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Analytics-led transformation of NHS outpatient and elective care services

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Executive Summary

This report examines how analytics changes the way NHS outpatient and elective care is delivered in an anonymised NHS Trust department. Dashboards, waiting-list validation and demand-capacity modelling can enhance the decision quality, it argues, but only if managers embrace analytics as a governed decision discipline instead of a technical cure-all. The four scenarios focus on the pathways redesign decision, changing the culture from compliance reporting to shared learning, establishing a multidisciplinary transformation cell, and a balanced performance-control system. The analysis is informed by NHS England's data, NAO and Parliamentary scrutiny, as well as theory relating to bounded rationality, evidence-based management, culture, psychological safety, team design, balanced scorecard and target gaming. The main recommendation is conditional adoption: analytics should be co-designed with clinicians, have robust data quality checks and rules, continuous equity monitoring, psychological safety, and learning-focused controls. This approach is more defensible than either dashboard optimism or resistance to measurement, because it links access recovery with patient safety, staff trust and ethical performance management.

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1. Introduction

NHS elective and outpatient services face sustained waiting-list pressure, productivity expectations and public accountability for access. This report provides policy context in terms of the NHS England elective recovery agenda and applies it to an anonymised NHS Trust outpatient/elective care department, as seen by an outpatient service improvement manager. It examines four interrelated areas: decision making, culture change, team effectiveness, and monitoring and control. The claim is that evidence, professional judgement and ethical governance must be designed together to help improve outpatient transformation through analytics.

2. Scenario 1 - Advanced Decision-Making Analysis

At the centre of the case is a practical decision: whether an anonymised NHS Trust outpatient and elective care department should adopt analytics-led waiting-list validation, demand-capacity review, patient-initiated follow-up (PIFU), and risk-based pathway prioritisation. From the viewpoint of an outpatient service improvement manager, the rational case is strong: outpatient pressure is large, with 146.1 million appointments, 113.2 million attendances and 8.1 million Did Not Attend appointments in England in 2024/25 (NHS England, Secondary Care Open Data and Publications, 2025). NHS England's reform plan also states that there were 7.5 million waiting-list pathways in October 2024, and that all trusts will see at least a five percentage point increase in their 18-week performance by March 2026 (Department of Health and Social Care and NHS England, 2025). Descriptive analytics, therefore, can provide a better indication of the queue, utilisation, DNA and breach-risk position than anecdotal management review.

Table 1: Decision-quality appraisal matrix for outpatient transformation

Lens	Contribution to the decision	Limitation in this case	Improvement implication
Rational decision model	Clarifies options, criteria and expected benefits	Assumes stable information and enough time	Use as a checklist, not a full description of reality
Bounded rationality	Explains pressure, incomplete data and satisficing	Can become an excuse for weak challenge	Build in clinical review and data-quality challenge
Evidence-based management	Links local choices to best available evidence	Evidence may not transfer cleanly across specialties	Combine national data, local audit and clinician judgement

But, analytics doesn't eliminate bounded rationality. Simon (1955) proposes that decision makers “satisfice” in the face of cognitive and informational constraints, which is appropriate for a national target pressure in the face of staffing constraints and incomplete pathway information. Official performance data shows activity gains, including value-weighted elective

activity at 121.8% of the 2019/20 baseline in March 2025 (NHS England, 2025a). However, long waits were not fully eliminated. External comment is less positive: The National Audit Office (2025) believes:

There has been no progress towards the aims of elective transformation programmes and the House of Commons Committee of Public Accounts (2025) reports that digital solutions may be used as a panacea for outpatient transformation and that there is no credible plan.

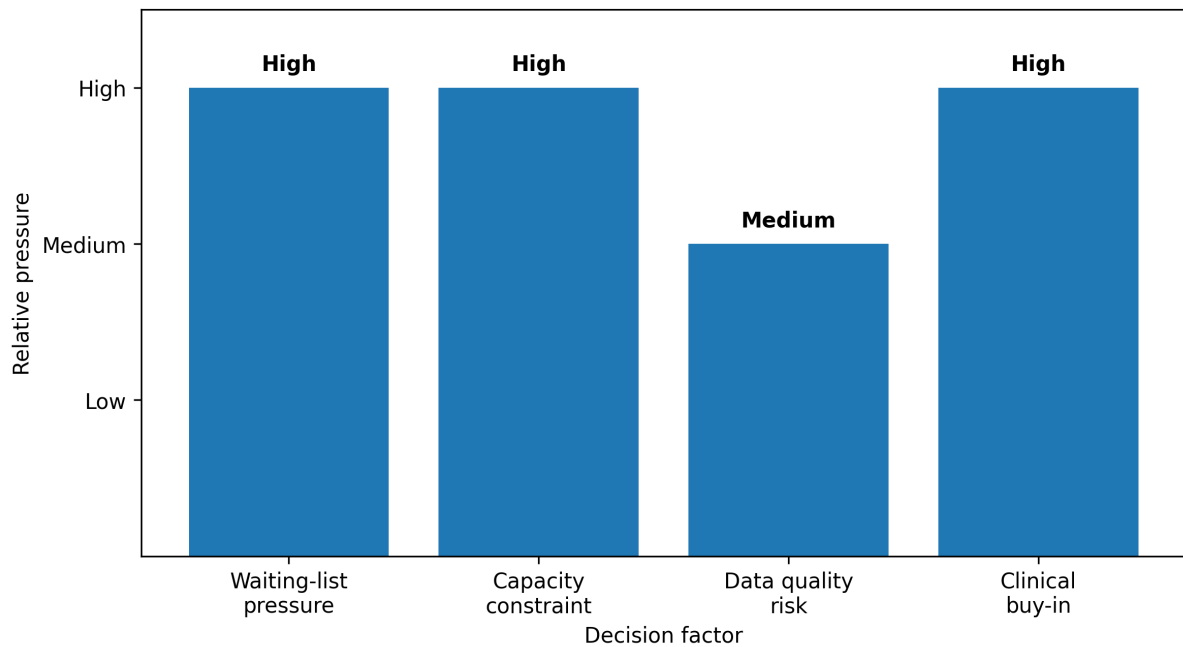
Public datasets can be a valuable source of information for visibility, but they are less suited for local causal inference. WLMDS also contains age and sex, ethnicity and deprivation fields although NHS England (2026) cautions that this is management information and should be treated with care. Outpatient statistics relate to appointments, not necessarily patient experience, acuity or hidden clinical work (NHS England, Secondary Care Open Data and Publications, 2025). Dashboard evidence is also mixed: Dowding et al. (2015) find that dashboards can improve care processes in some settings, but design, context and user response affect results. If managers use a waiting-list heat map as gospel without validating coding quality, duplicate entries, clinical need and specialty-level capacity, the decision would be a bad one.

Good decision making would blend three modes of analysis. Descriptive analytics will be used to display current waiting times, PIFU use, DNA rates and clinic utilisation. Predictive analytics would forecast the potential for breaches, specialties needs and staffing needs. Prescriptive analytics would evaluate the possibility of more validation sessions, guidance and direction, one more patient per clinic, or a targeted support in transport for high-DNA groups. This aligns to the evidence-based management argument of Rousseau (2006) in which analytics becomes an active part of an input to judgement rather than passive reporting. This should be done by a clinician-manager option appraisal, and with clear risk, equity and data-quality checks prior to implementation.

From a practical perspective, the manager should accept no one business-case answer, but instead conduct three decision tests. Firstly, will the option increase clinical risk or not improve access? Secondly, is the data consistent across referrals, capacity, bookings and outcomes? Third, who is disadvantaged by the application of the rule generally? This is because NHS England's guide to outpatient settings indicates that increased PIFU use, increased clinic capacity and reduced missed appointments can free up capacity, all of which will impact patient

contact and clinical review patterns (NHS England, 2024a). There has to be a stop/go point for patient safety and equity in the decision model, as well as a productivity calculation.

Figure 1: Decision Pressure Profile for Analytics-led Outpatient Transformation



In this case analytics should be considered a 'decision discipline' rather than neutral technology. The adopt or delay question is too simplistic, the better option is conditional adoption, with staged pilots, validation rules and clinical sign-off and monitored equity impact. This, in turn, gets you straight to Scenario 2, since no matter how technically proficient a decision is, if it is perceived as surveillance and not a common learning, it will invariably fail.

3. Scenario 2 - Organisational Culture and Change Intervention

In the anonymised Trust, the cultural issue is not simply resistance to data; it is the meaning attached to data. For artefacts, the artefacts identified by Schein's (1990) model would be dashboards, validation reports, breach lists and huddles. Staff would be likely to recommend access, safety and fairness at the espoused value level. A more fundamental question that needs to be addressed is whether data is utilized for learning or blaming. NHS England (2024b) states that providers' boards require culture and psychological safety, triangulation and assurance, not reassurance. This is very pertinent as the exposure of these issues of bottlenecks, coding challenges and unsafe demand-capacity gaps by local staff is integral to elective recovery within the NHS and not hiding them to protect teams.

Table 2: Cultural barriers, risks, interventions and safeguards

Cultural barrier	Risk if unmanaged	Change intervention	Ethical safeguard
Siloed clinical and operational ownership	Waiting-list action becomes fragmented	Specialty-level analytics champions with joint clinical-manager review	Shared sign-off for prioritisation rules
Dashboard anxiety	Staff avoid raising data-quality concerns	Fortnightly evidence-review huddles	No individual blame from unvalidated dashboard data
Target-first language	Patient safety and equity become secondary	Board narrative links access, quality and fairness	Equity review by deprivation, ethnicity, age and disability
Low trust in data definitions	Decisions are contested late	Data-quality protocol owned by clinical, admin and analytics staff	Transparent issue log and correction trail

Culture is thus important as part of the analytics-led transformation as recovery relies on common beliefs and expectations about evidence and accountability. The outpatient improvement guide highlights practical levers including PIFU, advice and guidance, remote monitoring and validation and demand capacity planning (NHS England, 2024a). But those

levers transcend professions and adoption relies on clinicians, booking staff, analysts, and managers interpreting data as a profession's lingua franca. Kotter's (1995) advice is useful here only in part: there is already a level of urgency, but the Trust still needs a guiding coalition (which involves no separate team or group), a level of short-term visible wins, and the establishment of new routines within specialty governance.

That's more challenging, though, because changes models can overestimate management control in healthcare. Strong commitment to quality, unclear goals, compliance bureaucracy, weak insight and staff disempowerment were all identified in the English NHS by Dixon-Woods et al (2014). The National Audit Office (2025) also highlights its findings that oversight of outpatient transformation is weaker than that of diagnostics, and the House of Commons Committee of Public Accounts (2025) states that elective reform could be overly reliant on digital solutions. These criticisms are important because staff may be against dashboards for reasons other than ignorance – they may have experienced poor dashboards due to poorly defined targets, workload pressure etc or improvement that has been worked on without increasing capacity, such as additional meetings.

Both Schein and Kotter's are helpful, but both may over-estimate what culture is. Layers of meaning are revealed by Schein (1990) but less about public sector constraint, professional autonomy, capacity shock. Kotter (1995) provides sequencing, but linear change is difficult in the face of daily clinical need. Ethical analysis is hence in the focus. Patients may be harmed if urgent risks are hidden by average waits, while staff trust may be harmed if dashboards are used for discipline before data quality is agreed. An equity issue, raised by NHS England (2025b) is that patients from deprived communities and Asian or Asian British backgrounds are more likely to wait more than 18 weeks.

Thus, two cultural elements require immediate attention. The first step is to shift from individual clinical and operational teams having responsibility for waiting-list performance to shared responsibility for patient-flow risk. Second, staff need to shift from using the dashboard defensively to using it to reveal errors in the evidence review. The intervention should start with a small number of specialties for which there is enough data of good quality to act, and then establish trust through short-cycle learning. This helps to safeguard patients and discourage cynicism as staff can see that analytics will eliminate unnecessary work rather than just highlight underperformance (Dixon-Woods et al., 2014; NHS England, 2024b).

Co-design is the most feasible change process. Each specialty should designate a clinical analytics champion, and conduct fortnightly evidence-review huddles, as well as a shared data quality protocol. Leaders should make the prioritisation, escalation and exception handling rules public so that staff are aware of when they are expected to use clinical override and when they are expected to use analytics to make decisions. Psychological safety is not a soft add-on; Edmondson (1999) related it to learning behaviour and O'Donovan and McAuliffe (2020) demonstrated that patient safety priority, learning orientation, hierarchy and familiarity are psychological safety determinants in healthcare. The envisioned cultural change is from compliance reporting to collaborative learning in the course of operations, thus establishing the conditions for the teams in scenario 3.

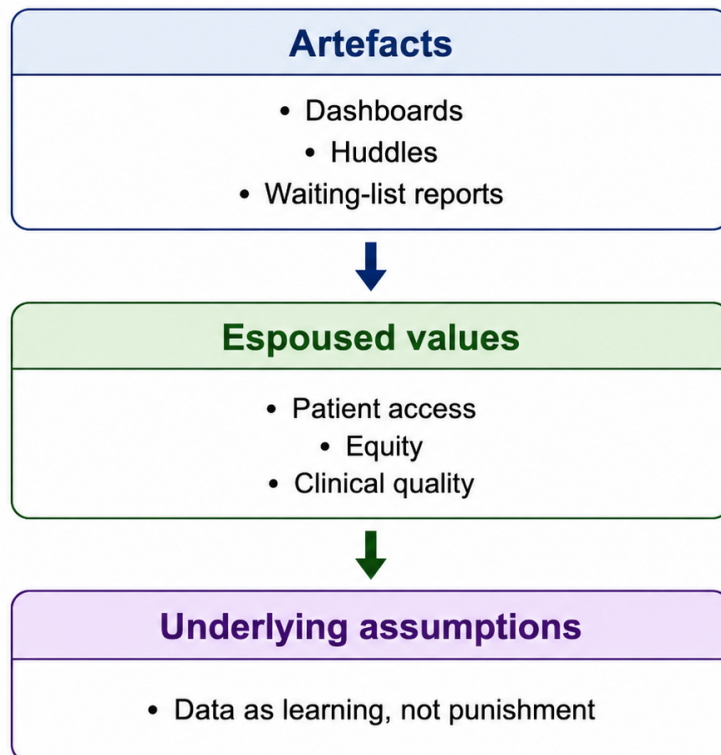


Figure 2: Schein-based culture diagnosis for outpatient analytics transformation

4. Scenario 3 - Team Effectiveness and Development

An out-patient transformation cell, led by a clinical lead, service manager, booking lead, analyst, nursing lead and patient-administration representative, should be the focus of team development. The first high-performing characteristic is psychological safety: staff must be able to say that a waiting-list field is unreliable, that a clinic template is unrealistic, or that a patient group is being disadvantaged. Psychological safety is associated with learning behaviour in work teams (Edmondson, 1999); and O'Donovan and McAuliffe (2020) have cited the following enablers in healthcare: patient safety priority; support; hierarchy management; familiarity. In this instance, safety is pragmatic – a hidden data-quality issue can turn into an unsafe scheduling decision.

Role clarity with mutual accountability is the second characteristic. Hackman (2002) says that a team requires a clear boundary, direction, structure, context and coaching. This addresses the typical problem with analytics programs - analysts are responsible for the insight, the operational staff are responsible for the booking knowledge, and the clinicians are responsible for the risk knowledge, but no one is responsible for the conversion of insight to pathway change. Rosen et al. (2018) demonstrate that effective team working in health care requires communication, coordination and system design, not just good will. In an outpatient transformation, this is a huddle that must conclude with an owner, action, due date and review point.

Caution is needed. Team building can be superficial when it is not tied to workload and authority. The NHS has enough meetings, let's not increase one that can look at dashboards but can't alter templates, staffing, referral and escalation pathways. Dixon-Woods et al. (2014) identified that staff in the NHS can be trapped in quality while lacking empowerment due to lack of clarity in terms of goals and bureaucracy. There is also the scale of outpatient activity that needs to be considered – 8.1 million DNAs in 2024/25 is no easy ride to be achieved by team morale (NHS England, Secondary Care Open Data and Publications, 2025). The relationship between psychological safety and decision rights therefore needs to be tied to the design of the team.

Table 3: Team working agreement for an outpatient transformation cell

Component	Agreement	Performance contribution
Shared purpose	Improve access, safety, equity and productivity together	Prevents narrow target chasing
Data rules	Challenge definitions before judging results	Raises data quality and trust
Huddle rhythm	Weekly 30-minute review of access risk, quality risk, bottleneck and action closure	Turns analytics into routine action
Challenge norm	Any member may raise a patient-risk or data-quality concern	Supports psychological safety
Decision rights	Clinical lead owns risk override; service manager owns operational delivery; analyst owns metric integrity	Reduces delay and duplication
Escalation	Unresolved capacity or safety risks go to directorate review within one week	Links team work to formal control

Theory is useful but only to a certain extent. Edmondson and Hackman describe enabling conditions, but they are not enough to address NHS limitations like small clinics, gaps in the medical rota or national performance pressures automatically. The intervention needs to therefore be integrated into work. One intervention is a weekly analytics huddle with set up agenda: access risk, quality risk, bottleneck, action owner and next review date. The working agreement in Table 3 is a second. A third is a RACI map for pathway changes; it establishes who is responsible, accountable, consulted and informed.

Implementing should start on one specialty pathway instead of the entire outpatient portfolio. The team would choose a small problem, such as “long wait validation” or “high DNA rates”, and test for four weeks, with common definitions. The analyst would provide the data, the booking lead would provide an explanation of process causes, and the clinical lead would make a determination of safety risk. This means that team development is visible: They have faster

action closure, fewer data definition disputes, more visible escalation, and less repeated bottlenecks. It also provides staff with some confidence in the working agreement due to the live patient-flow problem.

Shared competence also enables transferable professional practice: clinical language is learnt by technical analysts, data limits by clinical staff, and the appearance of process skills in the hands of administrators. That common competence is the actual team building result.

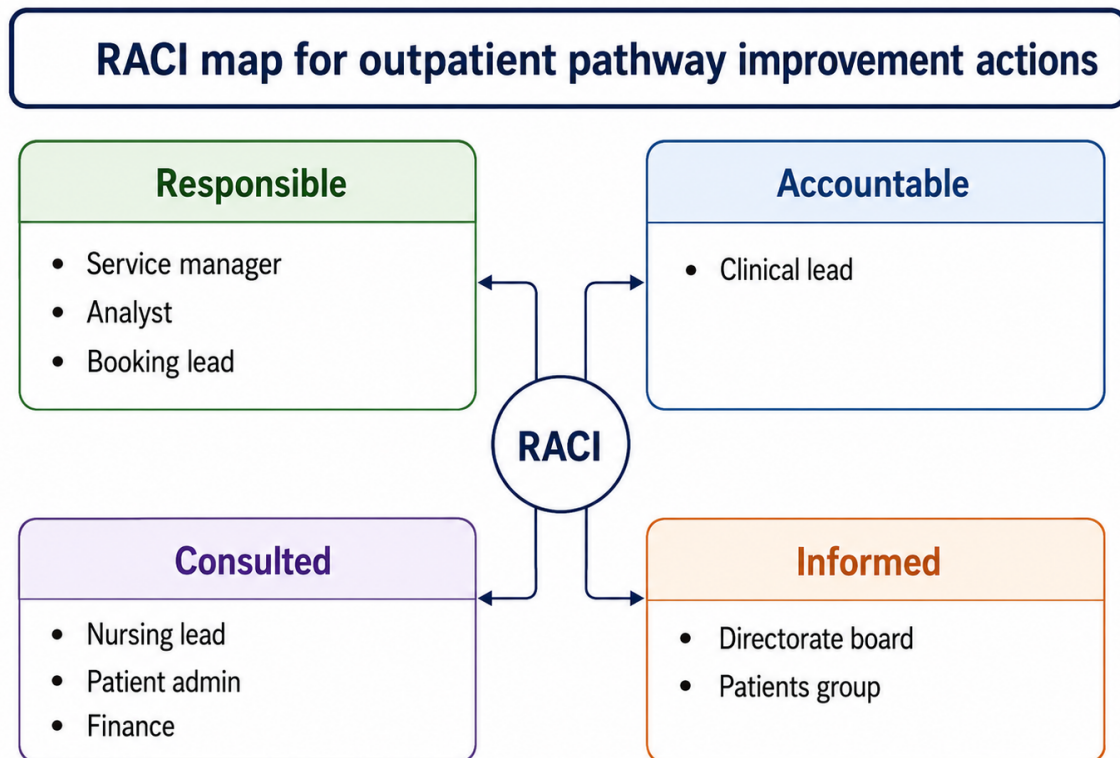


Figure 3: RACI map for outpatient pathway improvement actions

This team must then be organized as a working group, not a workshop. Technical levers are listed in the NHS England outpatient guide but the interpretation of these levers is for each local specialty to be determined by the transformation cell. The original contribution is that analytics behaviours are incorporated into the working agreement: challenge data early, separate blame from learning, record decision assumptions, and review if actions changed patient flow. In Scenario 4, those routines are the human infrastructure for the performance control system.

5. Scenario 4 - Performance Measurement and Control Systems

From the outpatient service manager role, a balanced scorecard and dashboard system would monitor individual, team and service performance. Elective recovery does not correct itself – national policy is for improvement in 18-week performance (Department of Health and Social Care and NHS England, 2025). According to Kaplan and Norton (1992), measurement systems influence managerial actions and must be balanced between financial, customer, internal process and learning perspectives. In the case of an NHS outpatient department these perspectives become patient access and equity, process reliability, staff learning and resource productivity.

Table 4: Balanced scorecard for outpatient analytics transformation

Perspec tive	KPI	Owner	Data source	Main risk	Review
Patient access	RTT performance, long-wait volume, appointment timeliness	Service manager	RTT / WLMDS	Target focus hides clinical risk	Weekly
Equity	Waiting-time variation by deprivation, ethnicity, age, disability and specialty	Clinical governance lead	WLMDS and local PAS	Small numbers or coding gaps	Monthl y
Process	Clinic utilisation, DNA rate, validation completion, follow-up ratio	Booking lead	PAS / dashboard	Productivity metric drives unsafe overbooking	Weekly
Quality and safety	Harm reviews, complaints, clinical escalation delays	Clinical lead	Risk system / audit	Safety data arrives late	Monthl y

Learnin g	Action closure, data- quality corrections, analytics training	Transforma tion cell	Huddle log	Activity without learning	Fortnig htly
Resourc e	Cost per attendance, extra-clinic use, staff capacity variance	Directorate manager	Finance and rota data	Cost focus weakens access	Monthl y

It is important to integrate descriptive, predictive and prescriptive analytics into the dashboard design. Descriptive views would display current wait, clinic use, DNAs, and DNA progress. Specialties would be flagged in predictive views in case of breaches or capacity shortfalls. In the prescriptive views, a template change, transport support for high-DNA groups, a clinical triage or further validation sessions would be suggested. NHS England (2024a) calculates that increasing PIFU use by 1 percentage point could enable an additional 400,000 patients to be seen in NHS services and an additional 1 patient every clinic could generate 3.5-4.5 million more appointments. These figures are a cause for measurement only when taking local safety and case mix into account.

Nevertheless, performance control can lead to behaviour being skewed. Bevan and Hood (2006) demonstrate the difficulties of gaming and measuring in the English public health system's health target regimes. Mannion and Braithwaite (2012) list the unintended consequences of NHS performance measurement as misplaced incentives, breach of trust, gaming, reduced morale and inequality. House of Commons Committee of Public Accounts (2025) write that only 59% of pathways were within 18 weeks of the 92% target and outpatient appointments dropped 0.1% short of a 25% target. The results suggest that one cannot assume that the more indicators there are, the better the performance will be.

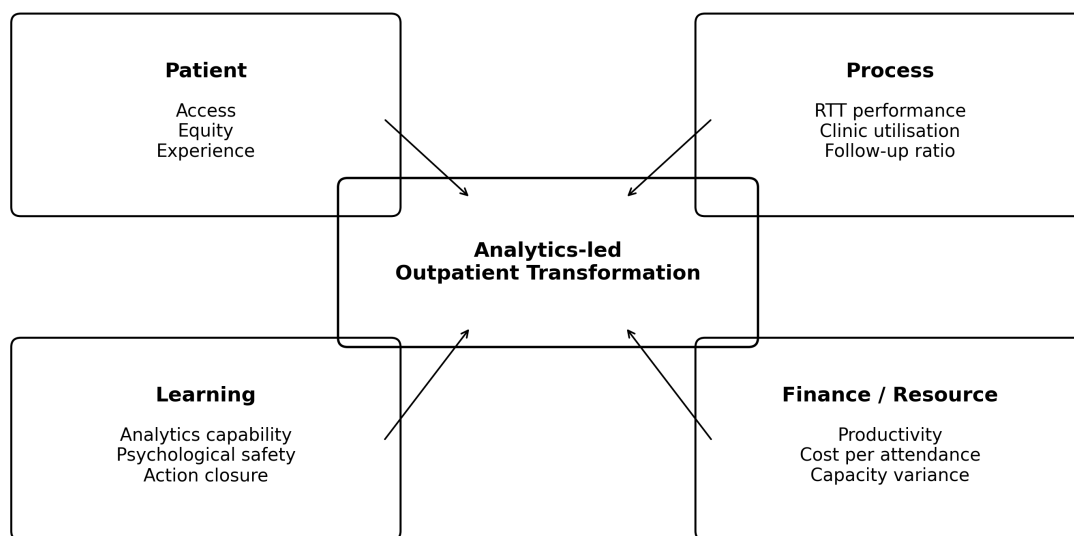
Data quality is a simpler issue, dashboards like numbers that can be counted. Dowding et al. (2015) report mixed evidence of the use of clinical dashboards and highlight their interpretation and use risks. WLMDS provides useful demographic breakdowns and NHS England (2026) advises that it is management information. The ethical risk is extreme: A department could reduce average wait times, but increase access to under-resourced patients, disabled patients, or specialties with complicated needs. This is important as NHS England (2025b) outlines why, deprived and Asian or Asian British patients are likely to wait longer than 18 weeks. A credible

control system must therefore incorporate equity indicators, a narrative review and clinical challenge.

There should be four levels of control. Operational control of validation, clinic fill and breach risk would be enhanced by daily dashboards. Exceptions would be turned into named actions in weekly huddles. Regular monthly directorate review will assess access gains with safety, experience and equity. A quarterly learning review will eliminate indicators that are no longer influencing decisions. This cadence is important as Kaplan and Norton's (1992) balanced approach can be overcrowded if all metrics are maintained indefinitely. The job of the manager is to make sure the score card is small enough to be used to make moves and big enough to not be gamed.

Role-specific measurement should be used for individual performance control. The KPIs of a booking officer, analyst and consultant shouldn't be the same, but they should link to the same pathway outcome.

Figure 4: Balanced Scorecard for Outpatient Transformation Control



Control principle: indicators should trigger inquiry, learning and ethical action before blame.

Learning control is the answer, rather than punitive control. It is important that individual KPIs focus on timely validation, data-quality corrections and agreed clinical administration tasks but poor results must first lead to investigation of capacity, definitions and system barriers. The following KPIs should be monitored for huddle action closure: booking accuracy and pathway-

cycle time. The key performance indicators (KPIs) for organisations should include RTT, waiting-list size, productivity, safety, experience, equity. The final judgement is that this control system should close the loop back to Scenarios 2 and 3.

6. Conclusion

In conclusion, analytics-led transformation of NHS outpatient and elective care succeeds when it strengthens decision quality, supports a learning culture and effective team routines, and uses balanced control systems. While descriptive, predictive and prescriptive analytics offer clear benefits, success depends on avoiding target fixation, maintaining strong data quality, and ensuring equitable access. A learning-oriented control system, supported by clinical meaning, safe challenge, equity review and team-owned actions, represents the strongest path forward. When applied thoughtfully, analytics can support recovery without reducing patients and staff to mere numbers.

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