlighting the need for ongoing data to monitor performance and look at trends. It was also noted that 2021 data may have been affected by the COVID-19 pandemic.

“...perhaps we need a bit more maturity with the data to know what’s a good benchmark. We can pat ourselves on the back because we look like we are doing well but are we doing as well as we should, ideally 100% of patients are getting the right treatment at the right time.”
Interviewee 007

“It will be really good to see if there’s any significant change between 2021 to 2022 and if there are any changes for the better...is it better practice or the COVID scenario” Interviewee 008

One site had started to reconsider the way in which data are recorded in electronic medical record systems, noting that information flow between the public and private systems potentially hindered data quality at that site.

“...if we were to do this study again it would probably change how we recorded data...there has been a number of other things I have been involved in this year that has

really highlighted how difficult it is for patients to navigate our service. And how the flow of information is hampered. . . That's probably the main thing that came out of this. . ." Interviewee 011

3.3.1. Subtheme 2a: Priorities for Future Quality Improvement Interventions. Participants were asked which quality indicators they felt were priorities for quality improvement. Two priorities were identified repeatedly.

3.3.2. Quality Improvement Priority 1: Increased Proportion of Stage III Patients Reviewed at an MDT Meeting Prior to Commencing Treatment. Increasing the proportion of stage III patients reviewed at an MDT meeting prior to treatment (in 2021, 76% overall (range 58%–100%) $p = 0.04$) was considered to be a measurable and achievable target that was strongly evidenced-based. One participant noted it should be ". . . pretty self-explanatory" to discuss all patients (Interviewee 011). Implementing a process for all stage III patients to be added to an MDT list for review was proposed as a simple intervention to improve performance on this indicator. A noted barrier to MDT review was one-hour weekly scheduling and oversubscription, resulting in long waitlists.

"The problem as you know is we have so many cases that we can't get through them. We could make it a strong recommendation that all stage III pts are reviewed by MDT. Stage III are the most controversial by far, everything else is pretty straightforward. Stage III need MDT discussion, therefore, a blanket statement saying all stage III should be reviewed by MDT would be a reasonable recommendation" Interviewee 008

3.3.3. Quality Improvement Priority 2: All Stage IV Patients Referred to Palliative Care Services within 8 Weeks of Diagnosis. Referral of stage IV patients earlier to palliative care services (in 2021, 64% overall (range 46%–100%) $p = 0.13$) was also deemed an evidence-based, measurable, and achievable target. Some, however, felt targeted treatments for this cohort of patients meant palliative care referral within the stipulated eight-week time frame was not always appropriate. Of note, the better prognosis associated with targeted therapies for patients with actionable genetic mutations was considered during the development of the quality indicators resulting in this patient group being excluded, but this did not significantly improve performance. At some sites, palliative care physicians routinely attended MDT meetings, but clinicians persisted in considering palliative care an end-of-life service or for when symptom management became problematic. Implementation of a routine referral pathway to palliative care for patients diagnosed with stage IV, non-mutated cancer, was proposed as a feasible solution to improve performance on this indicator.

"Palliative Care—that's going to vary place to place to do with quality and quantity of palliative care. . . I think again a recommendation should be, perhaps not as strongly as the Stage III [MDT discussion] but as a general principle, stage IV should be referred to palliative care early" Interviewee 008

3.3.4. Other Areas for Clinical Quality Improvement. Expediting diagnosis and treatment were discussed as important, with a potential high impact on patient outcomes. General suggestions were proposed to reduce diagnostic and treatment intervals but, without fully exploring outliers on these quality indicators to understand underlying reasons, participants were reluctant to take results at face value, and potential quality improvement interventions were considered difficult to implement.

". . . looking at what the delays are in tissue diagnosis, I feel interventions will be very systems based I am not sure what we can do about it" Interviewee 011

There was also agreement that it would be challenging to make changes to indicators for which part of the pathway is out of control of the individual clinician or clinical site, i.e., for diagnostic intervals, parts of the pathway lie within the primary and secondary care sectors.

". . . it is a little bit tricky because we are often not the first port of call for patients, for example I think it will be hard for me to change what I am doing to improve the first chart on here [Q1–diagnosis within 28 from first investigation for lung cancer] because patients just don't come to us. . . I don't know how I may be able to influence that" Interviewee 009

"We do wait for our mutation status that is 2–3 weeks. . . and that is something that is out of our control. . . but if we felt that was contributing to a delay in initiating treatment. . . a delay in our molecular testing. . . that is something we could actively promote as a problem and find a way around it, so we are not waiting 2 to 3 weeks to get our mutation tests" Interviewee 10

Increased roles for lung cancer nurse specialists within lung cancer MDTs were proposed as a general solution to improve care coordination which would, in turn, improve performance across a number of quality indicators.

"I think if we had a dedicated lung cancer nurse it'd make a big difference, that coordination, someone to chase the biopsies, someone to do that. . . It's probably the one thing we can intervene with to make a big change. Even if it's for the patient journey, having someone they can call to talk about things it improves quality of life, and I am sure it will improve their outcomes and their anxiety levels." Interviewee 10

“Clinical Nurse Consultant/Coordinator—extremely essential in the process and making things run smoothly.” Interviewee 03

Implementation of “one-stop shops” for regional patients, allowing them to see a specialist, has diagnostic imaging, and if required, be booked for treatment within one or two days, and was proposed as a solution to minimise potential diagnostic and treatment delays for regional patients, and maximise the efficiency of visiting medical services.

3.3.5. Subtheme 2b: Implementable and Nonimplementable Changes. Proposed quality improvement interventions were mapped against the NSW Agency for Clinical Innovation (ACI) Redesign Methodology Quick Wins Matrix [17]. According to this matrix, “Quick Wins” solutions are those that are easy and fast to implement, economical, and easily reversible. As shown in Figure 3, the two proposed interventions (all stage III patients discussed at an MDT meeting; all stage IV patients referred to palliative care within eight weeks of diagnosis) would be high impact, relatively easy and cost-effective to implement, easily reversible, and, therefore, possible “Quick Wins” for the health system and patients. Conversely, and in line with participants’ perceptions, changes related to improvements in diagnostic and treatment intervals would not be considered “Quick Wins” under this framework—while they would be high impact, they would require significant medium to long-term system redesign, and/or increased system capacity, potentially spanning primary, secondary, and tertiary care, which would be difficult to implement, potentially costly, and problematic to reverse. Performance was universally high on some indicators making change low impact.

3.3.6. Subtheme 2c: Quality Indicator Benchmarks. Interviews canvassed targets for each quality indicator, which generated mixed responses, and many were unwilling to settle on a specific target. What “should” be achieved and what is “realistic” were not the same.

[“In relation to the path diagnosis time] “. . . Oh god, you’d want at least 90%, 95% but what’s realistic. . . is 60-70%” Interviewee 005

In 2021, 52% overall (range 28%–71%); $p < 0.01$.

“. . . starting treatment within 28 days of diagnosis its again its. . . an elderly population and what do you do with comorbidities in the mix and that’s where it’s really hard to set benchmarks on it” Interviewee 006

In 2021, stage I–III patients commencing curative treatment within 28 days of diagnosis 26% overall (range 8%–32%; $p = 0.7$); stage IV patients commencing systemic treatment within 28 days of diagnosis 51% overall (range 40%–77%; $p = 0.2$)

Performance on diagnostic and treatment intervals were both considered suboptimal with only a minority diagnosed and treated within the recommended timeframes in the optimal care pathway for people with lung cancer [18]. Many proposed a ~90% target for stage I–III patients commencing curative treatment within 28 days of diagnosis. The target for molecular testing was proposed as 100% for those with histology (in 2021, 99% overall (range 75%–100%; $p = 0.03$)).

“There is no point in putting in targets that cannot be implemented with the restrictions, they need to be Australian-centric and backed up by something, we have should be evidence based and achievable under the MBS and PBS. Delays are never because people are lazy or slow its usually because doctors can’t reach demand, so I think that’s also a useful target” Interviewee 011

“. . . it’s not easy to compare, who would we compare with? We can’t compare with the coast; the Coast have an older population. You can’t compare us with Metro services without us feeling a bit sad as we don’t have the same resources. . . necessarily the same access” Interviewee 007

Survival rates were considered difficult to benchmark due to case mix (in 2021, one-year survival was 69% overall (range 47%–91%) $p < 0.01$), but participants noted they should be aligned with data from other jurisdictions where this is publicly reported.

Using benchmarks set against other cancers or other national and international performance were also mentioned as a consideration.

“I would be interested in seeing how we compare to international and national standards, that would really be a benchmark there. These are hard end points that really have meaning” Interviewee 003

“It would be good to show this data compared to other cancers like breast cancer for example to demonstrate the real differences” Interviewee 001

3.4. Theme 3: Ongoing Performance Monitoring to Identify and Address Unwarranted Clinical Variation

3.4.1. Subtheme 3a: Ongoing Provision of Current Performance Data. As noted under theme 1, all participants expressed interest in receiving ongoing quality indicator performance data.

“If you don’t have the data, you don’t know how to address things” Interviewee 009

“If we are a tertiary centre of excellence, we need to have some data to back it up not just saying you’re great” Interviewee 003

The need for “current” data was emphasised, and, in the ever-changing cancer treatment paradigm, a requirement for clinical practice changes to be supported.

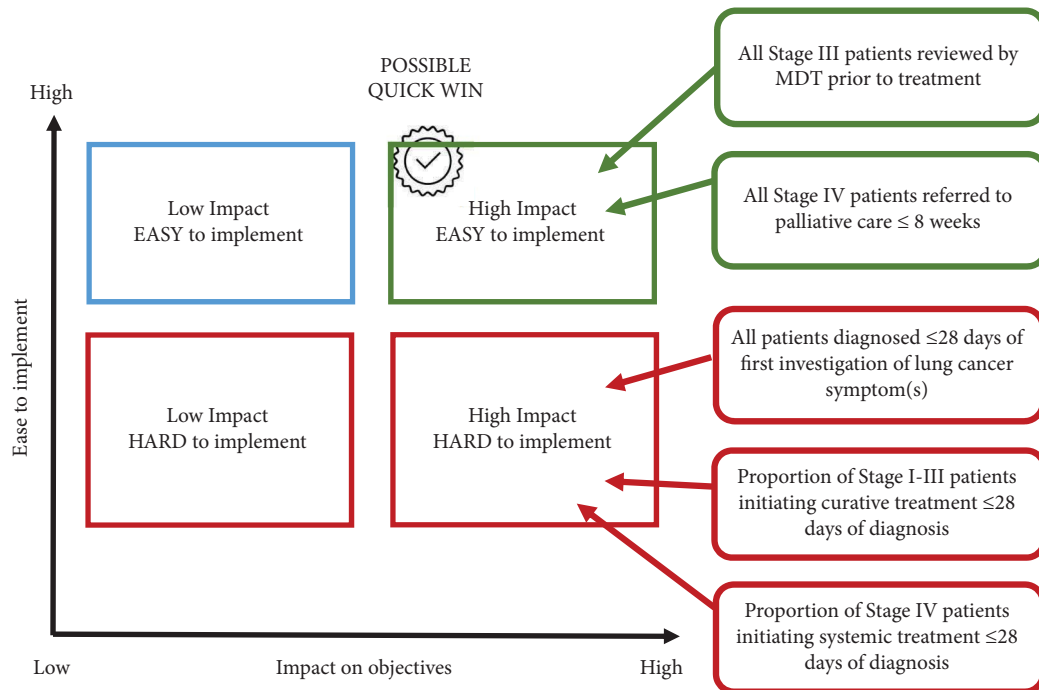


FIGURE 3: NSW Agency for Clinical Innovation (ACI) Quick Wins Matrix.

“Clinicians are always absolutely thirsty for current data. Wherever there’s a time lag they sort of say...yes but...because things have changed, new drugs have come on board, new immunotherapies...so it’s very easy to talk around the data rather than just accepting it. I think that the lack of data lag is really important” Interviewee 007

The importance of the comparison of pre-COVID and post-COVID performance data was also highlighted, and this analysis has been published elsewhere [19].

3.4.2. Subtheme 3b: Investigation of Performance Outliers. There was common interest among participants to further explore outliers on poor-performing quality indicators and to take a “deep dive” case study approach to ascertain whether observed variation was warranted or unwarranted. Identifying underlying causes through case study analysis was considered the best way to provide evidence to support necessary system or resource changes.

“The challenge is how we interpret this. There’s a bigger picture, there’s more scope to more indicators to account for...and I know it’s really hard because you need to trawl through records to find out why things are not meeting time frames and there are quite appropriate reasons for it” Interviewee 006

“...feeding back a list of patients that fell outside the benchmarks, that’s what’s going to be useful, these figures taken as a summary it’s a little bit hard to know if we’re underperforming. If you really want this to achieve what it was set to achieve, which is improve patient care to a minimum standard, you would need to tell the sites who

the patients were I think that’s really important...” Interviewee 011

An alternative reason for a deeper examination of individual patient journeys was to provide evidence to support the continuation of current practices that work well.

“...it’s the kind of...illustrations that can assist the clinicians and care coordinators and allied health staff...there is a really strong reason as to why we are doing what we are doing to prioritise these patients...sometimes it feels like every patient should be prioritised” Interviewee 007

4. Discussion

The focus of the Australian National Clinical Quality Registry and Virtual Registry Strategy (2020–2030) [20] is to maximise the value of national clinical quality outcome datasets, specifically “...in areas with the greatest burden of disease and cost to the Australian health system and/or with the greatest variation in care and outcomes,” such as lung cancer. However, at present, there is no NSW state-based or national lung cancer registry in Australia nor there is an agreed set of lung cancer quality indicators. While an abundance of routine healthcare data continues to be collected, there remain ongoing issues around timely access to such data in a format useful to make health service improvements [21].

The EnRICH program has developed a set of 10 evidence-based lung cancer quality indicators [8]. This evaluation found that the quality indicators and associated feedback dashboard were acceptable and clinically

meaningful, and clinicians would like to continue to receive performance data reporting on these indicators in close-to-real time on a biannual to annual basis. Since the completion of this study, 2022 performance data have been provided to MDTs. Sharing performance data beyond the MDT to health service administrators would increase accountability.

Within the theme of “clinical practice changes,” participants identified two immediate, evidence-based “Quick Wins” quality improvement interventions that could be implemented relatively easily across institutions: (i) *Review of all stage III lung cancer patients at a multidisciplinary team meeting prior to commencing potentially curative treatment.* A plethora of evidence demonstrates the benefits of a multidisciplinary approach to both clinical and process outcomes for cancer patients; however, there remains clinical variation, no mandatory presentation requirements, and oversubscribed MDT lists [22, 23]. Arguably, rationalising the selection criteria for MDT discussion to prioritise stage III lung cancers, which are complex and potentially require multimodal therapy, over early- and advanced-stage lung cancers for which there are clear evidence-based treatment regimens, would alleviate the caseload. (ii) *Implementation of a referral pathway to palliative care within eight weeks of diagnosis for all stage IV patients.* There is randomised controlled trial evidence that early palliative care referral led to significant improvements in both quality of life and mood for patients with metastatic non-small-cell lung cancer. Furthermore, compared with the standard of care, patients receiving early palliative care had less aggressive care at the end of life but longer survival [24]. A preliminary audit of patient numbers indicated routine referral would not overburden palliative care services and would result in approximately five additional referrals per week for most EnRICH clinical sites, including those with high patient volumes. There is also a need for reeducation around the role of palliative care to differentiate it from an end-of-life service or for when symptom management becomes problematic [24–26]. The importance of lung cancer nurse specialists for improved care coordination was noted, indicating a need for increased funding to support these roles within all lung cancer MDTs, a need reiterated by Lung Foundation Australia and others [27, 28]. Indeed, the remit of the lung cancer nurse specialist could include coordination of referrals of appropriate patients for MDT review and to palliative care.

Interventions to improve performance on quality indicators where time points began in primary care settings were considered difficult to implement. Participants felt that it would be challenging to influence the care pathway prior to presentation at the hospital. This view was supported by the results of an Australian survey of lung cancer specialists investigating acceptable versus estimated times to diagnosis for lung cancer patients, in which delays occurring in primary care and secondary care due to access to diagnostic services were perceived as significant reasons for disparity [29]. Recent work by Health Pathways [30] has recognised this gap and, in collaboration with GPs and lung cancer experts, has developed guidance for GPs including time

frames for diagnostic investigations and referrals when a patient presents with symptoms suspicious of lung cancer.

Quality indicator benchmarks were considered difficult to establish. Benchmarks are necessary to identify clinical variation and set targets for continuous quality improvement [31], yet participants found it challenging to identify realistic, achievable benchmarks. In the absence of a national lung cancer clinical quality registry, and with metropolitan and regional distinctions in care delivery, clinicians struggled to decide who and what they should compare themselves with. Potential local comparators include the Cancer Institute NSW Reporting for Better Cancer Outcomes (RBCO) program [32] and the Victorian Lung Cancer Registry [33]; however, quality indicator definitions and patient inclusion/exclusion criteria would need to be transparent and consistent for this to be meaningful. Furthermore, the ever-advancing lung cancer treatment paradigm means that quality indicators must “keep up”; they need to be reviewed and updated regularly to remain clinically significant.

While no variation was observed in responses between different clinical specialties, participants from regional areas identified particular challenges related to diagnostic and treatment quality indicators. Proposed solutions such as the implementation of “one-stop shops” could inform future system resourcing to ensure equitable access to diagnostic and treatment interventions for regional patients.

4.1. Implications. Key recommendations arising from this evaluation of the EnRICH lung cancer quality indicators are as follows: (i) the need for routine data collection and ongoing, *timely* feedback of performance data to enable clinicians and hospital administrators to identify unwarranted clinical variation and make appropriate changes to improve care and outcomes and (ii) the establishment of a NSW state-based or national lung cancer clinical quality registry to provide infrastructure for extended data collection and performance feedback. This latter recommendation has recently been echoed by others [34]. The EnRICH quality indicators provide a starting point for a nationally agreed set of lung cancer quality indicators for comparison between jurisdictions.

4.2. Limitations. A potential limitation of this evaluation is the relatively small sample size; however, the sample included a multidisciplinary representation covering all lung cancer clinical specialties from both metropolitan and regional areas of NSW, and the results indicate that the quality indicators are clinically meaningful across settings. Furthermore, as noted, the sample size is larger than the average required to achieve thematic saturation [12].

5. Conclusion

The lung cancer clinical quality indicators and associated feedback dashboard developed through this Cancer Institute NSW funded substudy of the EnRICH program are clinically meaningful and provide a foundation for ongoing

performance feedback to identify areas of unwarranted clinical variation that should be addressed to improve care and outcomes for patients with lung cancer.

Data Availability

Data are available from the corresponding author upon request, subject to necessary ethical approvals.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

Bernadette (Bea) Brown and Kirsty Galpin are joint first authors.

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