

NHS Lothian

Internal Audit 2024/25

Theatre Productivity Review

February 2025

Final Report

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Executive summary



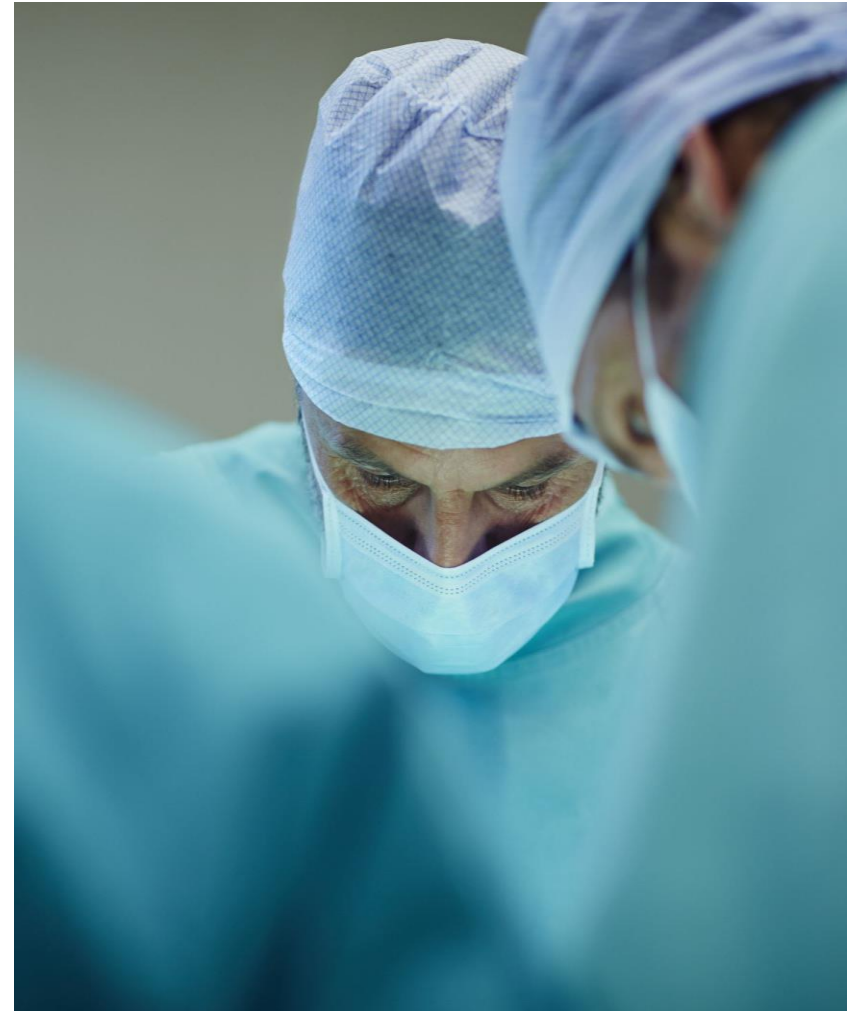
Background

Theatre productivity is critical for maximising the utilisation of operating theatres, ensuring timely surgical interventions, and optimising the use of resources. Effective management of theatre productivity can lead to improved patient outcomes, reduced waiting lists, and enhanced financial performance.

Theatre services at NHS Lothian has a process that allows them to schedule and plan weekday theatre activity through a weekly multi-disciplinary matrix meeting and they are currently introducing a new scheduling tool that they anticipate will further improve the process. The matrix meeting plans six weeks ahead to allow time to ensure there are appropriate levels of staffing and the correct equipment available.

The aim is that where it is not possible to secure the appropriate resources and arrangements, the matrix meeting allows time for unallocated theatre space to be utilised by another speciality.

This review will consider the effectiveness of the matrix process in optimising theatre productivity for agreed specialities and will assess if NHS Lothian's Board is sufficiently sighted and understands any gaps in theatre productivity.



Executive summary



Objectives

Our review focussed on the following key risks:

- Poor scheduling can impact the effective utilisation of theatre time and result in delays and cancellation of operations.
- Extended turnaround times between surgeries can impact theatre productivity.
- Ineffective utilisation of workforce and the physical resources can impact patient safety and reduce theatre productivity.
- Ineffective management of theatre case lists can result in delays and lost theatre time.
- NHS Lothian Board is not sufficiently sighted on accurate metrics associated with the performance and activity related theatre productivity.



Limitations in scope

Our findings and conclusions will be limited to the risks identified above. The scope of this audit does not allow us to provide an independent assessment of all risks and controls linked to the Theatre Productivity review.

Where sample testing is undertaken, our findings and conclusions will be limited to the sample tested only. Please note that there is a risk that our findings and conclusions based on the sample may differ from the findings and conclusions we would reach if we tested the entire population from which the sample is taken.

This report does not constitute an assurance engagement as set out under ISAE 3000.



Acknowledgement

We would like to take this opportunity to thank your staff for their co-operation during this internal audit.

Headline messages



Conclusion

Moderate Assurance

We have undertaken a review of processes and controls around managing theatre productivity. We have concluded that the processes have provided a rating of Moderate Assurance. This was confirmed through testing in specific areas of the organisation and through discussions with management.

The objectives reviewed are set out on the following page with the assurance rating we have assessed for each one and the number of recommendations raised. We have reported by exception against the areas where we consider that Management and the Audit Committee should focus their attention.

We have observed a weekly Matrix meeting and a weekly 'Red Flag' meeting at both the Royal Infirmary Edinburgh and the St John's Hospital. Our interviews and observations demonstrate that there are established arrangements in place that enable a timely and collaborative approach to monitoring and managing theatre productivity.

There are clear lines of reporting at each level of the organisation that allows gaps in theatre productivity or deterioration in performance to be identified promptly and escalated appropriately.

There is evidence to demonstrate that theatre services are responsive in addressing gaps in both performance and oversight; following the recent introduction of the 'Red Flag' meeting. However, further work is needed to engage medical staff with standardising the implementation and embedding the INFIX tool across all specialities.

In addition, the 'Red Flag' forum requires a Terms of Reference to be developed in order to formalise the process for allocating and declining the inclusion of additional procedures to optimise theatre utilisation in line with NHS Lothian's targets.



Headline messages



Conclusion

We have raised 3 recommendations. The grading of these recommendations, based on risk, is summarised in the table below.

Objectives	Assurance rating	Number of recommendations			
		High	Medium	Low	Imp
Poor scheduling can impact the effective utilisation of theatre time and result in delays and cancellation of operations.	Moderate Assurance	-	1	1	-
Extended turnaround times between surgeries can impact theatre productivity.	Assurance	-	-	-	-
Ineffective utilisation of workforce and the physical resources can impact patient safety and reduce theatre productivity.	Assurance	-	-	-	-
Ineffective management of theatre case lists can result in lost theatre time.	Moderate Assurance	-	-	1	-
NHS Lothian Board is not sufficiently sighted on accurate metrics associated with the performance and activity related theatre productivity.	Assurance	-	-	-	-

Summary of findings



Examples of where recommended practices are being applied

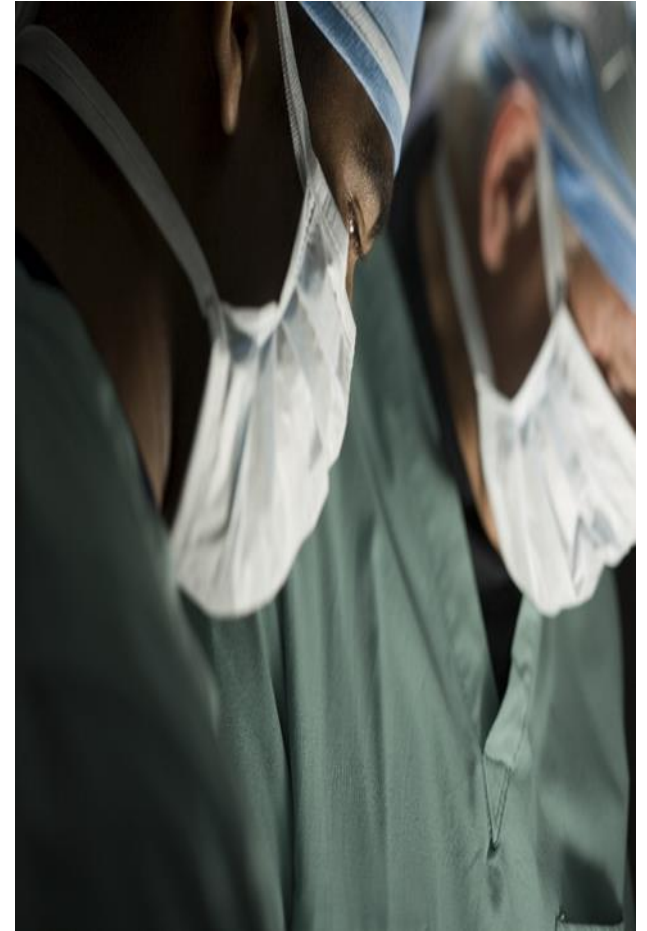
- There is an established weekly scheduling meeting that has representation from the Anaesthetist Rota Manager, Clinical Nurse Managers and Leads from theatres, Speciality Service managers and Waiting List Managers.
- There is established monitoring and oversight of theatre activity and theatre utilisation at each level of the organisation that allows gaps in productivity to be identified and addressed in a timely manner including the turn around times for each theatre procedure and late and early start times for each procedure are reported by speciality in the theatre dashboard.
- There are established lines of escalation and reporting regarding theatre activity that allows executive oversight of theatre performance.
- The data within the theatre dashboard informs monthly discussions between the Clinical Service Lead from Theatres and the Speciality at local Inpatient Day Case meetings. This allows gaps in utilisation or emerging themes such as delays in turn around times to be better understood by both Theatres and the Speciality.
- There are established and formalised daily safety huddles in Theatre at each site. This provides an additional opportunity to review the previous days performance and discuss what worked well and issues that could have been managed better. This forum allows an additional opportunity to revisit the order of theatre lists to ensure maximum utilisation and to address any gaps in theatre staffing that may arise due to sickness .
- Work has been undertaken to build and develop a multi-skilled workforce in theatres that provides increased resilience and flexibility in optimising the utilisation of theatres.
- In response to recognised issues, such as the capacity of pre-assessment appointments, there is evidence that Theatre services seek to mitigate and address emerging challenges. For example, the work undertaken to extend pre-assessment times and develop pools of patients that can back fill short notice cancellations.
- There are formal and informal arrangements in place to facilitate effective engagement and communication between Theatres, Specialities and Waiting List Managers.
- The Matrix meetings observed were attended by key personnel that allowed key decisions to be made in regard to the effective management of theatre availability in a timely manner.
- There is evidence to demonstrate that theatre performance and utilisation is routinely reported at a local speciality level and through the Site Inpatient Day Case Delivery Group and the Scheduled Care Delivery Board ensuring regular and sufficient oversight of the key performance metrics related to theatre productivity.

Summary of findings



Areas requiring improvement

- The implementation and embedding of the INFIX (the theatre scheduling tool) across all specialities to standardise oversight and arrangements in maximising theatre productivity.
- The Standard Operating Procedure that underpins the Matrix process requires updating to reflect the current process and aligning to the 'Red Flag' meetings.
- The recently established 'Red Flag' meetings require a Terms of Reference to be developed that formalises the approach for managing any under utilisation when it arises.



Detailed findings

Objective 1.

Poor scheduling can impact the effective utilisation of theatre time and result in delays and cancellation of operations.

Moderate Assurance

Finding and implications	Audit recommendation	Management response, including actions
<p>Consultants create planned theatre lists six weeks ahead of surgery which are then populated on Trak, the electronic patient management system. Trak automatically generates patient letters and books anaesthetic pre-assessments. Whilst the timing of this allows sufficient time to re-book any cancellations, it is recognised that the capacity of pre-assessment teams can limit the opportunity to back fill short notice cancellations of theatre slots. To address this work is being undertaken to extend pre-assessment booking times and create pools of patients for some surgical lists to increase the opportunity to back fill theatre slots due to late cancellations. This work has not formed part of our review.</p> <p>INFIX the national theatre scheduling tool, is currently being rolled out across NHS Lothian with the aim of reducing hospital waiting times and improving operating theatre efficiency by automating and standardising the key stages of theatre planning. INFIX allows the theatre lists to be created from the local services waiting lists. There is a formalised roll out plan for INFIX with the imminent roll out to General Surgery and Colo-rectal services at the time of reporting. The progress of the INFIX roll out is reported to the In-Patient Day Case Delivery Board. However, there remain some specialities where the plan to introduce the INFIX tool requires agreement. This may indicate further communication with the Consultants is required to highlight the benefits and effectiveness of INFIX in optimising theatre productivity. (Recommendation 1)</p>	<p>Recommendation 1</p> <p>To maximise utilisation of all theatres processes NHS Lothian should prioritise engagement with those specialities not yet using INFIX to understand the delays and seek solutions so the process can be standardised across all specialities.</p>	<p>Actions:</p> <p>Complete Rollout for elective specialty lists</p> <p>Responsible Officer: Iain Gorman Director DATCC</p> <p>Executive Lead: Michelle Carr Chief Officer Acute Services</p> <p>Due Date September 2025</p>
<p>NHS Lothian has an established weekly Matrix meeting that is supported by a Standard Operating Procedure. The SOP has recently been updated to assist in standardising the process across the sites NHS Lothian has theatres. A review of the SOP indicates that it needs updating to reflect the introduction of the 'Red Flag' meetings as the Matrix meeting no longer reviews the utilisation of theatre Lists. (Recommendation 2)</p> <p>The theatre matrix template is an excel spreadsheet held on a shared drive that can be updated by theatres and specialities providing a real time view of theatre capacity related to consultant and anaesthetic cover, scrub teams' availability, specialist equipment and utilisation for each booked session. This allows any gaps in resource to be identified, and alternative arrangements made. Adjustments are made to the matrix from immediate feedback, provided real time updates.</p> <p>The Matrix meeting incorporates theatre closures and demonstrates that consideration is given to planned High Dependency and Intensive Care Unit admissions. Our observation of the matrix meetings indicates that there is good representation from Specialities and Waiting List Managers in line with the SOP. This allows key decisions to be made in a timely manner and focus is given to theatre slots that are identified. The meetings observed were focused on reviewing theatre bookings to optimise utilisation of the resource. There was evidence of strong collaboration across departments to manage any adjustments to the matrix, and a solution focused approach observed in trying to maximise the use of theatres.</p>	<p>Recommendation 2</p> <p>To strengthen the Matrix Standard Operating Procedure the document should be updated to reflect current arrangements.</p>	<p>Actions:</p> <p>Update Matrix SOP to reflect current arrangements</p> <p>Responsible Officer: Iain Gorman Director DATCC</p> <p>Executive Lead: Michelle Carr Chief Officer Acute Services</p> <p>Due Date Completed February 2025</p>

Detailed findings

Objective 4.

Ineffective management of theatre case lists can result in lost theatre time.

Moderate Assurance

Finding and implication	Audit recommendation	Management response, including actions
<p>NHS Lothian has undertaken significant work to identify the local median timings for operational procedures to encourage Consultant body engagement. This data is used by INFIX to flag/alert any theatre lists which are under booked by more than 10%.</p> <p>A weekly 'Red Flag' meeting has been introduced at each of the sites to monitor and challenge the under utilisation of theatre sessions. These meetings are attended by Speciality Service Leads, and Theatre Leads and Waiting List Managers from the specialties. However, there is no representation from Clinicians.</p> <p>The 'Red Flag' meeting reviews the utilisation of individual theatres from the previous week and then looks forward to the proposed utilisation of theatre sessions in the coming three weeks. This approach allows the members of the meeting to learn and build confidence in the effectiveness of the INFIX tool in managing theatre lists, and in the decisions of the 'Red Flag' meeting to add additional cases to those theatre lists that alert as under booked. However, this information may not be as evident to the consultant body as they are not routinely present at the forum. [Recommendation 3]</p> <p>We did observe on several occasions during the 'Red Flag meetings that the view of a Clinician was needed before a decision to add an additional case to a theatre list could be agreed. However, the meeting was frequently told that the Consultants had requested no additional cases be added to their list and there was limited push back if the Consultant says they cannot do another case. This decision should be more formalised and documented. [Recommendation 3]</p> <p>We challenged theatre staff and staff from the waiting list team that there was a potential risk that decisions related to theatre list utilisation remained Consultant led. Staff we spoke to told us this was not the case and that where a Consultant refuses to increase their lists to optimise utilisation, this would be escalated to the Speciality Leads to address. However, the outcome of any escalations was not evidenced in the 'Red Flag' meetings we observed.</p> <p>It is recognised that the 'Red Flag' meeting is relatively new and remains an evolving forum. It is not yet supported by a formal terms of reference which would provide greater clarity on when an addition to theatre lists can be routinely extended to maximise utilisation. [Recommendation 3]</p>	<p>Recommendation 3</p> <p>a) To formalise the 'Red Flag' forum a Terms of Reference should be developed that outlines process to increase utilisation to the required 90% target.</p> <p>b) Where Consultants request theatre lists not be fully utilised, there should be formally documented consideration of reasons by the 'Red Flag' meeting.</p> <p>c) Meetings should include the attendance of Medical representation where persist under utilisation of theatre lists has been identified.</p>	<p>Actions:</p> <p>a) Develop terms of Red Flag meeting Due Date Completed February 2025</p> <p>b) INFIX updated to remove ability to alter times 2024 - Planned utilisation can be reduced but requires comment/reason to be recorded. Red flag meeting needs developed to include retrospective review of these changes Secondary note added to Matrix template if session under booked (for example to accommodate urgent cases) Booking accuracy Dashboard developed – testing in progress.</p> <p>c) Specialty Theatre KPIs discussed at Local IPDC /Theatre User Groups – both have medical representation. Specific session underutilisation highlighted at Theatre Prioritisation meeting ('use it or lose it' process). Surgical specialty responsibility to highlight with operators to be rolled out across acute system. Surgeon/AMD representation at Acute IPDC and Scheduled Care Delivery board to agree actions for improvement</p> <p>Responsible Officer: Iain Gorman Director DATCC</p> <p>Executive Lead: Michelle Carr Chief Officer Acute Services</p> <p>Due Date September 2025</p>

Appendices

Appendix 1: Staff involved and meetings observed



Staff Involved

- Iain Gorman – Service Director of Anaesthetics, Diagnostics, Theatres & Intensive Care
- Kevin McNab – Clinical Service Manager Anaesthetics Theatres & Critical Care
- Danny McGee – Clinical Service Manger Anaesthetics Theatres & Critical Care
- Jane MacDonald – General Manager Anaesthetics Theatres & Critical Care
- Michal Merwa – Assistant Service Manager Anaesthetics Theatres & Critical Care
- Gordon Mills – Deputy Associate Nurse Director
- Lisa Watson – Health Records Manager
- Ona Lally – Senior Waiting List Manager



Meetings Observed

- Royal Infirmary Red Flag meeting – 02/12/24
- Royal Infirmary matrix meeting – 03/012/24
- St John's Red Flag meeting – 10/12/24
- St John's matrix meeting – 11/12/24

Appendix 2:

Documents reviewed



Documents Reviewed

- Anaesthetics, Theatres, Critical Care (ATCC) overview
- Matrix process Standard Operating Procedure (SOP)
- Matrix screen shot
- Staff Ratio Tool
- Theatre Dashboard
- Theatre Prioritisation Meeting Agendas
- Theatre Prioritisation Meeting Terms of Reference
- Gynae In patient Day Case (IDPC) Action Log
- Site In patient Day Case meeting minutes & agendas
- In Patient Day Case Delivery Board minutes & agendas
- Infix report to Inpatient Day Case Board
- Scheduled Care Delivery Board Terms of Reference April 2024
- Scheduled Care Delivery Group – highlight report
- Example of daily theatre safety brief
- Band 4 Review
- Health Roster
- Session Availability Change Report to Site Management Group
- KPI report to Senior Management Team

Appendix 3:

Our assurance levels

The table below shows the levels of assurance we provide and guidelines for how these are arrived at. We always exercise professional judgement in determining assignment assurance levels, reflective of the circumstances of each individual assignment.

Rating*	Description
Significant Assurance	<p>The Board can take reasonable assurance that the system(s) of control achieves or will achieve the control objective. There may be an insignificant amount of residual risk or none at all.</p> <p>There is little evidence of system failure and the system appears to be robust and sustainable. The controls adequately mitigate the risk, or weaknesses are only minor (for instance a low number of findings which are all rated as 'low' or no findings)</p>
Moderate Assurance	<p>The Board can take reasonable assurance that controls upon which the organisation relies to achieve the control objective are in the main suitably designed and effectively applied. There remains a moderate amount of residual risk.</p> <p>In most respects the "purpose" is being achieved. There are some areas where further action is required, and the residual risk is greater than "insignificant".</p> <p>The controls are largely effective and in most respects achieve their purpose with a limited number of findings which require management action (for instance a mix of 'medium' findings and 'low' findings)</p>
Limited Assurance	<p>The Board can take some assurance from the systems of control in place to achieve the control objective, but there remains a significant amount of residual risk which requires action to be taken.</p> <p>This may be used when:</p> <ul style="list-style-type: none"> • There are known material weaknesses in key control areas. • It is known that there will have to be changes that are relevant to the control objective (e.g. due to a change in the law) and the impact has not been assessed and planned for. <p>The controls are deficient in some aspects and require management action (for instance one 'high' finding and a number of other lower rated findings)</p>
No assurance	<p>The Board cannot take any assurance from the audit findings. There remains a significant amount of residual risk.</p> <p>The controls are not adequately designed and / or operating effectively and immediate management action is required as there remains a significant amount of residual risk (for instance a number of HIGH rated recommendations)</p>

Appendix 3:

Our recommendation ratings

The table below describes how we grade our audit recommendations based on risks:

Rating	Description	Possible features
High	Findings that are fundamental to the management of risk in the business area, representing a weakness in the design or application of activities or control that requires the immediate attention of management	<ul style="list-style-type: none"> • Key activity or control not designed or operating effectively • Potential for fraud identified • Non-compliance with key procedures/standards • Non-compliance with regulation
Medium	Findings that are important to the management of risk in the business area, representing a moderate weakness in the design or application of activities or control that requires the immediate attention of management	<ul style="list-style-type: none"> • Important activity or control not designed or operating effectively • Impact is contained within the department and compensating controls would detect errors • Possibility for fraud exists • Control failures identified but not in key controls • Non-compliance with procedures/standards (but not resulting in key control failure)
Low	Findings that identify non-compliance with established procedures, or which identify changes that could improve the efficiency and/or effectiveness of the activity or control but which are not vital to the management of risk in the business area.	<ul style="list-style-type: none"> • Minor control design or operational weakness • Minor non-compliance with procedures/standards
Improvement	Items requiring no action but which may be of interest to management or which represent best practice advice	<ul style="list-style-type: none"> • Information for management • Control operating but not necessarily in accordance with best practice

