



Contour

Autosegmentation

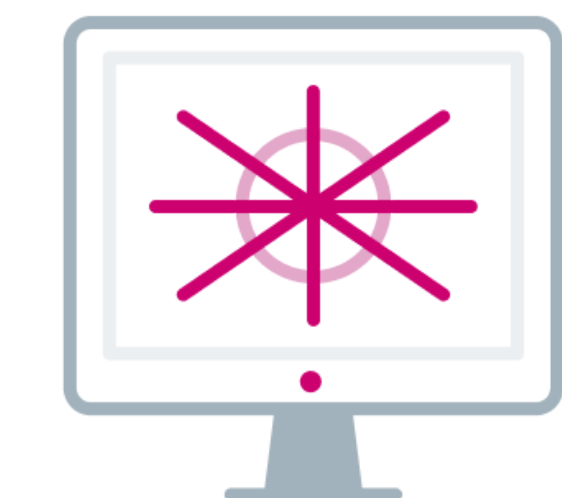
The introduction of AI has altered the contouring landscape. Deep-learning algorithms have been shown to reduce contouring time by up to **60%**. A study by NYU Langone has shown that on average, most contours only require modest edits prior to clinical use.

Contouring software can operate within the treatment planning system for convenience, but leveraging cloud resources expedites complex calculations for fast results.

60%
time savings

Increased Safety

- The more an intervention relies on the consistent manual efforts of clinical staff, the less likely it is to achieve a **consistent and sustainable** change. Automation and forcing functions are among the most effective strategies to implement change in the **prevention of errors**.
- Boeing found a **46%** decrease in errors when using their automated electronic checklist compared to paper checklist.



Plan

Automated Treatment Planning

Planning is a time-consuming process, and there is wide variability in manual treatment planning outputs that can be attributed to planner skill levels.

Automating iterative processes like field-in-field planning has reduced the time required to create breast tangent plans by **85%**. Doing the same on the Halcyon using the electronic compensation technique—traditionally a difficult process taking several hours to produce a clinically acceptable plan—can be done successfully in **20-30 minutes**.

85%
time savings

Resource Efficiency

- A study by NYU Winthrop showed that **13.6%** of over 10,000 patient encounters were found to exhibit a charge error (primarily in simulation and treatment charges).
- Improving efficiency provides resilience in the face of potential changes in billing towards a future bundled payment model.
- Analysis of clinical information provides insights on how to design better workflows.



Check

Plan Evaluation and Reporting

AAPM Task Group Report 275 touts automation for physics plan checks given the scope of verification items recommended as part of a comprehensive review.

Access to application program interfaces (APIs) for treatment planning systems has allowed for robust and comprehensive plan evaluations that include constraints, collision detection, at-a-glance plan information comparison, and customized reporting. In streamlining their department's reporting process via automation, UCSD was able to reduce the resources required for all their plan reports by **53%**, resulting in a time savings of **26 hours** over a period of just two weeks.

53%
time savings

Improved Plan Quality

- Automated 3D planning for breast sites has resulted in **lower hot spot volumes** (V105% and dmax) and improved **dose coverage** (D95%) and homogeneity
- Less reliance on manual planning techniques in favor of templates, automation, and pre-defined inputs reduces the incidence of errors and improves consistency in plans.



Treatment & Billing

Weekly Physics Review

The cadence of physics checks—once per every five fractions—allows errors to potentially remain undetected for several days. Because of other clinical tasks and competing priorities, weekly chart checks can sometimes be relegated to the end of the day, when physicists may be less attentive to detail. Manually comparing data from various sources (treatment planning system, record and verify, billing database) can be cumbersome. Collating automatically synced data into a chart review platform has led to a reduction in **63 clicks per patient** and a time reduction of **80%**, equating to savings of **2.5 hours** for a patient load of 45 patients per week.

80%
time savings

Billing Reconciliation

Automation software can help manage day-to-day charges, detect code conflicts, ensure proper documentation, approval status, and more.

After introducing an automated billing quality assurance platform, a radiation oncology department caught an estimated **\$352k** in incorrect charges for external beam treatments, along with an additional **\$73k** in HDR-related charges.

\$352k
incorrect charges

Quality Assurance Management

Centralized databases for routine quality assurance measurements, as well as equipment calibration records, provides convenient, accessible records and documentation for inspections and accreditation.

References

- www.resources.radformation.com
- N. Bice, et. al. 2022. *Statistical Evaluation of a Commercial Deep-Learning-Based Automatic Contouring Software*. American Association of Physicists in Medicine Annual Meeting, Washington, DC.
- G. Demircioglu, et. al. 2019. *Addressing Billing Errors: Results of a Prospective Quality Assurance Initiative to Optimize the Accuracy of Radiation Oncology Patient Charges*. International Journal of Radiation Oncology, Biology, Physics, 104(3), S214-215. <https://doi.org/10.1016/j.ijrobp.2018.07.131>