Case Study

Eliminating Intake Errors and Restoring Turnaround Time for High-Volume Ortho-K Distributor Orders (WDS-II)

GP Specialists (GPS) | iSee Ortho-K | Customer Service Intake Automation + Lab Release Workflow

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1. Executive Summary

GP Specialists (GPS) experienced a rapid surge in distributor demand for iSee orthokeratology (Ortho-K) lenses. What had been ~1 small distributor file per month became an operational constraint within ~6 months. Distributor stock orders arrived as Excel files containing hundreds to thousands of custom lenses.

Customer Service (CS) manually entered lens parameters into WDS-II, a legacy system ~40 years old at the time. Manual entry created long turnaround times, a high intake error rate, and downstream interruptions. The CS entry backlog became the primary constraint for service levels, particularly impacting everyday (non-distributor) customer orders.

GPS implemented an automated distributor intake module layered onto an existing non-native web UI/process layer around WDS-II. The solution converted Excel to CSV, staged rows in a temporary table, applied validation/normalization rules, required user review/approval, then created patient-based orders end-to-end in WDS-II (1 patient = 1 order; 1–2 lenses per order depending on OD/OS or both).

Primary KPI improvement was end-to-end turnaround time (order received → shipped). Everyday customer orders improved from ~1–2 weeks to ~3 days. Distributor orders improved from ~3–6 weeks to ~1–4 weeks (bounded by ship-complete distributor requirements and batch manufacturing time).

2. Background and Scope

2.1 What changed in the business

Distributor onboarding and existing distributor growth drove a rapid increase in stock ordering volume, with strong uptake in Asian markets.

2.2 Scope of this initiative

This initiative targeted distributor-submitted downloadable order files (the highest-volume, highest-friction intake stream). Everyday customer orders remained manual during this period.

2.3 Volume profile

Distributor uploads averaged ~8–10 files per month, each containing 300–2,500 lenses (typical ~600), representing ~60% of overall order intake workload.

Performance remained consistent at peak volumes. GPS validated scalability using a stress test file of 50,000 lenses processed end-to-end in under 20 minutes (≥2,500 lenses per minute).

3. Problem Statement

3.1 Manual entry bottleneck in WDS-II

Distributor files required manual parameter entry into WDS-II. Depending on order size, a single distributor order took 8–20 hours per person to enter, typically with two people working each order (16–40 person-hours per order).

3.2 Intake-driven quality risk

Pre-automation, approximately 15% of entered lens line items had errors on distributor orders. Errors included out-of-range parameters and wrong product codes. In Ortho-K, parameters are clinically sensitive: any deviation can result in a lens that does not work for the patient.

3.3 Root cause of service degradation

As distributor volume grew, CS capacity was consumed by manual entry. This CS entry backlog became the primary constraint for overall turnaround time and was the main limiter for everyday customer orders.

Normal day-to-day customer orders could wait up to two weeks to be entered, cascading into weeks-long lead times.

3.4 Operational noise and overtime

Backlog drove frequent "where is my order?" inquiries, rush handling to recover from internal delays, and overtime. Pre-automation inquiry volume was roughly 100–200 calls per week (~80% everyday customer orders and ~20% distributor orders). Average handle time was ~2 minutes per call. More than 50% of normal customer orders were treated as expedited due to backlog, and CS overtime averaged ~25 hours per week.

4. Constraints and Requirements

4.1 Legacy system constraint

WDS-II remained the system of record. The goal was not replacement. The goal was a safe, controlled intake layer that improved speed and correctness while preserving downstream workflows and traceability.

4.2 Regulated environment constraint (high level)

GPS operated under an ISO 13485 quality system, requiring controlled validation (IQ/OQ/PQ), documentation, version control, SOP updates, and sign-offs (high level only; not the focus of this case study).

5. Solution Design

5.1 End-to-end workflow

- Distributor Excel file standardized to CSV
- CSV uploaded through the WDS-II web UI/process layer (non-native to WDS-II)
- Rows staged into a temporary table (no direct order creation)
- Validation + normalization applied (10+ fields per lens)
- Preflight review screen shows processed output; errors flagged with messages and highlighted cells
- User actions: Update values, Approve/Commit, or Scrap + re-run
- After approval, the system creates patient-based orders end-to-end in WDS-II
- Orders enter Pending for lab review, lot capture, tray scanning, and release

5.2 Order construction logic

Order creation mirrored clinical reality: 1 patient = 1 order. If both eyes were ordered, the order contained two lenses (OD + OS). If only one eye was ordered, the order contained one lens.

5.3 Template platform for distributor formats

At launch, the system supported 4 distributor formats. A template builder in the UI allowed new formats to be created in minutes, expanding to 6 formats within a year without rewriting core code.

Template builder capabilities included:

- Column-to-field mapping
- Implied decimal/scaling rules (example: 25 interpreted as 0.25)
- Distributor-specific required fields
- Product-code validation table selection
- Default values

- OD/OS pairing rules
- Support for rare non-default options (example: lens color)

Governance: templates were controlled by the Director of Operations and Systems (single-owner change control). In steady state, templates were not changed.

5.4 Exception handling and approval

When validation flagged an issue, the UI displayed a clear message and highlighted the affected row/cell. Exceptions were rare (<1% of uploads) and typically resolved in under one minute.

Uploads ran through a full preflight cycle and presented processed output for review before order creation. Users could update values, approve/commit, or scrap and re-run. Post go-live, scrap/re-run was rarely used and typically only occurred when the wrong customer account context was selected.

6. Implementation and Validation

6.1 Testing approach (high level)

GPS executed structured IQ/OQ/PQ testing under ISO 13485 controls. Testing included three weeks of hard validation and ~1,200 test iterations; two of three weeks included parallel testing using real order data.

6.2 Go-live criteria

Go-live success criteria were operational: reduce the CS entry backlog and maintain lab workflow stability (no production-disrupting interruptions tied to intake).

6.3 Stabilization and early edge cases

A rare early edge case involved Excel→CSV conversion drift (field shift or missed line). The fix was rate limiting and batching: adding a delay between row processing and processing files in smaller batches.

7. Results

7.1 Turnaround time

Everyday customer orders improved from ~1–2 weeks to ~3 days after automation removed distributor intake as the CS bottleneck.

Distributor orders improved from ~3–6 weeks to ~1–4 weeks. Distributor turnaround remained bounded by batch manufacturing time and a distributor ship-complete requirement.

7.2 Service stability and inquiry reduction

Pre-automation, GPS handled roughly 100–200 "where is my order?" inquiries per week (~80% everyday orders; ~20% distributor). Average handle time was ~2 minutes per call. After intake stabilized, inquiry volume dropped to ~0–5 calls per week.

7.3 Quality improvement

Intake/CSR errors on distributor imports dropped from ~15% (lens line items) to 0% after automation.

8. Financial and Operational Impact

8.1 Cost of quality (conservative direct model)

Pre-automation, ~15% of entered lens line items had errors. Of those erroneous lenses, ~84% were typically caught before cutting, while ~16% were caught only after cutting had started.

Per-issue direct costs (inputs from GPS operations):

- Post-cut scrap/restart: $23.67 per lens (button + ~25 minutes lab time @ $40/hr).
- Pre-cut correction: lab 3–5 minutes @ $40/hr plus CS 3–5 minutes @ $32/hr (≈ $3.60–$6.00 per issue).

Per 1,000 lenses entered: ~150 erroneous lenses; ~126 caught pre-cut; ~24 caught post-cut. Estimated direct waste/correction = $1,021.60–$1,324 per 1,000 lenses (conservative).

8.2 Shipped defect handling (high level)

Shipped defects were rare (0–2% of error-affected lenses). In those cases, GPS credited and remade the lens and bundled the remake with the next normal distributor shipment (handled within established ISO 13485 processes, high level only).

8.3 Capacity and headcount avoidance

Eliminating manual distributor entry allowed GPS to avoid backfilling approximately two Customer Service order-entry positions annually while supporting increased distributor volume.

8.4 Human impact

The most visible human impact was stress reduction: CS no longer spent their day buried in entry while phones rang and the order pile grew. With backlog under control, the team could keep up with calls and follow-ups, and stress dropped substantially.

9. Decision and Delivery

9.1 Approval and business case

Approved by the General Manager due to an untenable backlog and the need to automate distributor orders. Additional CS hiring had already occurred and was insufficient; automation was required.

9.2 Delivery performance

Delivered in 5 weeks versus a 14-week estimate; actual cost ~$60K versus ~$100K estimate.

9.3 Options considered

GPS briefly considered broader integration paths (for example, EDI-style approaches) and larger modernization, but in practice leveraged a proven internal pattern for safe automation around WDS-II.

10. Key Metrics Snapshot

Metric	Before	After
Everyday orders: received → shipped	~1–2 weeks	~3 days
Everyday order entry (steady state)	Backlog up to 2 weeks	Mostly same-day (24 hours acceptable ceiling)
Distributor orders: received → shipped	~3–6 weeks	~1–4 weeks (ship-complete constraint)
Distributor intake error rate	~15% (lens line items)	0% (distributor imports)
Distributor file volume	~1/month (smaller)	~8–10/month; typical ~600 lenses; peaks ~2,500
Stress test	N/A	50,000 lenses < 20 min
Orders available to lab	Days/weeks	Typically within the hour (hourly pull cadence)
'Where is my order?' calls	~100–200/week	~0–5/week
Avg handle time per status call	~2 min	~2 min
CS overtime	~25 hours/week (OT)	Eliminated

| Rush fee waivers due to delay | >50% of normal orders | ≤5% |
| Headcount avoidance | Hiring still insufficient | ~2 CS order-entry roles/year avoided |

11. Footnotes (Calculations and Assumptions)

1. All numbers and operational observations reflect the provided GP Specialists (GPS) experience details.

2. Error rate basis: ~15% of entered lens line items had errors (pre-automation) for distributor orders.

3. Catch point definition: "before manufacturing" = before cutting starts.

4. Catch-point math: 60% caught pre-cut directly + (remaining 40% × 60% caught at traying/inspection pre-cut) = 84% pre-cut; remaining 16% post-cut.

5. Post-cut scrap/restart cost: $7 button + (25/60 hr × $40/hr) = $23.67 per lens.

6. Pre-cut correction cost range: lab 3–5 min @ $40/hr plus CS 3–5 min @ $32/hr = $3.60–$6.00 per issue.

7. Per 1,000 lenses: 15% error rate → 150 erroneous lenses; 84% pre-cut → 126; 16% post-cut → 24. Direct waste range = $1,021.60–$1,324.

8. Status calls: baseline ~100–200/week, ~80% everyday orders and ~20% distributor; average handle time ~2 minutes; post-change steady state ~0–5/week.

9. Shipped defects were rare (0–2% of error-affected lenses) and were handled via credit + remake bundled with the next normal distributor shipment.