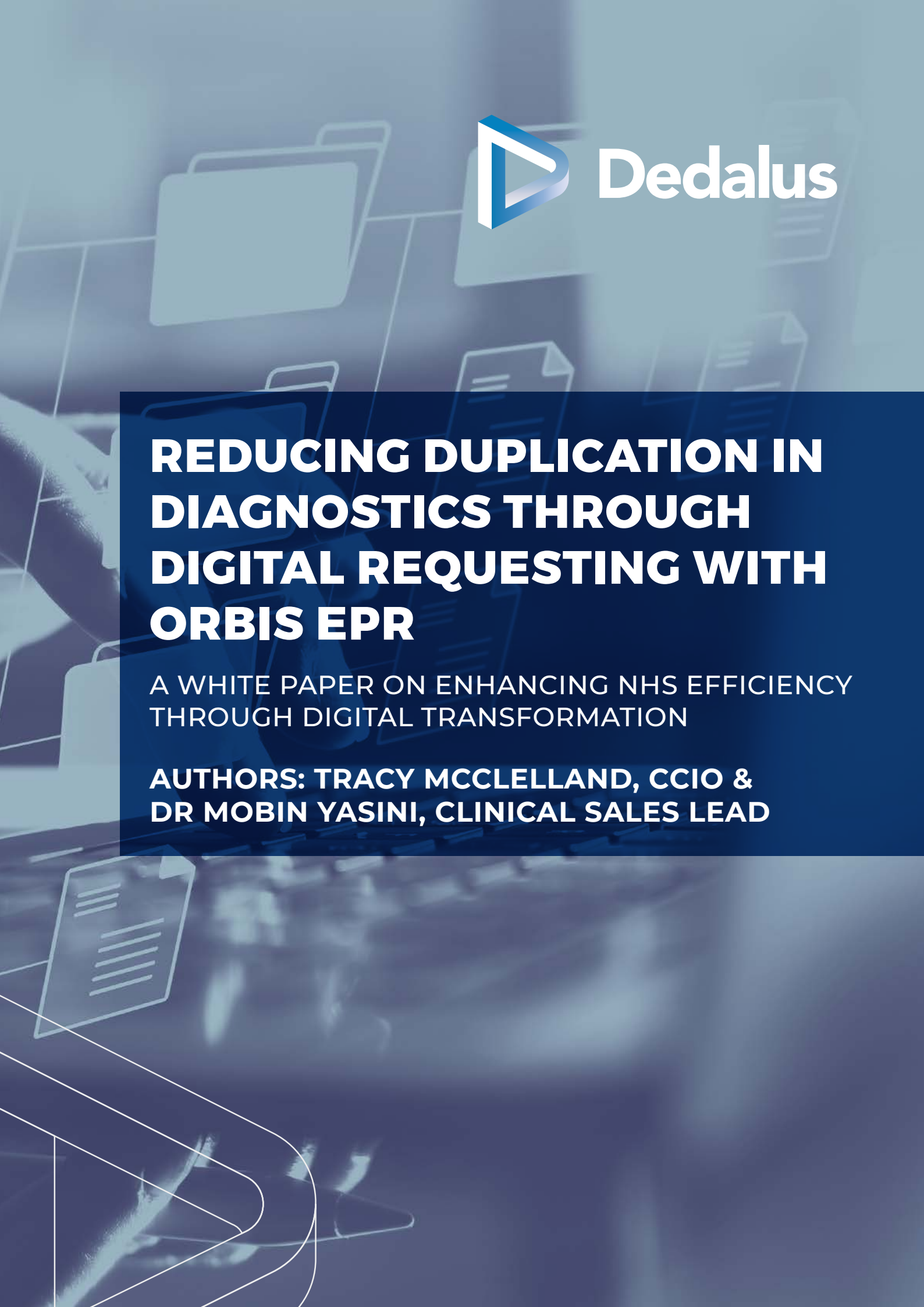

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REDUCING DUPLICATION IN DIAGNOSTICS THROUGH DIGITAL REQUESTING WITH ORBIS EPR

A WHITE PAPER ON ENHANCING NHS EFFICIENCY THROUGH DIGITAL TRANSFORMATION

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Executive Summary

Diagnostic test duplication poses significant challenges for the NHS, contributing to causing increased costs, inefficiencies, and patient discomfort. Traditional paper-based processes lack visibility into previous diagnostic orders, leading clinicians to unnecessarily repeat tests. This results in resource waste, operational delays, and potential patient harm – critical concerns in an NHS facing intense resource pressure.

The Challenge of Diagnostic Duplication in the NHS

Diagnostic test duplication represents a significant challenge for the NHS, contributing to:

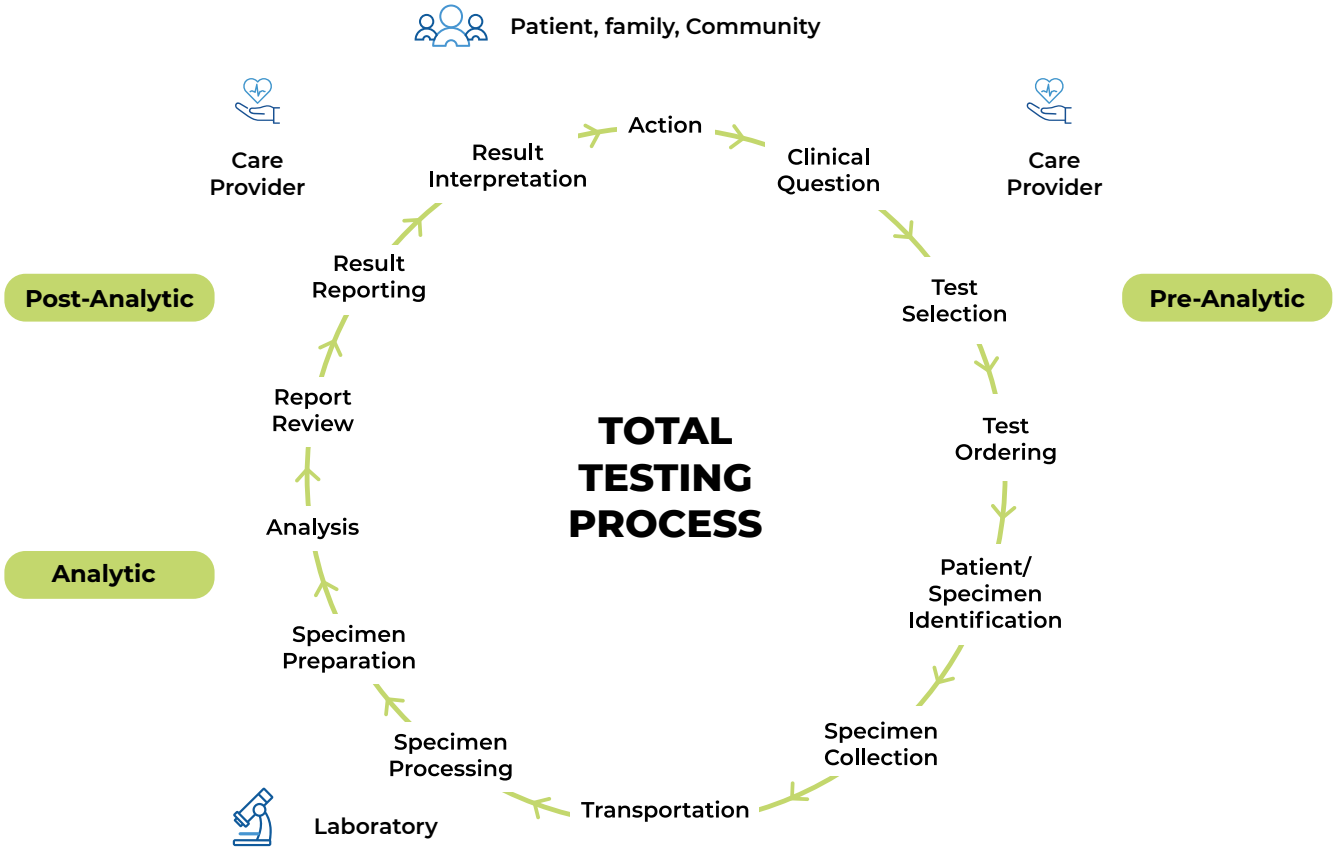
- Increased healthcare costs
- Operational inefficiencies
- Unnecessary patient discomfort
- Resource waste in an already pressured system

Traditional paper-based processes lack visibility into previous diagnostic orders, often leading clinicians to unnecessarily repeat tests when patients are seen across different care settings or by multiple providers.

The Total Testing process in Laboratory Medicine:

A Focus on Pre-Analytical Vulnerabilities and Diagnostic Duplication

The complete process of laboratory testing (Total Test Process) begins with a clinical question. It involves the patient and at least one healthcare provider. Each step is itself subdivided into several sub-steps. The proper functioning of laboratory medicine depends on the correct execution of all these steps. Some evidences emphasize the complexity of diagnostic processes, noting the critical phases (pre-analytic, analytic, and post-analytic) in which errors, frequently occur (1).



The Total Testing Process in Laboratory Medicine: From Clinical Question to Diagnostic Action

While the analytical phase has seen significant error reduction through automation, technological improvements, standardization, better-trained personnel, and defined quality control protocols, the pre-analytical phase remains the most vulnerable. Studies demonstrate that up to 67% of laboratory test requests may be inappropriate or redundant, significantly impacting NHS resources and patient care quality—a particular concern given the NHS's focus on improving efficiency and reducing waiting times.

Digital Requesting as a Solution

The digital requesting module embedded in the Orbis EPR plays a pivotal role in reducing diagnostic test duplication and inappropriate test ordering within NHS Trusts, particularly in the vulnerable pre-analytical phase. This digital solution transforms the traditionally opaque and error-prone test-ordering process into a transparent, evidence-based, and patient-context-aware clinical activity. Key features include:

- **Real-time visibility of previously ordered tests:** Orbis retrieves and displays prior test orders and results directly within the clinician's ordering interface. This visibility is crucial in reducing redundancy, especially when patients are seen by multiple providers or transferred across departments. Displaying past orders reduces unnecessary repeats, minimizes patient burden (e.g., additional blood draws), and decreases costs.

- **Automated alerts to clinicians about potential duplicates:** Orbis implements rule-based logic to trigger alerts when a test is ordered too soon after a previous request. For example, if a test like HbA1c or HCV serology is reordered within a timeframe considered clinically irrelevant, the system prompts the user with a duplication warning. This alert is context-aware and embedded in clinical workflows. Such automated reminders have shown a 47% reduction in redundant test orders (2) supporting NHS efforts to reduce unnecessary spending.

- **Integration of evidence-based decision-support tools within clinical workflows:** Digital ordering in Orbis is enriched by clinical decision support (CDS) mechanisms that utilize patient data (e.g., age, diagnosis, medications) to recommend or suppress test options based on NHS guidelines and protocols. These tools are underpinned by guidelines, which ensure clinical rules are actionable, context-specific, and computable. For example, an alert may guide the physician to consider specific virology or autoimmune panels only if clinical criteria are met. Studies confirm that this integration improves adherence to best practices and reduces cognitive burden (3,4).

Evidence from Research

Research has consistently demonstrated the benefits of integrated digital decision-support systems in reducing redundant tests:

- **Automated Clinical Decision-Support Systems:** Studies reported significant reductions in duplicate and unnecessary test orders through automated alerts provided at the point of ordering (2,5).

- **Computational Modeling:** Structured modeling, such as Unified Modeling Language, enables precise guideline translation into actionable system interventions (4) aligned with NHS pathways.

- **Clinical Validation:** Another study demonstrated increased adherence to guidelines through automated reminders, significantly decreasing unnecessary diagnostics (3).

Impact and Outcomes

The implementation of digital requesting via Orbis EPR results in measurable clinical and operational improvements:

- **Cost Savings:** Reduced resource use and financial burden through minimized duplicate testing (6), critical for patient safety and in the context of NHS budget constraints.

- **Workflow Efficiency:** Improved clinician productivity and faster decision-making processes (7), helping address NHS workforce challenges.

- **Patient Safety and Experience:** Decreased patient discomfort and procedural risks associated with unnecessary testing, supporting the NHS commitment to patient-centered care.

Technical and Organizational Enablers

Successful implementation of Orbis EPR's digital requesting system is facilitated by:

- **Effective stakeholder engagement and clinical training:** Engaging clinicians, nurses, and administrative staff early in the implementation process ensures that the system meets the practical needs of its users. Comprehensive training programs, tailored to different user roles, help in building confidence and competence in using the new digital tools.

- **Redesign of standard operating procedures (SOPs) to align with digital workflows:** Transitioning from paper-based to digital systems requires thorough review and modification of existing NHS SOPs to align with the Long Term Plan's digital transformation goals.

- **Strong executive support and collaboration across clinical departments (8):** Leadership commitment is crucial for allocating resources, setting priorities, and driving cultural change. Encouraging collaboration across departments fosters a unified approach to implementation, addressing potential challenges and promoting shared ownership of the system's success.

Expanded Analysis

Digital requesting integrated within Orbis creates sustainable and continuous improvement in clinical practice. The structured data captured by Orbis enhances clinical research capabilities, facilitates data analytics, and promotes adherence to evolving clinical guidelines, thus ensuring practice relevance and improved outcomes.

Digital Requesting Directly Targets Pre Analytic Phase By:

- Structuring test panels according to patient context and NHS clinical guidelines.
- Enforcing mandatory fields and drop-down menus to reduce ambiguity in orders.
- Automatically checking for redundancy and temporal relevance.
- Connecting to lab catalogues in real-time to prevent unavailable or mismatched requests.

This reduces common sources of error such as illegible handwriting, incorrect test codes, and inappropriate test combinations

Data Driven Monitoring of Ordering Behaviour

Orbis EPR captures all ordering data digitally, enabling advanced analytics dashboards and audit trails. These tools support:

- Monitoring duplicate test rates across departments or specialties.
- Identifying high-frequency outliers in test ordering.
- Tracking time-to-result and time-to-clinical-action metrics.

Hospitals using Orbis can benchmark their duplicate test reduction performance longitudinally and against peer institutions.

Clinical and Economic Value

Reducing test duplication doesn't just cut costs, it also prevents:

- Unnecessary venipuncture and associated patient distress.
- Diagnostic confusion from unneeded tests (e.g., false positives).
- Delays due to congestion in lab workflows.

Enhancing Research, learning and Feedback loops

With structured data, Orbis allows researchers and managers to:

- Design retrospective and prospective studies on test ordering behaviors.
- Implement feedback mechanisms (e.g., monthly dashboards to clinicians).
- Run A/B testing or controlled rollouts of new ordering pathways.

Interoperability and Future Extensions

Orbis supports NHS interoperability standards such as HL7 FHIR, allowing diagnostic data and ordering behaviors to be integrated with:

- Regional Health Information Exchanges.
- National reporting frameworks.
- AI-powered clinical decision support systems (e.g., algorithms for high-value test panels).

This allows for cross-institutional tracking of test duplication and standardization of test utilization norms which is a crucial element in future healthcare harmonization.

Future Directions and Innovations

As the NHS continues its digital transformation, requesting systems like Orbis EPR are incorporating advanced technologies to further enhance diagnostic processes:

- **Artificial Intelligence (AI) and Machine Learning:** Integrating AI can provide predictive analytics, assisting clinicians in making more informed decisions and identifying potential diagnostic errors before they occur.
- **Interoperability Enhancements supporting NHS Shared care Records:** Improving data exchange between different healthcare systems ensures that clinicians have access to comprehensive patient information, reducing the likelihood of duplicate testing.
- **Mobile Accessibility for NHS staff and patients:** Expanding mobile capabilities allows healthcare providers to access and input information on-the-go, increasing flexibility and responsiveness in patient care.
- **Patient Engagement Tools integrated with the NHS APP and NHS Login:** Incorporating features that allow patients to view their test results and understand their care plans can lead to increased satisfaction and adherence to medical advice.in patient care.

Conclusion

Orbis EPR's digital requesting capabilities significantly decrease duplication in diagnostic tests, providing measurable improvements in cost, clinical efficiency, and patient safety. These findings highlight the critical role of integrated digital decision-support systems in achieving sustainable healthcare efficiency and high-quality patient care. By focusing on the areas of future directions and innovation, healthcare organizations can continue to improve the efficiency and effectiveness of diagnostic testing processes, ultimately leading to better patient outcomes and resource utilization.

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