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Improvements in the lung cancer pathology pathway

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Introduction

The reliable availability of a cellular pathology report at lung cancer MDTs is critical for smooth and rapid diagnostic pathways. This project arose from a need to address longstanding delays to lung pathology reporting in our trust. Delays and variability in processing times may arise from multiple interdependent parts of the pathway, including biopsy timing and location, human factors, intra/inter-hospital transport, laboratory administration, laboratory sample processing and availability of reporting pathologist.

Methods

In December 2023, we mapped and audited the pathway of lung biopsy samples from tissue acquisition to the issue of a cellular pathology report in our Trust. A number of areas where minor changes could be made were identified and actioned simultaneously. From January 2024 to October 2024, we continuously mapped and audited the pathway. Historical data for baseline data collection and key pathway milestones were taken from the Laboratory Information Management System (LIMS).

Results

Mapping of all of the stages involved from collection of a sample from the patient, to the issue of a histopathology report, alongside data collection from the LIMS enabled us to identify areas where potential delays might occur.

Endoscopy lists operate on a Friday on site 1 which is 9 miles away from the histopathology laboratory on site 2. Samples are transported in large specimen containers via regular inter-site van runs. MDT meetings occur on a Wednesday afternoon.

Table 1: Proposed change ideas and activities

A number of change ideas and SMART (specific, measurable, achievable, relevant, timely) goals were identified and actioned via a series of PDSA (Plan-Do-Study-Act) cycles.

Idea	Specific	Measurable	Achievable	Relevant	Timely	PDSA cycle
Understand process pathway and timepoints	Map pathway. Improve communication and provide education around urgency of lung samples for endoscopy staff, pathology reception and laboratory staff	Sample collection to issue of a complete histopathology report and action of reflex molecular testing (Time = Outcome Metric)	Identify all steps involved in pathway. Discussion and communication with all staff groups via MDT/discussion in laboratory	Earlier availability of results = earlier treatment and management for optimum patient outcomes	Jan 2024	1
Mid-morning sample run	Co-ordination of endoscopy samples with pathology transport van runs	Sample collection to receipt in laboratory (Time = Process Metric 1)	Communication with endoscopy staff	Reduced sample time in transit = rapid processing in laboratory and improved sample quality.	Jan 2024	2
Designated sample transport box	Aid easy identification and fast-tracking of lung samples for porters and pathology reception staff	Sample collection to receipt in laboratory (Time = Process Metric 1)	Sourcing and labelling of transport boxes. Communication with porters and pathology reception staff	Reduced sample time in transit = rapid identification and processing in laboratory and improved sample quality.	April 2024	3
Proactive pull of results through the system	Monitoring of lung MDT lists by genomic navigator	Sample collection to completion of IHC testing and reflex molecular testing (Time = Process metric 2) Sample collection to authorisation of a complete histopathology report (Time = Outcome Metric)	Genomic navigator in place (temporary external funding)	Earlier availability of results = earlier treatment and management for optimum patient outcomes	May 2024	4
Bright highlight label for lung IHC testing	Aid easy identification and fast-tracking of lung samples for laboratory staff	Sample collection to completion of IHC testing and reflex molecular testing (Time = Process metric 2) Sample collection to authorisation of a complete histopathology report (Time = Outcome Metric)	Simple and easy to implement	Earlier availability of lung ICH results leads to quicker action of reflex testing and earlier availability of results = earlier treatment and management for optimum patient outcomes	June 2024	5

Image A: Designated sample transport box

Image B: Highlight sticker

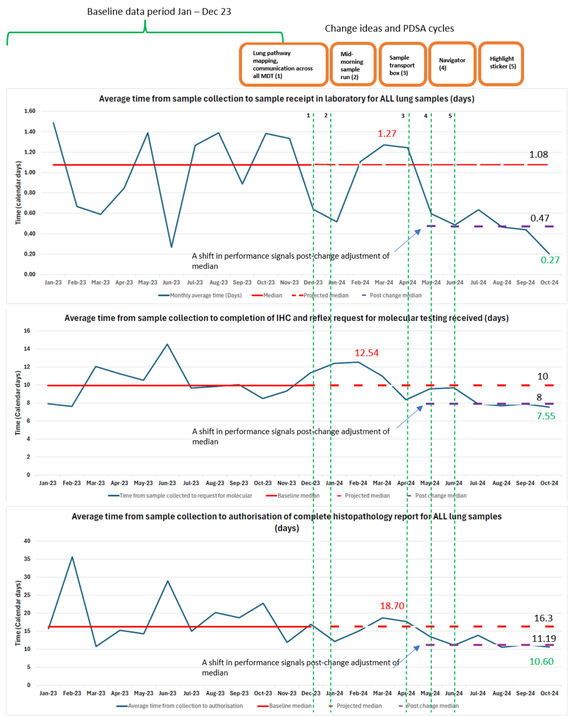

Figure 2: Run chart - Process metric 1: Sample collection to sample receipt in laboratory for ALL lung samples

Mapping of the pathway and corresponding baseline data highlighted a delay in the time from sample collection to receipt in the laboratory in the previous year for all lung samples. We instigated engagement and education of endoscopy and pathology staff (PDSA 1) and introduced an extra mid-list transport run coordinated with pathology transport van (PDSA 2). After monitoring with insignificant change, we implemented dedicated urgent lung sample transport boxes (PDSA 3).

We stabilised transport times, reducing the variability in length of time samples took to reach the laboratory. There was a reduction of the baseline median time from lung biopsy collection to receipt in the laboratory by 0.6 days from 1.08 days (peak at 1.27) to 0.47 days (low at 0.27).

Furthermore, lung samples were able to be identified on receipt in pathology reception and fast-tracked for same day processing.

Figure 3: Run chart: Process metric 2: Sample collected to completion of IHC and reflex request for molecular testing

An externally funded genomic navigator allowed for proactive monitoring of lung MDT lists enabling samples to be 'pulled through' the laboratory in time for the following MDT meeting (PDSA 4). This also improved communication with the reporting pathologist. We noted that reports were held up due to IHC testing and as reflex testing for molecular testing is not performed until all IHC testing is complete and reported, this was impacting time to request for molecular testing. Implementation of a simple highlight sticker (PDSA 5) enabled rapid identification and subsequent prioritisation of these samples following requests for IHC testing in the laboratory.

There was a corresponding improvement in the onward referral to genomic testing (PDL1, Lung DNA and RNA NGS panels). We reduced the variation and stabilised the baseline median time from sample collection to completion of IHC and reflex request for molecular testing from a median of 10 days (peak 12.54 days) down to a consistent median of 8 days (low 7.55).

Figure 4: Run chart – Outcome metric: Sample collection to histopathology report authorisation for ALL lung samples

We identified that there can be an administrative delay from completion of IHC testing and discussion at MDT, to the availability of a complete histopathology report in our LIMS.

Through the combination of PDSA cycles, we observed a stabilisation of the pathway and a corresponding reduction in the baseline median time from sample collection to authorisation of the cellular pathology report by 5 days, from 16.3 days (peak at 18.7 days) down to 11.19 days (low at 10.60 days) over the period of January to October 2024.

Conclusions:

Understanding every step that the tissue sample takes during the pathway and coordinating each of these elements was critical. Collaboration between the MDT and multiple other staff and services was essential. Minor changes across the pathway with minimal cost can result in substantial improvements. Further change ideas are being considered to reduce this pathway further in-line with the National Optimal Lung Cancer Pathway (NOLCP) and the Cancer Genomics Improvement Programme (CGIP).

Next steps:

The laboratory team continue to maintain close communication with the lung MDT. Further ideas for new PDSA cycles include splitting of lung core biopsies to increase sample availability and reduce time to reflex testing, upfront IHC on cases clinically identified as likely lung cancer, improved histopathological reporting of sample quality to streamline onward assessment and referral for genomic testing, and automated electronic requesting of molecular testing via the LIMS.

References:

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National Optimal Lung Cancer Pathway. For suspected and confirmed lung cancer: Referral to treatment. Update 2020, Version 3.0. Available at: PowerPoint Presentation

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