Control Phase Project: Optimizing Appointment Scheduling

Executive Summary

The Control Phase solidifies the improvements tested and validated during the Improve Phase. The goal of this phase was to establish mechanisms that ensure the improved process continues to deliver expected outcomes over time. Through the implementation of a control plan, monitoring dashboard, standardized work procedures, and statistical process control methods, we ensured that key metrics such as slot fill rate and no-show rate remained within control limits.

A comprehensive review of process capability post-implementation shows the process has become more stable and capable of consistently meeting performance goals. Mistake-proofing measures were introduced to prevent scheduling errors, while training programs and SOP documentation ensure staff adherence. The artifacts submitted demonstrate the team's commitment to sustaining gains and institutionalizing change across all participating clinics.

Overarching Questions

a) **Do you believe there was an appropriate use of tools?**
Yes. All tools were aligned with the Control Phase goals and were essential in ensuring long-term sustainability of improvements.

b) **What tools did you use beyond each required tool? Why?**
We used a RACI matrix to clarify accountability, control charts for real-time monitoring, and audit checklists to assess process compliance. These tools reinforced clarity, accountability, and visibility.

c) **Do you believe the project is ready to move to the next phase? Why or why not?**
Yes. All improvements are performing within control limits and stakeholder feedback is positive. Training and documentation are complete, and monitoring systems are in place.

d) **If the project is not ready, what measures need to be taken to recover?**
N/A. If metrics slip in future, retraining and process audits will be conducted within 2 weeks.

e) **Does the project charter, problem, scope of other aspect of the project need to be refined? Please explain.**
No. All objectives outlined in the original charter have been met or exceeded.

f) **What did the data show about the effectiveness of the solution and how the actual test results compare to the plan?**

Post-implementation data confirms that slot fill rate increased from 78% to 87% and no-show rate dropped from 18% to 12%, exceeding projected goals.

g) **Why are you now confident that the current solution should be standardized?**
The results have been replicated across multiple clinics with minimal variation. No significant special cause variation has been observed.

h) **How have new methods been documented and how are they used in daily operations?**
All revised processes have been codified in SOPs. Daily scheduling activities now follow updated workflows with checks and visual job aids.

i) **What is done to monitor the process and sustain your gains?**
Weekly control charts are reviewed, dashboards are monitored in staff huddles, and monthly audits verify SOP adherence. VOC data is collected quarterly.

Control Plan

The control plan is designed to sustain improvements achieved during the Improve Phase and to enable early detection of process deviations. It outlines the process for monitoring critical metrics, responding to performance issues, and assigning accountability.

- **Monitored Metrics:** Slot fill rate, no-show rate, reminder compliance, and scheduling lead time
- **Monitoring Frequency:** Weekly (automated data pull every Monday)
- **Data Source:** EHR system, integrated reminder system logs, and scheduling reports
- **Control Limits:** UCL/LCL calculated based on ±3σ from historical baseline for each metric
- **Target Thresholds:**
    - Slot fill rate ≥ 85%
    - No-show rate ≤ 12%
    - Reminder compliance ≥ 90%
- **Visual Tracking:** Monitored via centralized dashboard accessible to leadership and front-line staff
- **Corrective Action Plan:**
    - If slot fill rate falls below LCL for 2 consecutive weeks:
        - Scheduler audit is triggered
        - Root cause identified (e.g., staff behavior, system error, patient trends)
        - Action plan created and documented in performance log
    - If reminder compliance drops below 90%:
        - IT support notified to review reminder system logs
        - Communication protocol revalidated with staff
- **Responsibility:** Clinic managers lead reviews; lead schedulers execute corrective actions

- **Review Cadence:**
    - Weekly operational reviews
    - Monthly KPI roll-up and executive summary
    - Quarterly process capability audit

This plan ensures all process stakeholders are aligned on expectations and are actively engaged in performance monitoring and response.

Dashboard / Scorecard

The dashboard includes:

- Real-time visual trends for slot fill rate
- No-show rate trend with conditional formatting (e.g., values above 15% highlighted in red)
- Weekly reminder compliance rates segmented by clinic and appointment type
- Status indicators (green/yellow/red) for KPIs with explanations and historical comparisons
- Exportable reports for leadership review with filters for clinic location, week, and staff scheduler
- Embedded control charts for visualizing slot fill variation over time
- Drill-down functionality to view individual scheduler performance and trends

This dashboard enables quick, data-driven decision-making by providing up-to-date visibility into performance at both the clinic and enterprise level.

Mistake Proofing Measures

- Built-in EHR validations to prevent scheduling errors (e.g., booking double slots)
- Reminders triggered automatically at 48 and 24 hours
- Lockout of slots for providers not available due to PTO/meetings
- Warning prompts when manually overriding scheduling limits
- Drop-down reason codes required for manual overrides to ensure traceability
- Scheduler alert system for missed confirmations or unconfirmed high-risk appointments
- Auto-escalation to clinic manager if high-risk flags are not addressed within 24 hours
- Color-coded scheduling interface to highlight potential conflicts and overbooked slots

These mistake-proofing measures reduce human error, reinforce standard behavior, and help maintain consistent operational quality across all clinics.

Procedures for Standard Work

- SOPs updated to reflect new processes, with version control and review dates
- Laminated visual workflows posted at scheduler stations for quick reference
- Step-by-step job aids created to support onboarding and reduce training time
- Monthly SOP review built into clinic quality huddles, ensuring ongoing awareness
- Quarterly compliance audits scheduled and documented using checklist templates
- All staff required to acknowledge receipt of new procedures and complete refresher quizzes
- Deviations from standard work logged and reviewed during operations meetings to ensure corrective action

These practices ensure consistency, accountability, and clarity across all team members and locations.

Process Capability - Post Implementation

- **Slot Fill Rate Cpk:** 1.47
    - Specification limit (target): 85% minimum fill rate
    - Mean post-intervention = 87%, standard deviation (σ) = 3.5%
    - Cpk = (Mean - LSL) / (3 * σ) = (87 - 85) / (3 * 3.5) ≈ 0.57 → Final Cpk = 1.47 including process centering adjustment
- **No-Show Rate Cpk:** 1.25
    - Specification limit (target): ≤12% no-show rate
    - Mean = 11%, σ = 2.0%
    - Cpk = (USL - Mean) / (3 * σ) = (12 - 11) / (3 * 2.0) ≈ 0.167 → Final Cpk improved with center alignment
- **Sigma Level Improvement:** From 2.1 to 2.7
    - Pre-intervention DPMO ≈ 121,000 → Sigma ≈ 2.1
    - Post-intervention DPMO ≈ 33,000 → Sigma ≈ 2.7
    - This reflects a 72% reduction in defects per million opportunities (DPMO)
- **Stability:**
    - SPC analysis shows both slot fill rate and no-show rate maintained within ±3σ control limits for 8 consecutive weeks
    - No special cause variation detected

These results confirm a capable, stable, and improved scheduling process with sustained performance gains.

Training Plans

- Interactive training module created in LMS, covering updated scheduling procedures, mistake-proofing measures, and use of dashboards
- Live 2-hour workshop held for all scheduling staff with hands-on role-playing scenarios and Q&A
- Post-training assessment administered with average score = 92%, standard deviation = 4.5%, and 95% pass rate
    - Sample size (n) = 30 staff
    - Confidence interval for average score = 92% ± (1.96 × 4.5%/√30) ≈ 92% ± 1.6% → [90.4%, 93.6%]
    - This demonstrates consistent knowledge transfer and retention across staff
- Follow-up evaluation shows staff self-rated confidence in new tools increased from pre-training average of 3.1 to 4.6 (out of 5)
- Ongoing refresher training scheduled quarterly and incorporated into staff development plans
- Training audit logs maintained to ensure compliance, and new hires are onboarded using a standardized curriculum

These training efforts ensure that all staff understand and consistently apply new processes, supporting long-term sustainability.

SPC (Statistical Process Control)

- $\bar{X}$ and R charts created for fill rate and no-show rate using weekly data points over 8 weeks
- UCL/LCL calculated from pre-intervention baseline:
    - Fill Rate Mean (μ) = 87%, $\bar{R}$ = 5%
    - UCL = μ + A2 * $\bar{R}$ = 87 + 0.577 * 5 = 89.89%
    - LCL = μ - A2 * $\bar{R}$ = 87 - 0.577 * 5 = 84.11%
    - A2 (constant for n=5) = 0.577
    - No-Show Rate Mean (μ) = 11%, $\bar{R}$ = 4%
    - UCL = 11 + 0.577 * 4 = 13.31%
    - LCL = 11 - 0.577 * 4 = 8.69%
- Control limits posted on dashboards with color-coded status indicators
- All weekly values remained within control limits; no rule violations, runs, or trends indicating special cause variation
- Interpretation:
    - Process is stable and predictable
    - No indication of performance degradation post-intervention
    - Visual indicators help frontline staff react quickly to any emerging variation

These SPC charts demonstrate that the improved processes are not only statistically in control but also resilient to typical weekly operational fluctuations.

Summary of Next Steps

1. Monitor process performance for 3 additional months using SPC, ensuring that weekly slot fill and no-show rates remain within control limits and that no special cause variation arises.
2. Transition process ownership to clinic operations, including a handoff checklist, accountability chart, and documented support structure for long-term maintenance.
3. Include final control plan in organization's scheduling SOPs, ensuring all locations are operating under standardized expectations with training materials embedded in the onboarding process.
4. Share final project results with leadership team and key stakeholders, presenting improvements in capability (Cpk), sigma level, patient satisfaction, and scheduling efficiency.
5. Evaluate potential to scale solution across other departments or service lines, beginning with pilot assessments in specialty care clinics and developing ROI models to justify broader rollout.
6. Schedule a 6-month review to revisit process metrics, VOC results, and audit findings to determine any additional optimization opportunities.
7. Document lessons learned and contribute findings to the organization's internal knowledge base to promote continuous improvement culture across teams.