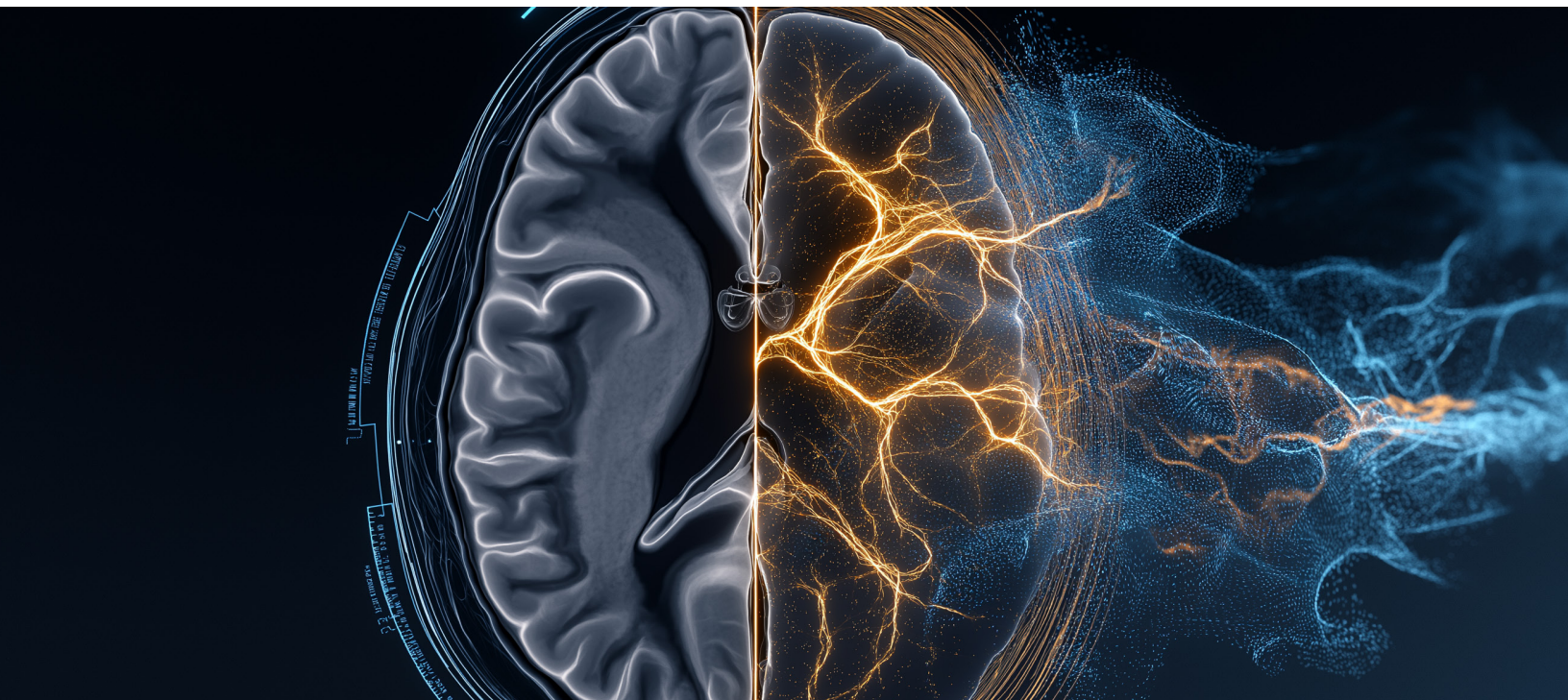


Transforming Oncology Workflow Efficiency with Autonomous AI

How Autonomous AI Improves Quality Without
Disrupting Clinical Workflows



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Abstract

Before adopting AI, the oncology planning team at a large academic medical center faced a growing challenge: scan volumes were increasing faster than staff capacity. Each case required 30–90 minutes of manual segmentation, leaving the department operating reactively rather than proactively. As one senior medical physicist summarized, “We didn’t want another tool; we wanted less to do.”

By implementing TheraPanacea’s ART-Plan™, the team processed more than 24,000 patients without a single user ever logging in to the software. The AI ran quietly within their existing ecosystem as an autonomous system, automatically processing hundreds of scans each week and returning contours directly to clinicians’ review folders.

This case study outlines how the institution achieved lasting efficiency gains and clinician trust by deploying AI that works in the background. Segmentation time fell by nearly 85%, with 92% clinical approval. The experience highlights how simplicity, transparency, trust, and quality can make automation both effective and enduring.

At a Glance:



24,000+ patients processed



5–10 minutes per case



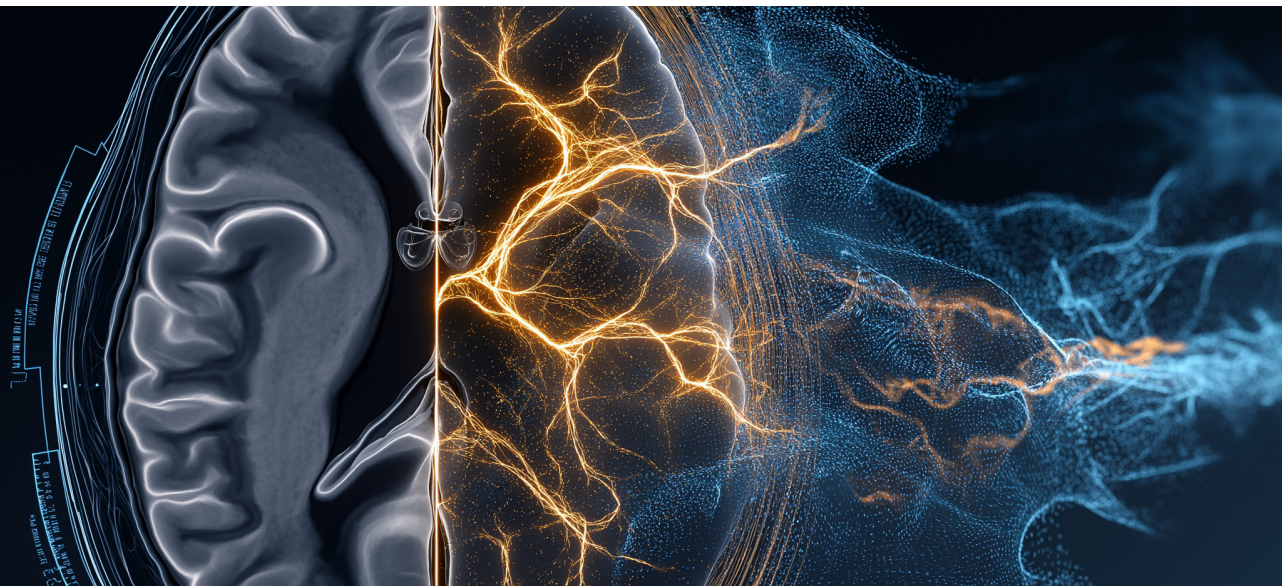
~85% reduction in
contouring time



92% contour approval



Automation runs entirely in
the background



When Demand Outruns Capacity

The oncology planning team at the academic medical center faced a universal challenge: rising scan volumes paired with staffing levels that could no longer keep pace. Teams were constantly in reactive mode, working case by case to maintain daily throughput. Staff were spending long hours on repetitive contouring tasks that required high-quality results, while physicians managed growing backlogs. Despite their dedication, the workflow left little room for process improvement or proactive planning.

Prior technologies had not solved the problem. Every “solution” introduced new interfaces, added steps, or increased context switching between systems like Epic and Aria. The team needed a tool that reduced workload, not one that added more to manage.

Autonomous AI That Works Unattended

The initiative was led by a senior medical physicist with deep experience in clinical workflow and operational burden, who sought a solution that could improve efficiency without forcing clinicians to change how they worked.

After evaluating several options, the team selected TheraPanacea’s ART-Plan for its seamless integration with existing systems and its ability to work entirely in the background. ART-Plan processed CT studies according to standard routing rules, segmented anatomy with validated AI models through an autonomous process, and returned results directly into the same review folders clinicians were already using no new interfaces, steps, or training required.

What stood out most for the team was how little attention the system demanded. Once deployed, the AI ran quietly in the background, supporting clinicians without interrupting their workflow while maintaining consistent contour quality or adding to system fatigue.

“There’s not a single user in the 24,000 patients who has ever logged into the GUI. We already struggle with Epic and Aria, that’s the max.”

Senior Medical Physicist
Large Academic Medical Center

Trust Built Through Consistent Quality

Introducing AI into contouring workflows requires more than technical validation; it requires clinical confidence and consistent quality. Accuracy, reproducibility, and alignment with established processes are essential. The team approached deployment in phases to build trust incrementally.



Phase 1: Internal Validation

Pilot studies on anonymized historical data compared AI segmentations to gold-standard contours. Metrics such as Dice score and indication-specific performance gave physicists confidence before moving to live deployment.

Phase 2: Seamless Integration

ART-Plan was linked to existing DICOM routing rules. Eligible cases automatically flowed to the AI through an autonomous workflow and back into the same review folders clinicians were already using. No extra steps or training were required.

Phase 3: Confident Expansion

With early success in head and neck and prostate cases, the system expanded to thoracic and GI indications. Case volume accelerated from ~100 to more than 2,000 per month without additional staff, demonstrating how automation can ease the workload while keeping clinicians in control.

Real Gains in Quality and Time

After processing more than 24,000 patients, the program reported significant improvements in efficiency and trust. Deployment succeeded because ART-Plan fit naturally into the clinical workflow with no forced adoption, no added interfaces, and no disruption to established routines.

85% reduction

Segmentation time dropped from 45–60 minutes per case to 5–10 minutes.

5–10 minutes per case

Average segmentation time after deployment.

92% high-quality contours

Fewer than 8 percent required minor edits.

0 logins required

AI remained entirely in the background; no user ever logged into the software.

0.773 Dice similarity

Thousands of studies demonstrated consistent anatomy and high contour quality.

What Autonomous AI Unlocks for Teams

Oncology departments today face ongoing pressure from rising case volumes and increasing contouring requirements. Many groups are seeking ways to maintain high-quality care without adding complexity or overburdening staff. This experience demonstrates how integrated automation can help address these pressures in a reliable and scalable way. TheraPanacea's approach emphasizes background automation. By delivering contours directly into the folders clinicians already use, ART-Plan reduces manual workload while maintaining accuracy and oversight while ensuring high-quality contours. This supports teams facing constraints around throughput, consistency, and time-to-review without requiring new systems or training.

Departments looking to improve operational efficiency can apply the same principles demonstrated in this deployment. Automation that runs in the background, through an autonomous workflow, aligns with clinical judgment, and scales across indications becomes a force multiplier. It reduces repetitive tasks, accelerates turnaround times, and allows clinicians to focus on higher-value responsibilities. As oncology programs navigate workforce challenges and rising demands, the ability to improve efficiency without disrupting workflows has become increasingly important. The results presented here show how seamless automation can support staff, strengthen quality, and help organizations meet growing patient needs.

Conclusion

This deployment illustrates what clinical AI looks like when it is designed to disappear into the workflow. What began as a response to rising scan volumes has become a model of efficiency, accuracy, and quiet reliability, demonstrating that innovation does not need to disrupt the clinic to deliver meaningful impact.

By integrating directly into existing systems, ART-Plan improved productivity, consistency, and clinician confidence while freeing staff to focus on patient care. The result is a workflow that operates faster, more intelligently, and with renewed assurance.

TheraPanacea continues to advance AI's role across the radiotherapy process. From SmartFuse™ to SmartQA™, each stage enhances precision and adaptability, supporting the next generation of intelligent, data-driven oncology care.



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TheraPanacea develops cutting-edge AI technologies that enhance accuracy, consistency, and efficiency across the radiotherapy and imaging workflow. Rooted in collaboration with clinical partners worldwide, our mission is to make advanced cancer care more intelligent, connected, and accessible—helping clinicians focus on their patients.

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