Driving Operational Excellence in Hospital Theaters

Operating theaters are some of the most in-demand spaces in any healthcare facility. Efficient use of theater time has a direct impact on patient outcomes and is crucial for controlling costs, optimizing staff utilization and generating revenue.

Hospital leaders, theater managers, and booking teams need the right data to monitor and optimize utilization to improve operational efficiency and patient outcomes.

The client challenge

There were two core challenges facing this healthcare provider – poor data quality and a lack of visibility. Theaters generate large amounts of complex operational data, with multiple stages to each booking, and this complexity is compounded by multi-level session planning. As a result, senior executives lacked a consolidated view of utilization across all 47 sites.

This lack of visibility was also felt at an operational level. Unused time could not easily be reallocated, the impact of late arrivals was not adequately understood and it was difficult to make performance assessments due to incomplete data.

Incomplete data was a symptom of a wider problem with data quality and definitions of utilization varied widely between hospitals, leading to inconsistent reporting.

These issues were present across the provider's 47 sites. If all hospitals achieved 80% utilization, the potential cost savings were estimated to be in the millions annually.

The client needed a system that allowed it to:

- Track session-level theater performance and full-day theatre capacity

- Identify inefficiencies such as early finishes, delayed starts and unused sessions

- Plan and reallocate future sessions

- Provide accurate metrics for consultant performance and procedure planning

The solution

Thorogood developed a comprehensive Power BI reporting suite anchored on a robust data model that combined planning-level and booking-level granularity. This enabled hospital teams to compare planned theater use with actual patient bookings. The solution incorporated up to 13 timestamps for different events that could happen over a booking such as patient arrival, anesthesia given, knife-to-skin, and recovery exit, to help identify the causes of delays.

For this new solution to be effective, the quality of the data needed to be improved. Thorogood first helped the healthcare provider to align its definitions across all sites. Once the solution was implemented, missing or incorrect data was flagged to ensure that the overall picture was as accurate as possible. The system also revealed behavioral patterns, including recurring cancellations, underuse, and consistent late starts, allowing targeted interventions.

The right way

Thorogood combined a deep understanding of the business challenges the healthcare provider faced with the right application of technology to drive measurable impact. The team designed and delivered a robust Data Lakehouse platform on the Microsoft Azure cloud. A modern Delta Lake architecture was implemented for scalable, high-performance processing of the data and a metadata-driven ingestion framework enabled faster onboarding of new data sources.

The sensitivity of much of the data, which qualified as PII (personally identifiable information), meant security was essential. A secure development setup and a quarantine layer protected patient data while allowing for the operational analysis the healthcare provider needed to improve patient outcomes.

The project was co-created with the client, evolving from a single theater utilization report to a dedicated dashboard suite serving multiple user personas as requirements became clearer.

The results

The solution transformed visibility of theater utilization, making it possible to proactively adjust bookings, reduce idle time, and improve throughput. Clear KPIs at hospital, theater, and consultant levels allowed better resource allocation and performance oversight. The approach also informed strategic decisions on theater capacity, such as whether to open or close facilities.

The reimagined dashboard transformed visibility of theater utilization, delivering actionable insights across five core reporting areas:

- In-session – Metrics include actual vs. booked utilization, early and late session starts, and downtime within sessions

- Full-day – Minute-by-minute and 15-minute slot-based utilization across operational capacity bands

- Upcoming– Forecasts of theater activity, unallocated sessions, and consultant planning views

- By procedure – Average and actual procedure durations by each procedure type, aiding smarter booking allocations

- Data quality – Raw timestamp extracts to aid with historic data quality assessments

Different users have benefited in different ways: hospital directors can use the system for performance management, booking teams to fill gaps created by cancellations, and operational managers to analyze trends and improve planning.

Following this success, the healthcare provider is exploring the application of similar approaches to outpatient consulting room utilization. Minor enhancements to the theater solution are also planned.

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