

Hippocampal Sparing Whole Brain (HCSWB) Model Description

Purpose:

This document describes the context in which the Hippocampal Sparing Whole Brain (HCSWB) Model should be used, as well as how it was configured and validated. For additional information on the validation process, reference Eclipse Photon and Electron Reference Guide.

Applicability:

Note *RapidPlan knowledge-based planning and its models are not intended to replace clinical decisions, provide medical advice or endorse any particular radiation plan or treatment procedure. The patients' medical professionals are solely responsible for and must rely on their professional clinical judgment when deciding how to plan and provide radiation therapy.*

Note *You should validate every DVH estimation model before using it clinically. This applies to any model, whether Varian provided, peer provided or the models you create yourself.*

- This model is designed to be used for RapidArc treatment plans for whole brain utilizing a hippocampal sparing technique.
- The model estimates the DVH for brainstem, spinal cord, left and right optic nerves, right and left lens, right and left eyes, right and left lacrimal glands, hippocampus + 0.5cm, and hippocampus.
- The model is intended to be used in conjunction with a MU objective with a relative strength of 80 and minimum and maximum MU of 1000 and 2000, respectively. MU objective must be added manually.
- The “Intermediate Dose” function of the Photon Optimizer was not utilized
- The model is intended to be utilized for whole brain with hippocampal sparing without a simultaneous integrated boost (SIB) to gross disease. If SIB is intended to be utilized for boost volume, clinical validation of model performance is necessary. The model was not generated and fully validated for these SIB clinical cases. See Annex A for details on limited SIB usage /experimental testing.
- The HCSWB model was created using the guidelines described below.

Note *The performance of the HCSWB model may vary depending on the contouring and planning guidelines. Each site should validate the model with institution-specific contouring and planning guidelines before clinical use.*

Target and OAR contouring and planning guidelines:

The HCSWB model was created using the following guidelines. Every patient must have a planning CT. The CT simulation scan must encompass the entire head to include the most superior aspect of the patient through the entire head. Axial slice thickness should not exceed 2.5mm and smaller axial cuts are recommended.

The use of MRI guided contouring is also recommended. The MRI axial slice thickness should match the CT slice thickness as much as possible. It is recommended to obtain gadolinium-enhanced studies to include three-dimensional spoiled gradient (SPGR), magnetization-prepared rapid gradient echo (MP-RAGE), or turbo field echo (TRF) axial MRI scans with axial slice thickness not greater than 1.5mm. Standard axial and coronal gadolinium contrast-enhanced T1-weighted sequence and axial T2/FLAIR sequence scans should be acquired with no greater than 2.5mm slice thickness.

The planning target volumes (PTV) and the organs at risk (OARs) are contoured on the planning CT.

Target contouring guidelines:

Target name	Guidelines
CTV (or Brain)	Whole brain parenchyma through the foramen magnum
PTV_WB	CTV excluding the hippocampal avoidance region (see below); no setup margin is added

OAR contouring guidelines:

OAR name	Guidelines
Hippocampus(R+L)	Bilateral hippocampal contours (contoured in one structure); will be generated from the CT simulation image set fused to MRI image sets
Brainstem	Best generated on MRI image set and verified on CT simulation image set. Inferior aspect at the level of foramen magnum (should be at the interface of CTV inferior aspect) and superiorly to include midbrain
Spinal Canal	Superior aspect to begin at the distal edge of the brainstem through inferior aspect of the image set
Lens(R/L)	Use CT image set only for creation; bilateral contoured separately
Optic Nerve (R/L)	Use CT image set only for creation; bilateral contoured separately
Eye(R/L)	Best generated from CT simulation image set; delineate the entire globe of the eye; bilateral contoured separately
Optic Chiasm	Structure best visualized on MRI image set and confirmed on CT image set; located above the pituitary fossa which is located within the sella turcica
Lacrimal Gland(R/L)	Structure sits superior and lateral to the globe of the eye; best generated on CT simulation image set and verified using MRI; bilateral contoured separately

Required optimization structure contouring guidelines:

Optimization structure	Guidelines
Hippocampus+05(R+L)	Hippocampal avoidance region; the hippocampi with 5mm expansion radially
PTV_WBopt	PTV excluding hippocampal avoidance region + additional margin; recommended margin is additional 3mm to a total of 8mm margin from hippocampus structure. See Annex A for additional margin guidance.

Treatment planning guidelines:

All cases used to train and to validate the model were planned using head-first supine position with head positioned in a neutral position. All patients were immobilized with an aquaplast mask.

A four arc VMAT technique was utilized with two full, coplanar arcs and two partial vertex arcs. Each set of coplanar and vertex arcs had clock-wise and counter clock-wise gantry rotations with mirrored collimator positions (315/45) for each set. The coplanar arcs had 359.8 degrees of arc rotation for each field. The vertex arcs had 184.9 degrees of arc rotation for each with the start and end positions being 180.1 and 5 degree gantry positions with a 90 degree couch position. Each arc was positioned at a single isocenter located in the center of the target, isocenter was aligned to best achieve coverage of the PTV and jaw settings were verified for proper field size by a beams eye view (BEV) evaluation of each control point in the arc rotation, ensuring the entire brain was always visible, never under the jaw. See Annex A for further discussion on different number of arcs and the end of Annex A for a screen capture that includes a visualization of the arcs.

The following dose prescription and planning guidelines were used for the cases to train and validate the model.

Target:

PTV_WB	30Gy in 10 fractions
PTV_WB coverage	D100% at 95%; D98% > 25Gy; D2% < 37.5Gy;
plan normalization	recommended for D100% >95%

OARs:

Planning objectives for OARs are as follows but may be adapted according to the desired fractionation scheme*:

Hippocampus	D0.03cc <13Gy; Mean dose < 8Gy; D100% < 7Gy
Chiasm	D0.03cc < 30Gy
Brainstem	D0.03cc < 33Gy
Cord	D0.03cc < 25Gy
Optic Nerve	D0.03cc < 30Gy
Eye	Mean dose < 6Gy
Lacrimal Gland	Mean dose < 10Gy
Lens	D0.03cc < 4Gy

*See Annex B for full Plan Quality Metric scoring criteria

References for contouring and planning guidelines:

Brown P, Gondi V NRG-CC001: A Randomized Phase III Trial of Memantine and Whole-Brain Radiotherapy With or Without Hippocampal Avoidance in Patients with Brain Metastases <https://www.nrgoncology.org/Clinical-Trials/NRG-CC001>

Prokic V, et al Whole Brain Irradiation with Hippocampal Sparing and Dose Escalation on Multiple Brain Metastases: A Planning Study on Treatment Concepts <http://dx.doi.org/10.1016/j.ijrobp.2012.02.036>

2015 AAMD / Sun Nuclear Plan Challenge <http://planchallenge.sunnuclear.com/>

A physician with considerable experience in treating patients under the NRG-CC001 protocol, planning goals and contouring consistency were completed to this individual's clinical preference

Structure codes:

To ensure robust structure matching between new cases and the structures defined in the model, it is recommended to use the following structure code assignment:

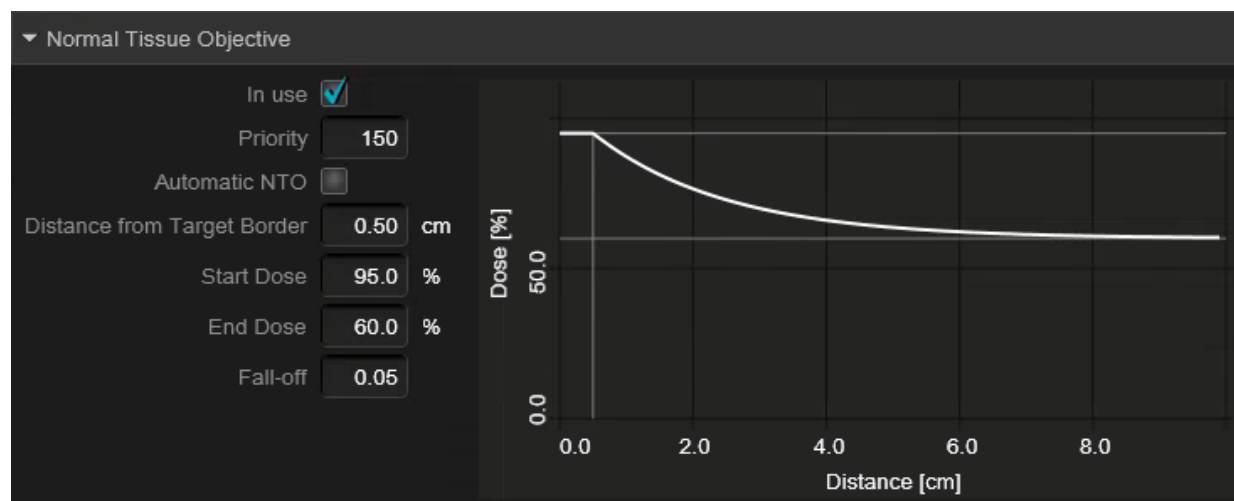
Structure name example	Structure name in model	Structure code(s) in model
PTV_WBopt	PTV_WBopt	(PTV_High,PTV_Int Target)
Hippocampus_TotI	Hippocampus(R+L)	(275020)
Hippocampus+05_TotI	Hippo+05(R+L)	(PRV)
Chiasm	OpticChiasm	(62045)
Brainstem	Brainstem	(79876)
Spinal Cord	SpinalCanal	(9680, 7647)
LOptic	OpticNerve(R/L)	(50878, 50875)
ROptic	OpticNerve(R/L)	(50878, 50875)
LEye	Eye(R/L)	(12515, 125124)
REye	Eye(R/L)	(12515, 125124)
LLacrimaI	LacrimaI(L/R)	(59103, 59102)
RLacrimaI	LacrimaI(L/R)	(59103, 59102)
LLens	Lens((R/L)	(58243, 58242)
RLens	Lens((R/L)	(58243, 58242)

Optimization objectives and Optimization settings:

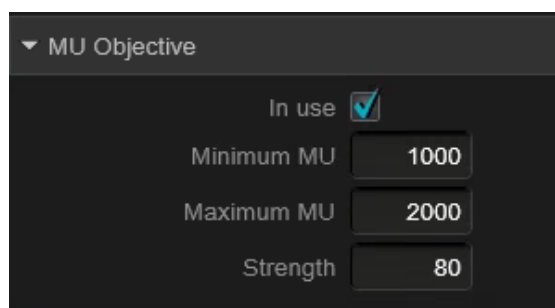
The following optimization objectives were defined in the model and will be generated when the model is applied to a new case.

Targets		Vol(%)	Dose(%)	Priority
PTV_WBOpt	Upper	0	107.6	150
	Lower	99.5	101.6	185
	Lower	99.7	100.6	200
	Lower	100	95.6	175
OARs		Vol(%)	Dose(%)	Priority
Brainstem	Upper	0	101.8	150
Eye(R/L)	Line	Generated	Generated	115
Hippo+05(R+L)	Line	Generated	Generated	180
Hippocampus(R+L)	Upper	99	Generated	165
	Upper	0	Generated	100
	Line	Generated	Generated	180
Lacrimal(L/R)	Line	Generated	Generated	65
Lens(R/L)	Upper	0	Generated	110
	Line	Generated	Generated	50
OpticChiasm	Upper	0	95.8	150
OpticNerve(R/L)	Upper	0	95.8	140
	Line	Generated	Generated	30
SpinalCanal	Upper	0	76.5	120

Applying the model will also set the following parameters for the NTO:



MU objective is also recommended for planning with the following parameters (must be added manually):



MU Objective	
In use	<input checked="" type="checkbox"/>
Minimum MU	1000
Maximum MU	2000
Strength	80

Model Training:

The Hippocampal Sparing Whole Brain (HCSWB) model was trained with 20 cases. Each case was simulated with aquaplast mask immobilization and neutral head position.

All cases were planned to 30Gy in 3Gy fractions with 6X energy on a Varian Linac with Millennium120 MLC.

All cases utilized VMAT technique. See Annex H for full details of cases in model training set.

The training cases were extracted from clinical cases that satisfied the contouring criteria described previously. A recursive method of model creation was utilized to generate a RapidPlan model with very consistent, high quality plans developed with tight DVH prediction bands allowing for aggressive hippocampal sparing optimization objectives to be used.

The recursive model creation process is summarized below:

First, an initial RapidPlan model is created from 20 manually planned cases. Then, that model is used to re-plan all the cases in that training set and/or others. Different arc geometries and differing combinations of auto-created optimization objectives are systematically used. The best scoring plan from each method is selected for each patient and those plans become the training set for the final model, and a final set of automatic objectives are then established for this final model. One RapidPlan model created from another initial/parent model, a la the recursive method.

See Annex C for full details of the model creation process with recursive method.

Model Validation:

The HCSWB model was validated using 21 cases which included the 20 final model training cases as well as an independent control case. See Annex F for details on the control case final validation and Annex M for scoring details of the final model on the training set.

Additional validation was done using 7 cases obtained from another, outside institution. See Annex N for details on the final model validation on the external cases.

Since finalizing this model it has been tested on a number of cases from multiple institutions and the resulting plans were judged to have clinically satisfactory results, with PQM scores all within the expected range.

Finally, it should be noted since this provided model only has 20 cases in its training set, the green/orange match indicators which appear when the model is applied to new patients may display more orange structures than would be common with models created from larger training sets.

Annex Directory

- Annex A: **Usage variations** (number of arcs, margin for WB_PTVopt, optimization thoroughness, objectives relative to Rx, SIB usage)
- Annex B: **Plan Quality Metric** (PQM) used to assess quality of plans
- Annex C: Model creation, tuning, and validation **process detailing recursive method**
- Annex D: **PQM Histograms** of plans created in each phase of the recursive model training process
- Annex E: **Comparison of DVH prediction bands** from initial model against final recursively trained model and details of MU objective utilization
- Annex F: **Scorecards from control case** (patient not included in model training set) at each phase in process
- Annex G: PQM Histogram, scoring table and individual **scorecards from manually planned cases** used to create initial, non-final model
- Annex H: **Scoring table and explanations** for each series of cases planned by the initial model with differing sets of DVH objectives and beam arrangements
- Annex I: PQM Histogram and individual scorecards from recursively planned cases created with **“balanced”** priority hippocampal sparing objectives (**3 arc** beam arrangement)
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- Annex M: PQM Histogram and individual **scorecards from final model re-planning the cases in the training set** (4 arc beam arrangement)
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- Annex O: **Acknowledgements**
- Annex P: **Release, distribution and compatibility**

Annex A: Usage variations

Variation: Number of arcs

All validation plans were created using the 4 arc arrangement described above, in the main document. The plans created manually for the initial model used only 3 arcs: two full arcs, 0 couch, 315/45 collimators and one vertex arc 180(PA) -> 5 degrees(from AP) 90 couch, 90 collimator. Later in the process, a concern was brought up about constant nature of the inter-leaf leakage through the MLC throughout the gantry rotation of the 3rd vertex arc (90 collimator, 90 couch). Plan attempts simply changing the collimator rotation on the 3rd arc always resulted in poorer plan quality plans (ie. lower PQM scores). The solution was to break the vertex arc into two CW/CCW paired arcs with 315/45 collimator angles, resulting in the 4 arc beam geometry as described in the main document. To verify this 4 arc beam arrangement resulted in equal or better plans than the previous 3 arc beam arrangement, the initial model was used to plan all the cases in the final model's training set, twice with identical optimization objectives, just changing the arc arrangement. The plans scores were very similar between both beam arrangements, with the 4 arc arrangement usually scoring slightly higher. The highest scoring plans created with the initial model were used to train the final model, regardless of optimization criteria or beam arrangement. It should be noted the vast majority of the cases used to train the final model were 4 arc beam arrangement plans.

See Annex H for details of which objectives and beam arrangements were used in the cases used to train the final model.

See Annex I and J for comparison details of plans made with the 3 arc vs 4 arc technique.

It is recognized that a 4arc geometry will result in slightly longer treatment time for the patient. This model creates very similar quality plans (as measured by the PQM) with either 3 or 4 arcs, it is up to the user and their associated clinical, physics and medical staff to choose which arc arrangement to employ. If utilizing only 3 arcs (1 vertex arc), consider lowering the "Minimum MU objective" < 1000MU.

Variation: Margin used to create optimization structure WB_PTVopt

During planning of the external validation cases it was recognized that there was variation in the absolute volume (size) of the hippocampus structures. Using the standard Hippocampus+08mm expansion removed from the brain contour to create the PTV_WBopt (as described in the main document, above) sometimes resulted in plans scoring lower than expected due to the PTV_WBopt absolute volume (size) being too low (small) to provide sufficient coverage of prescription dose to the WB_PTV (D100 <95%, D98 < 25Gy). The solution was to create the WB_PTVopt from a 7mm expansion of the hippocampus structure instead of 8mm. In cases where target coverage is below expectation, or an even more steep (aggressive) dose gradient is desired around the hippocampus structure, consider using a smaller expansion (7mm instead of 8mm) from the hippocampus structure when using the "Crop structure" or "Boolean operator" tool to create your WB_PTVopt.

Variation: Optimization thoroughness

At all phases in the model creation process every plan was "optimized thoroughly". It has been the experience of the creators of this model that noticeably higher quality plans can be achieved when pausing the Photon Optimizer in each MR level and sub-step until the cost/time line has run completely flat. This is achieved by pausing the optimizer at the beginning of optimization. Then, once the line is flat, the optimizer is un-paused until the next MR sub-step begins and the optimizer is immediately paused again. This process is repeated at each MR sub-step (all 10 MR level sub-steps). By giving the optimizer time to find the ideal solution at each sub-step the plan quality is improved. There is debate as to if all sub-steps need to be paused, or if it is important that the cost/time line be completely flat before allowing the optimizer to continue to the next sub-step. As with all other aspects of usage of this model, how thoroughly plans are optimized is completely up to the discretion of the user and their associated clinical, physics, and medical staff to decide. Pausing the optimizer is not required but is highly recommended to achieve the plan quality results found in this validation.

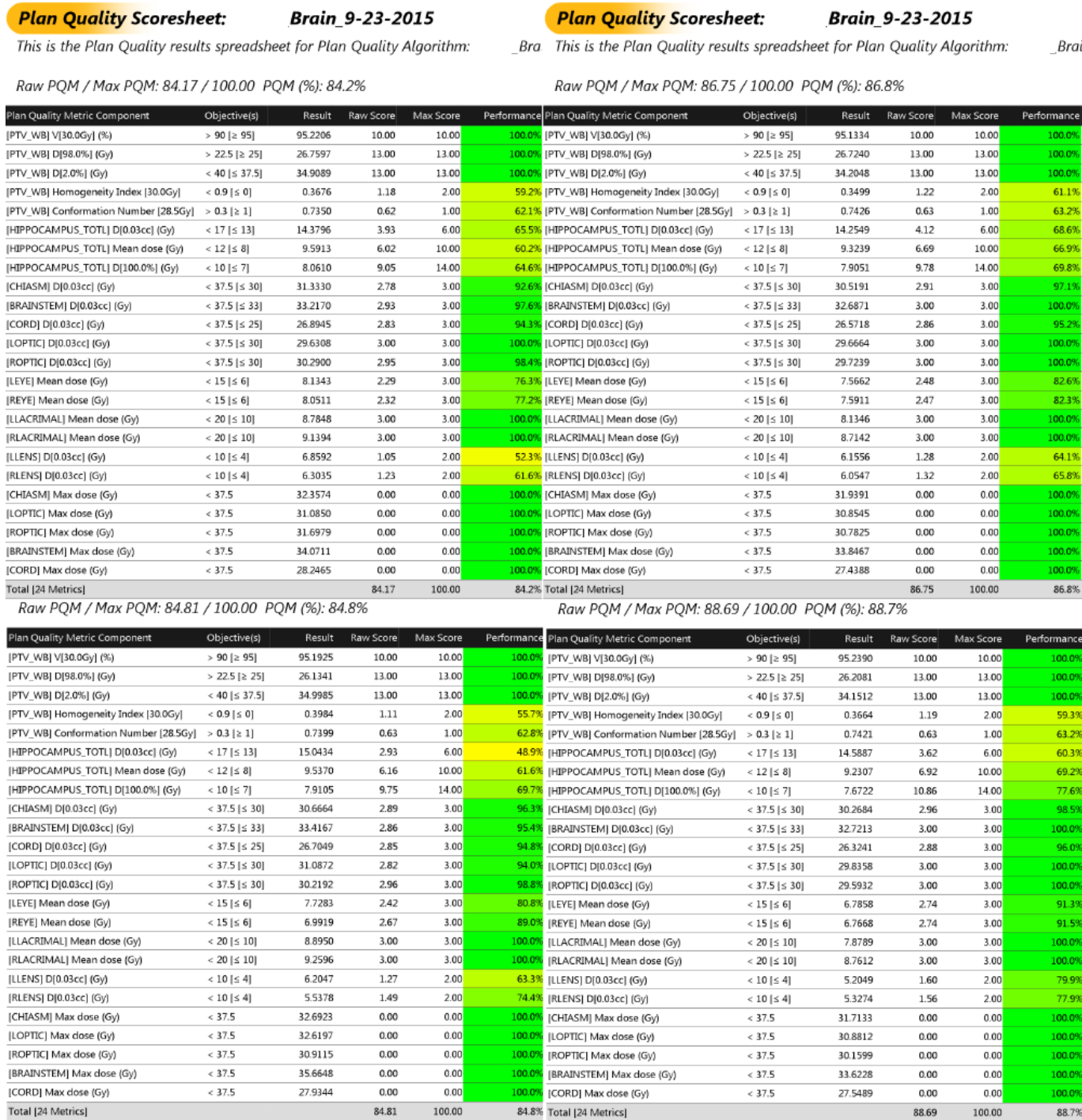


Figure 1: Two patients’ (outside patients not otherwise cited in this work) PQM scorecards (first patient top scorecards, second patient bottom scorecards) planed twice with this model, the only difference being “optimization thoroughness”. The scorecards on the left were generated from the plans created without pausing (score 84.17/84.81) and pausing the optimizer at each MR level sub-step resulted in the scorecards the right (score 86.75/88.69). Scorecards courtesy of PlanIQ, Sun Nuclear Corporation.

Variation: WB_PTV prescription dose other than 30Gy (3Gy in 10 fractions)

Optimization objectives are set to scale relative to the prescription dose to support varying dose prescriptions (ie 25Gy). Prescriptions other than 30Gy to the PTV_WB have not been tested or validated. If utilizing this model for a prescription that varies from 3Gy per fraction, consider changing the “Minimum MU objective” from 1000MU to a number that increases or decreases relative to the dose per fraction. As always, validate results from this model for your patients at your institution before clinical use.

Variation: Simultaneous Integrated Boost (SIB) usage

This model was trained for and is expecting only one (30Gy) target. However, it could be used carefully to create SIB plans by subtracting from the PTV_WBopt the high risk PTV and a margin to accommodate the dose gradient/falloff (in addition to removing the hippocampus + margin done normally). Next, simply use the model to automatically populate the optimizer as is normally done, but then manually add upper and lower dose constraints for the high risk PTV. Obvious care would need to be taken to ensure your margin removed from the WB_PTVopt for the high risk target was not too conservative or aggressive.

It is important to note when using this method, the HCSWB model has no knowledge of the higher dose level target when generating the DVH prediction and creating the relative optimization objectives (since the new higher dose target objectives are manually added into the optimizer after the model has been applied). This situation could cause the model to create objectives that are no longer relevant for your patient and as a result could create inferior, undesirable plans. The degree to which the objectives are off is directly proportional to the distance the high dose target is from the OARs with DHV bands being predicted (especially the hippocampus) and how much higher the high risk PTV is prescribed relative to the WB_PTV. Therefore, usage in the SIB scenario cannot be recommended by the creators of this model. However, what each user does with this model is at the discretion of the user and their associated clinical, physics, and medical staff.

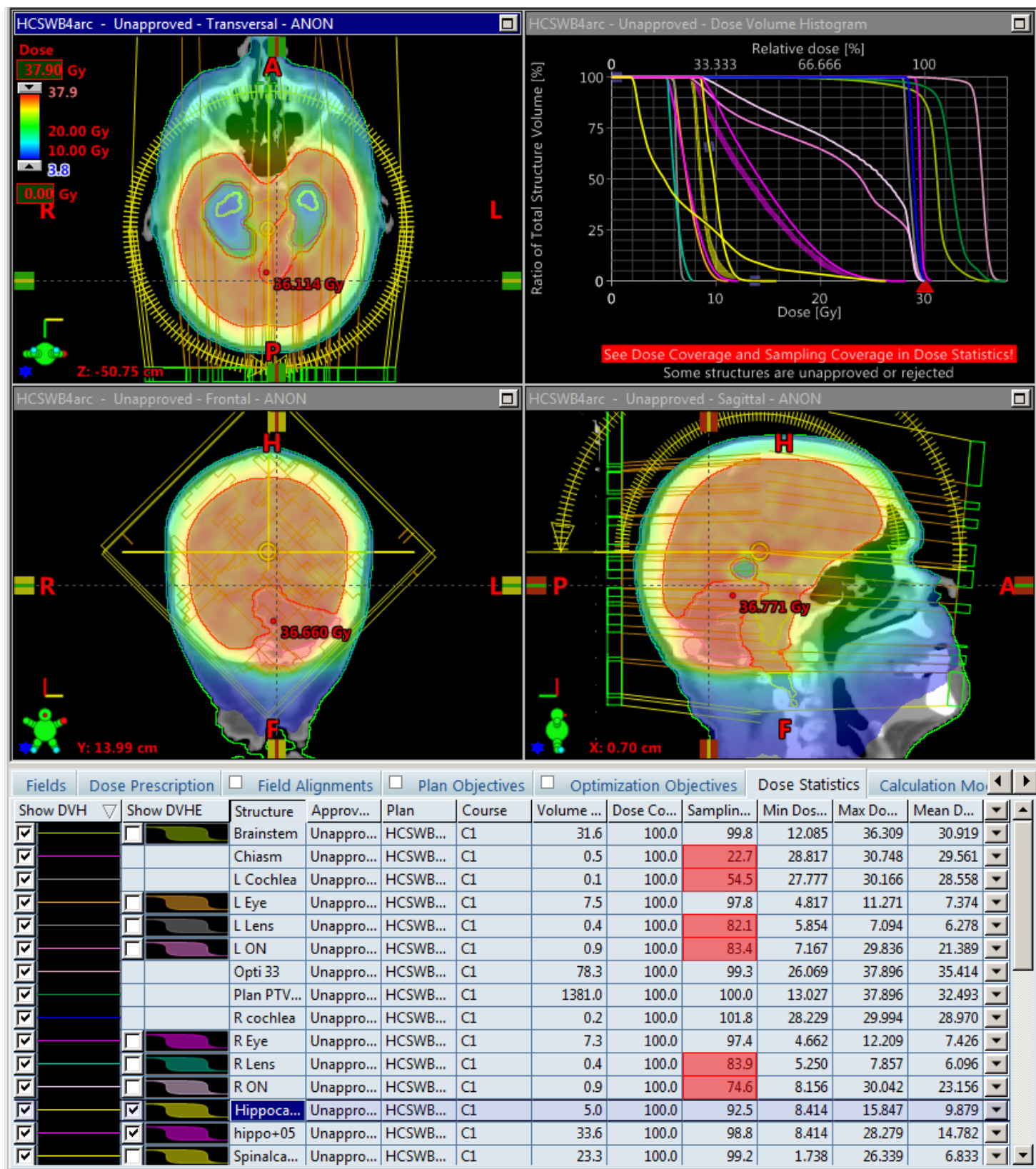


Figure 2: An example of a mild SIB (33Gy to high dose target, 30Gy to WB_PTV in 10fx) plan created using the required modifications for SIB mentioned above. Note the DVH prediction bands are turned on for the hippocampus and hippocampus+05, and due to the proximity of the high risk target to the hippocampus the bands weren't as accurate resulting in overly/unreasonably aggressive automatically generated optimization criteria for the hippocampus. Even given the more heterogeneous WB_PTV dose distribution, this case was judged to be clinically satisfactory.

Annex B: Plan Quality Metric (PQM) used to assess quality of plans

Scorecards were created for each plan using a Plan Quality Metric (PQM). The metrics were created from the criteria mentioned, in the main document above, with direct guidance added from a physician with experience treating hippocampal sparing whole brain patients under protocol. This guidance resulted in the more extreme hippocampal sparing than is requested in the protocols referenced. The PQM scorecards were created using the Plan IQ software (formerly Quality Reports) from Sun Nuclear Corporation. Building scorecards to guide plan quality throughout the model creation process proved to be critical. PQM scorecards enabled a very minute degree of plan quality control and measure throughout the model creation process and removed all subjectivity in judging which plan was superior when assessing two or more plans for the same patient.

Careful consideration needs to be applied to create a static, robust, well thought out PQM prior to getting too far into the model creation process. A good PQM should drive all planners to a similar, high quality plan which scores well; a key component to achieving this result is, usually, to ensure the target score metrics have the highest score weighting.

Plan Quality Algorithm:

Brain, 9-22-2015 (100 Max Possible) (24 Metrics) (Page 1 of 3)

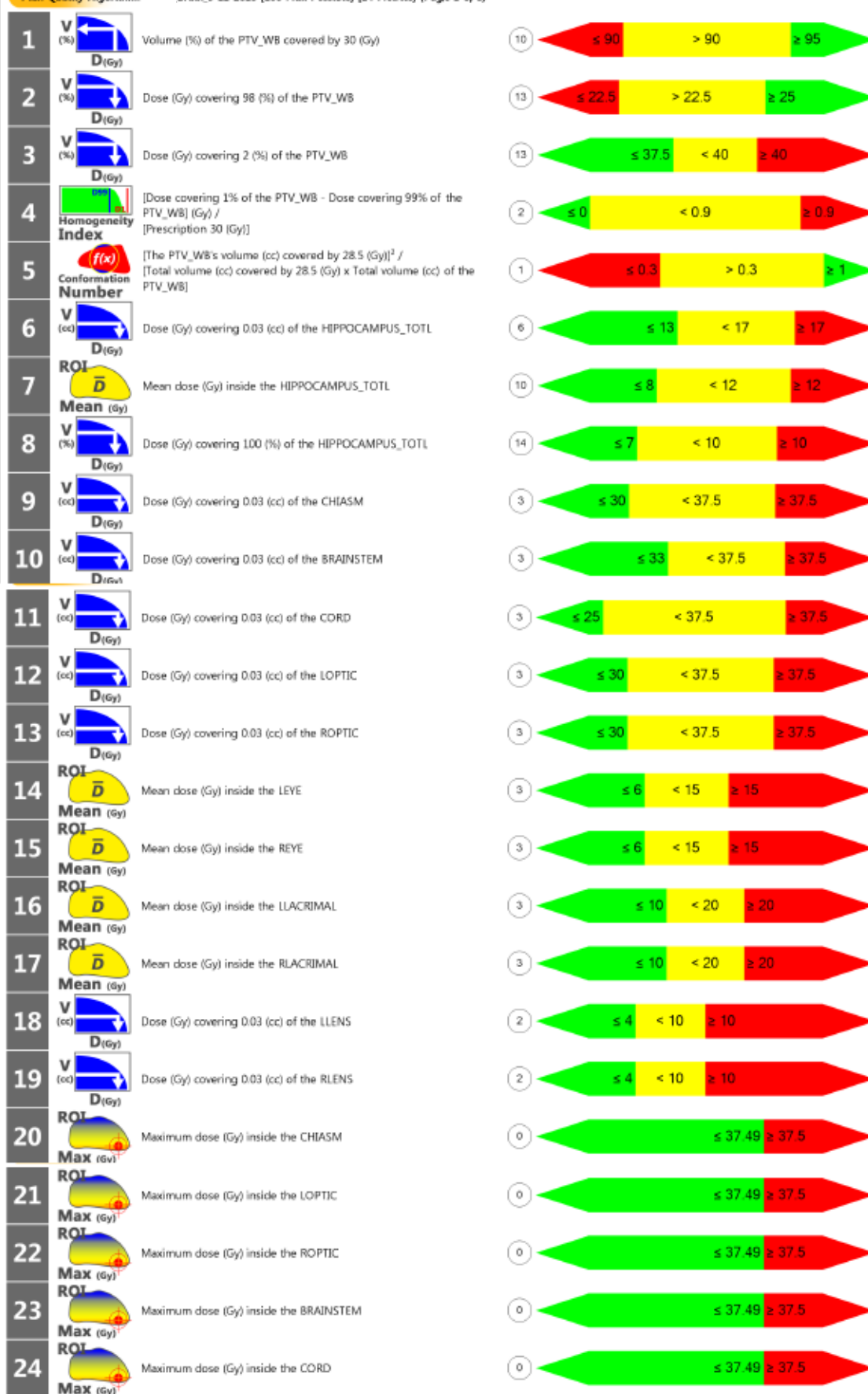


Figure 4: The scoring criteria used to generate the scorecard for each patient. Note the score value for each relevant sub-metric to the left of each score range arrow. Total points possible = 100 (usually, max score is never achievable on a well-designed PQM).

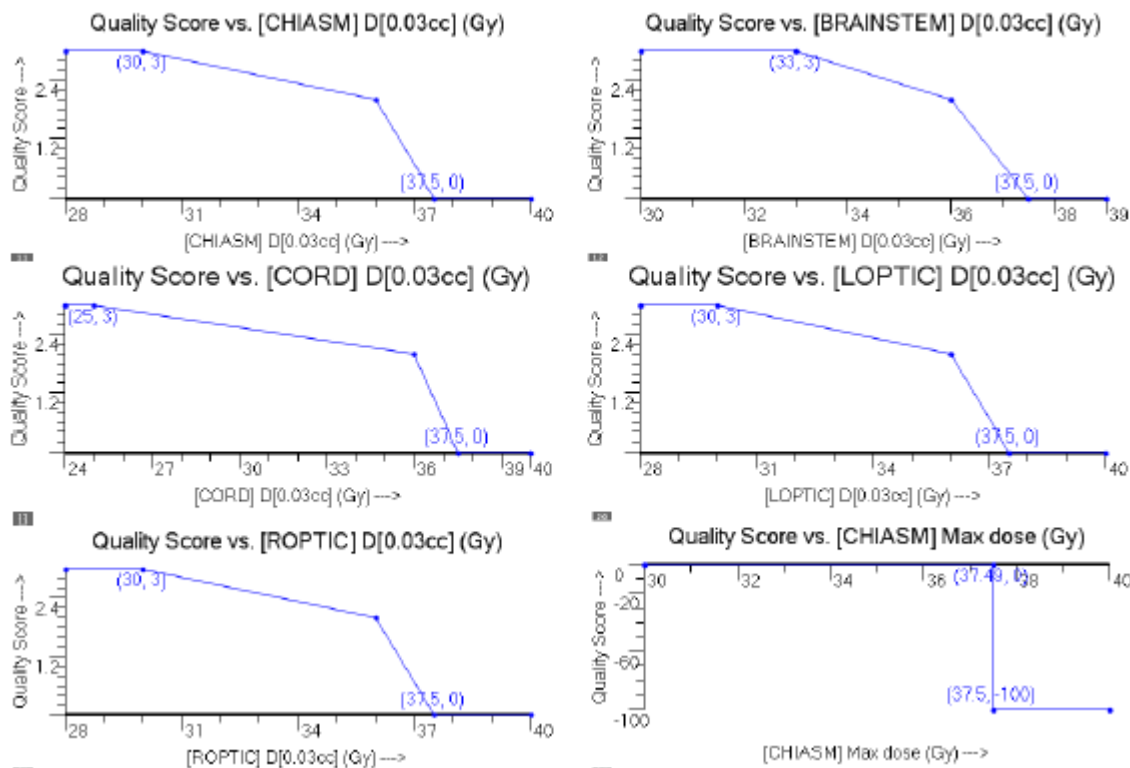


Figure 5: The individual metrics that did not score linearly throughout the sub-metric range for that specific OAR. Slopes were built per the request of the physician giving guidance for PQM scoring.

Annex C: Model creation, tuning and validation process detail using recursive method.

Most RapidPlan models are likely created utilizing a straightforward, non-recursive approach similar to the violet section in figure 6 below. However, after creating the initial HCSWB RapidPlan model and examining the model in the Eclipse “Model Configuration” workspace and in Varian’s cloud based tool, “Model Analytics”, this models’ creators determined it seemed to work well but wasn’t quite ideal. Specifically, there appeared to be:

- 1) Inconsistency with the structure sets / OAR contours on some of the patients’ data sets
- 2) Difficulty finding a single set of auto-created optimization objectives to be populated and work well on future cases planned with the model
- 3) Questions remained as to the effect of different arc arrangements (3 arc vs 4 arc) on plan quality

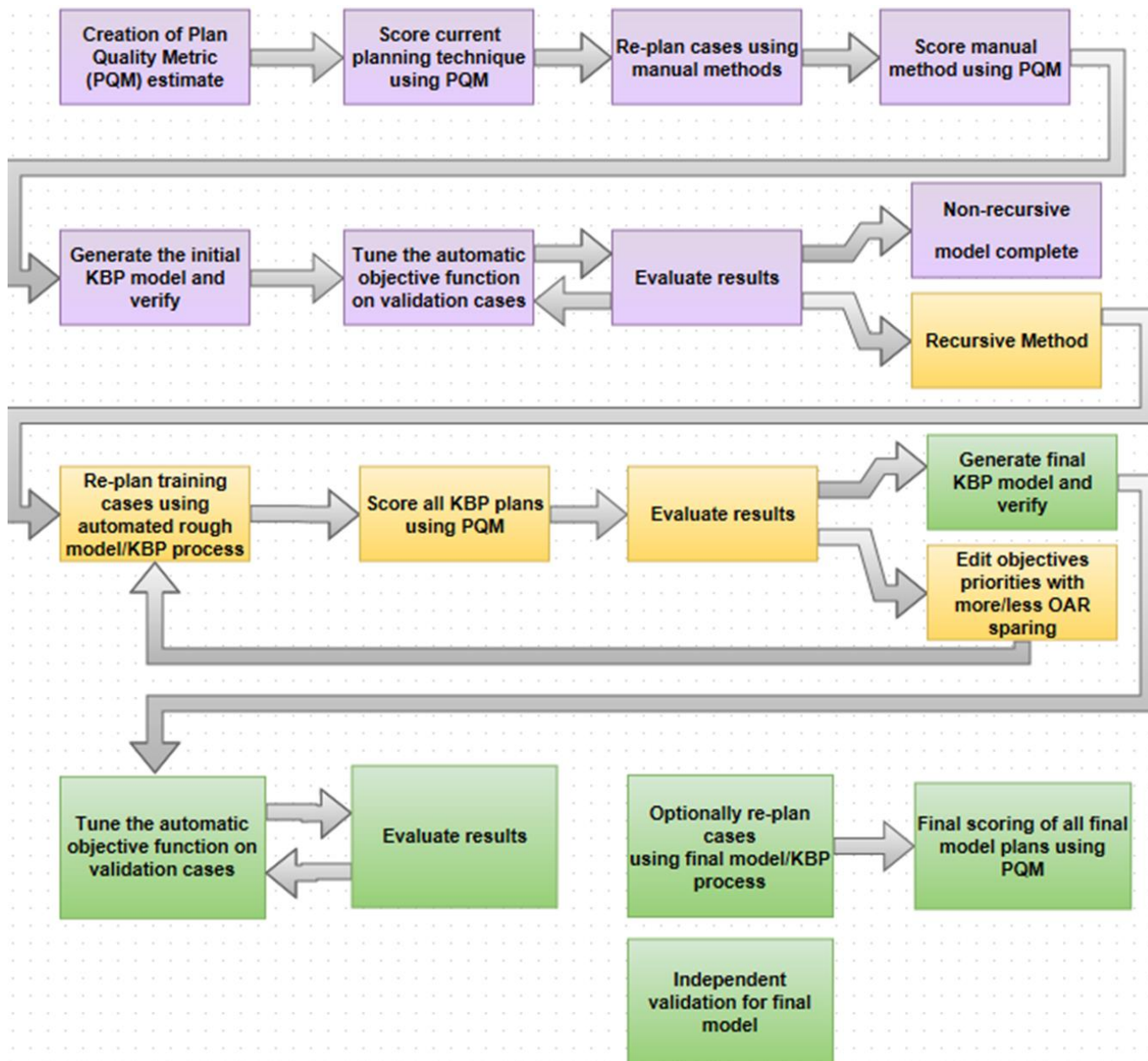


Figure 6: The process flow chart for creating this model using a recursive model training method.

Overall, the goal of this project was to create and release to the public a high quality RapidPlan model for this clinical treatment site. Had the goal been to create a model for internal use only, a simple non-recursively trained RapidPlan model would have likely been deemed “good enough”, as the first generation of the model did work quite well. Or if the training set was larger than the minimum 20 cases required, we could have simply eliminated outliers as in traditional model building practices. Since we were using the minimum allowed number of cases (20) to build this model, eliminating patients with OAR/structure outliers wasn’t an option either. However, 20 cases were deemed sufficient as the brain’s anatomy is relatively static from patient to patient. The brain isn’t a body site with much variability in OAR/target size/shape which would likely require a training set with greater than 20 cases.

After the initial model was created from the original 20 cases, some of the training cases with suspect OARs were either re-contoured or, where the doctor who drew the original hippocampus structure could not be reached, the case was thrown out and new cases with verified hippocampus structures were used. The original cases, some with modified

contours, and some new cases with verified structures (20 total) were all planned using the model created from the original cases with one of two beam arrangements (3 vs 4 arc) and one of three sets of auto-created optimization objectives (balanced OAR sparing, extreme OAR sparing, and very extreme OAR sparing).

The methodology was to first plan all remaining 20 cases with the same set of “balanced” auto-created optimization objectives with both 3 and 4 arc arrangements. Then, whichever arc arrangement scored higher, that case was then tried with a new set of auto-created optimization objectives with more aggressive OAR sparing. If the more aggressive OAR sparing resulted in another yet higher scoring plan, a final set of “very extreme” auto-created optimization objective were then attempted on the patient. This process is seen in figure 6, above, in the yellow section underscored by the gray looping arrow. As a result of this methodology, each of the 20 cases were planned utilizing the initial model at least three different times with different arc arrangements and auto-created optimization objectives.

Note: Plans created at this phase were normalized so that D100 = 95.1%, +/- 0.1%; usually normalization required was minimal (<1%).

The decision was then made to create a final model from the plan with the arc arrangement and auto-created optimization objectives combination that resulted in the highest score for each patient. This phase is illustrated in the green section in figure 6 above. Since all the plans were created from the same model with a relatively minor change to the auto-created optimization objectives and a very small effective difference in arc arrangement, the resulting model created noticeably tighter DVH prediction bands that resulted in a need to create and tune new auto-created optimization objectives for the final model. Finally, the final model and objectives re-planned all 20 cases (training set cases) to document the scores and additional control and validation cases were also planned and scored with the final model and objectives.

Note: Plans created at this phase required use of the MU objective feature of the v13.X Photon Optimizer; as DVH bands were often so narrow auto-created optimization objectives were being placed so near to the expected DVH curves that high scoring plans couldn't be attained without the MU objective being utilized on the final model's plans.

Annex D: PQM Histograms of plans created in each phase of the recursive model training process

The following histograms of PQM scores show that variability in plan quality is not only reduced by utilizing Knowledge Based Planning (RapidPlan), but further reductions in variability can be achieved by insuring your RapidPlan model's training set consists of high quality, consistently planned cases. An innovative way to facilitate the creation of a high quality training set for a RapidPlan model is to have a RapidPlan model create that training set via the recursive method described above. All PQM histograms created with PlanIQ (formerly Quality Reports) from Sun Nuclear Corporation.

See the reduction in standard deviations in each phase in the graphs below.

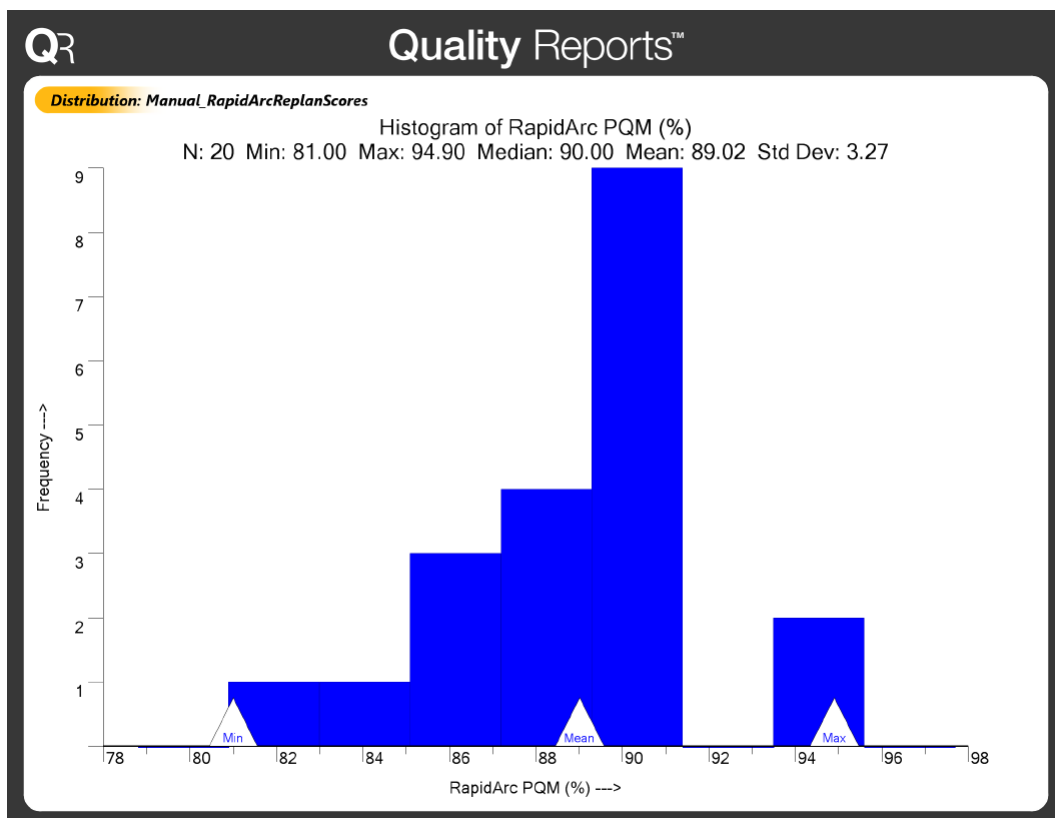


Figure 7: PQM score distribution from the 20 original plans made with manual (non KBP) methods, these plans became the training set for the initial model

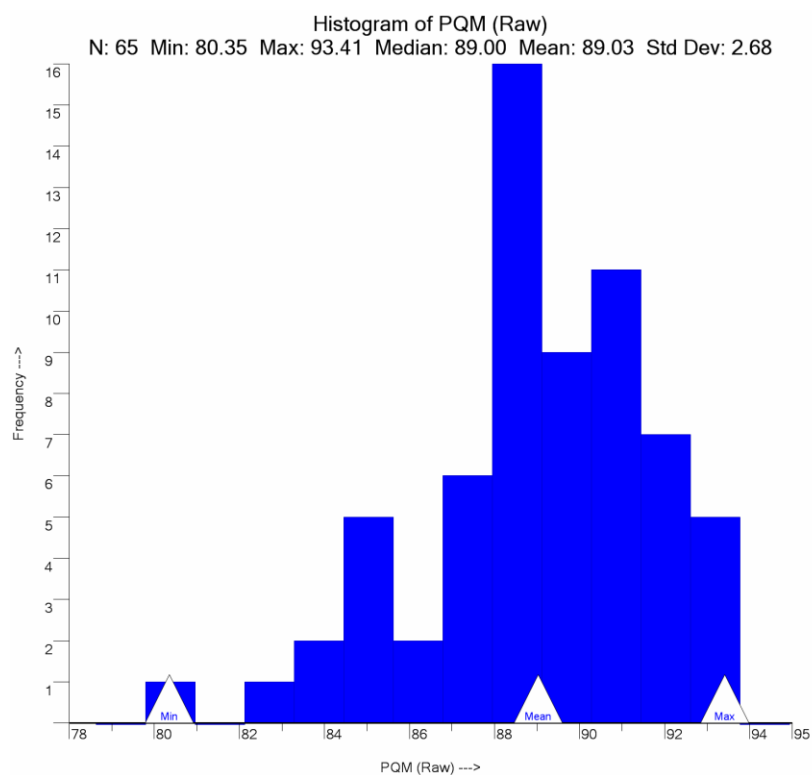


Figure 8: PQM score distribution from the 20 cases planned by the initial RapidPlan model with systematic arc arrangement and auto-created optimization objective combinations attempts. The highest scoring plan on each patient was used to create the final model.

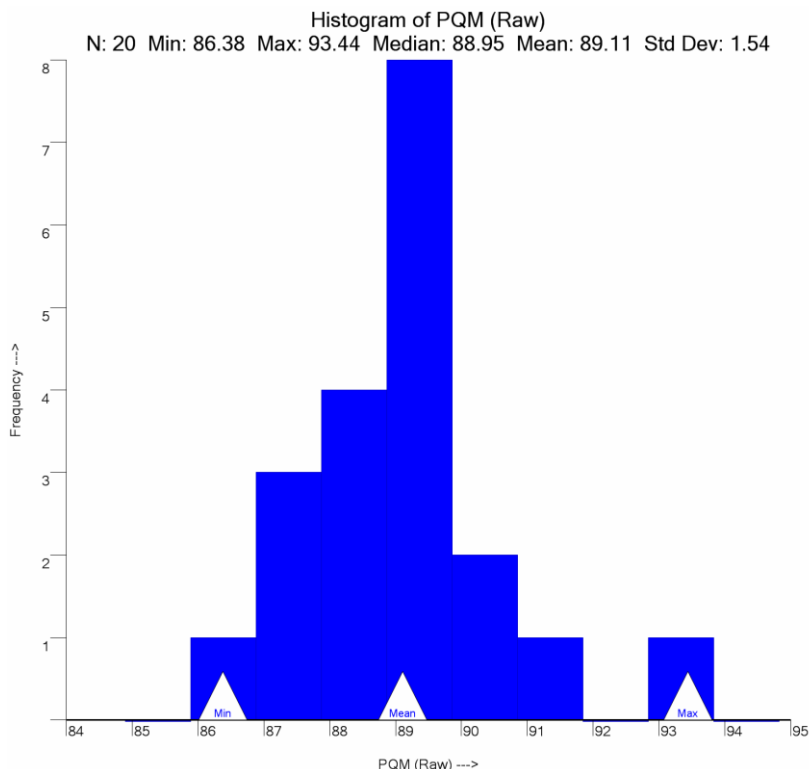


Figure 9: PQM score distribution from the same 20 cases from figure 8, above, re-planned by the final RapidPlan model with the final set of auto-created optimization objectives.

Annex E: Comparison of DVH prediction bands

The more consistently planned cases used for the RapidPlan model’s training set, the tighter the DVH prediction bands will be. Tighter DVH prediction bands allow the model creator to use higher priorities on their auto-created optimization objectives that accompany the RapidPlan model. If bands are wider allowing too much variance, lower priorities must be used as the associated model generated line objectives could be legitimately further from the actual achievable DVH in a future plan. Narrow bands demonstrate the confidence the system has with the DVH prediction for the associated OAR.

These narrow bands are extremely effective in helping create very consistent quality plans for this treatment site. For this treatment site, fears of “overfitting data” are less applicable due to the relatively static nature of the target and OARs in size, shape, and relationship with minimal patient to patient variance. The more specific a model’s intended use, the tighter the DVH prediction bands can be driven and, in turn, the higher the relative priorities on the relative auto-created objectives can be driven and tuned.

It is the option of the model creators that it is easier to create smaller “more specific” models which can be finely tuned and tweaked to deliver optimal results. The other option is to create and tune a larger “less specific” model. Both types of models have their pros and cons, but with a less specific, more general purpose, model fears of “overfitting data” are very relevant as it impacts the applicability and flexibility of the model.

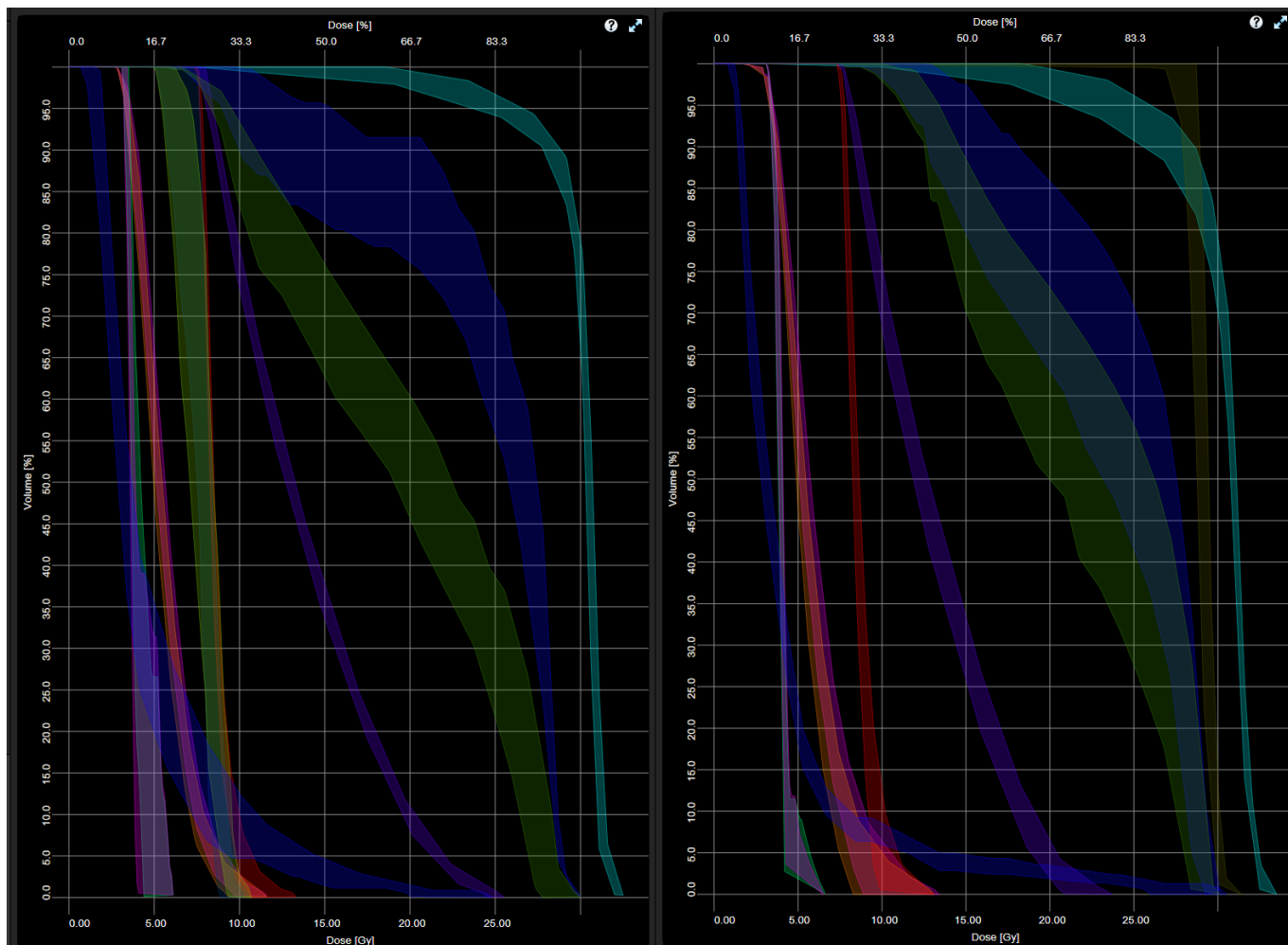


Figure 10: The DVH prediction bands for all OARs on the control patient (patient not in the model training set). The DVH prediction bands on the left are from the final, recursively trained model. The DVH prediction bands on the right are from the initial model trained with manually planned cases. The astute observer will notice there are additional bands on the final model, not seen on the original model – this is because the initial model’s training set didn’t have lacrimal glands contoured on enough of the cases and as a result the initial model was unable to predict DVH bands for those structures; this was one of the OAR consistency issues addressed for the cases that were re-planned with the initial model for the final model’s training set.

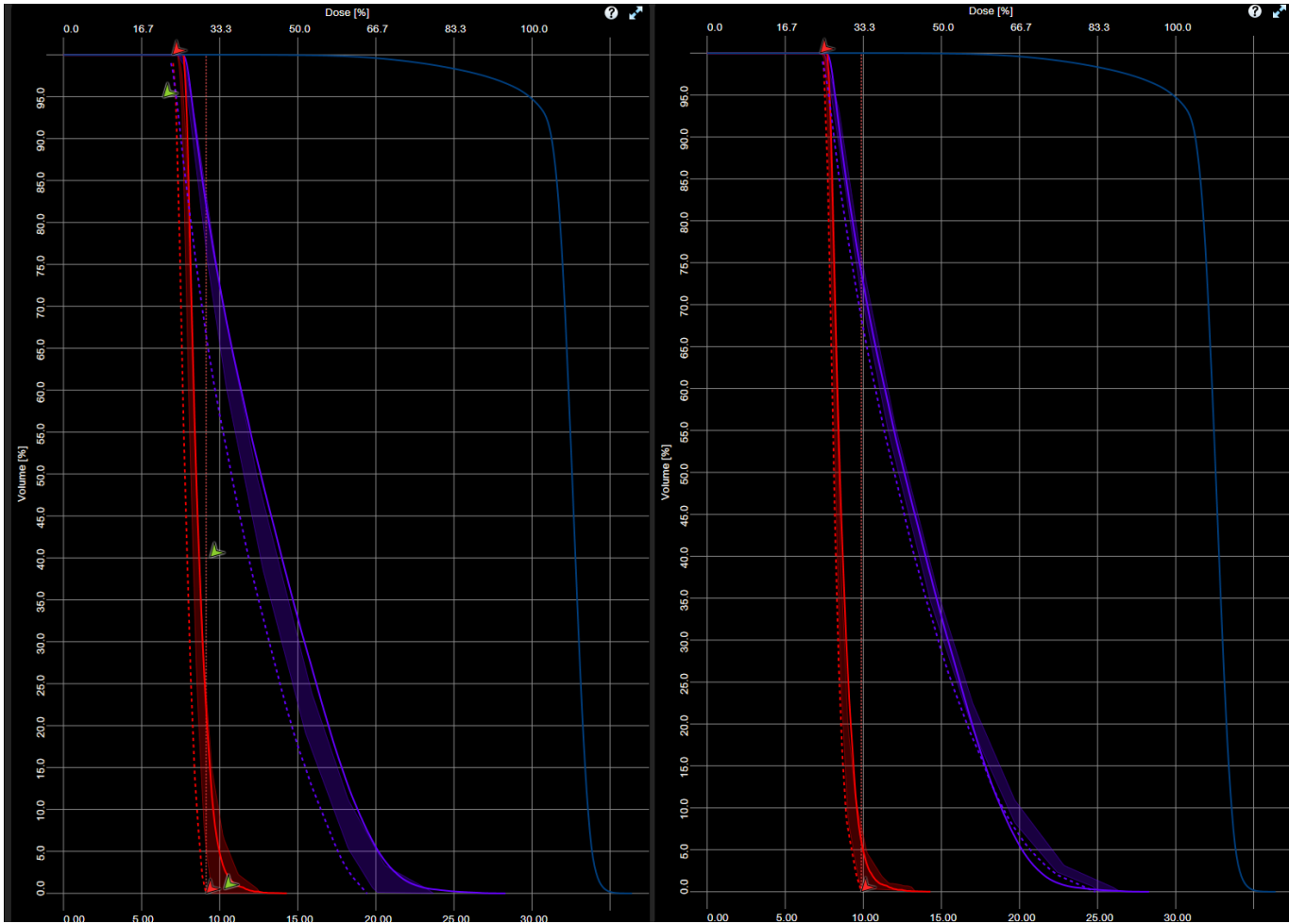


Figure 11: Control patient from figure 10, above, with only the hippocampus (red) and hippocampus+O5 (violet) prediction bands (shaded regions) and auto-created optimization objectives (dotted line objectives) displayed on both graphs. The exact same actual DVH (solid lines for hippocampus, hippocampus+O5 and PTV) are displayed on both graphs as a point of reference. Here, the initial model is on the left (wider bands) and the final recursively trained model is on the right (narrower bands).

The unintended consequence of creating DVH prediction bands so narrow and specific was the auto-created optimization (line) objectives populated in the optimizer were too close to the achievable DVH bands such that the optimizer was unable to create plans to meet those objectives, no matter the priority applied to those line objectives. The solution for this was to employ the use of the MU objective. Utilizing the minimum MU objective allowed for a greater dynamic range in delivery allowing for a larger modulation of dose delivered. After applying the MU objective with a minimum MU slightly greater than is usually expected for the plan, the optimizer continued to make progress towards the objectives and very high quality and consistent plans were created by the final recursively trained model and the associated auto-created optimization objectives.

Annex F: Scorecards from control case (patient not in training set) at each phase in process.

As patient cases were limited in number for this model creation project, a single case was kept separate from the training set case and used for validation and as a control case. This case was the first case used to tune the auto-created optimization objectives, before those objectives are applied when re-planning cases in the training set.



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm

Brain_9-23-2015.

Raw PQM / Max PQM: 88.99 / 100.00 PQM (%): 89.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2107	10.00	10	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.0586	13.00	13	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9419	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3685	1.18	2	59.1% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7740	0.68	1	67.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.5421	3.69	6	61.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0783	7.30	10	73.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6710	10.87	14	77.6% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1138	2.98	3	99.4% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.1282	2.96	3	98.6% [ROI Synonym]
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	29.6764	2.57	3	85.8% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6740	3.00	3	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1433	2.98	3	99.2% [ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.9899	2.67	3	89.0% [ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.8117	2.73	3	91.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.0981	2.97	3	99.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.3716	2.89	3	96.3% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9149	1.70	2	84.8% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5003	1.83	2	91.7% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7799	0.00	0	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6603	0.00	0	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	31.1578	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	34.3724	0.00	0	100.0% [ROI Synonym]
[CORD] Max dose (Gy)	≤ 37.49	30.4773	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			88.99	100.00	89.0%

Control Patient PQM RapidArc manually planned = 88.99



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.30 / 100.00 PQM (%): 91.3%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	96.1687	10.00	10	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.3901	13.00	13	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9974	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3345	1.26	2	62.8% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7548	0.65	1	65.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.6376	6.00	6	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0328	7.42	10	74.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9021	9.79	14	69.9% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8536	3.00	3	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.8264	2.72	3	90.8% [ROI Synonym]
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	29.2982	2.61	3	87.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6094	3.00	3	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1770	2.97	3	99.0% [ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.7610	3.00	3	100.0% [ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.4391	3.00	3	100.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.6103	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5882	3.00	3	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.3341	1.89	2	94.4% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.0192	1.99	2	99.7% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7059	0.00	0	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6050	0.00	0	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	31.3284	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	34.2962	0.00	0	100.0% [ROI Synonym]
[CORD] Max dose (Gy)	≤ 37.49	29.5972	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			91.30	100.00	91.3%

Control Patient PQM highest score from all objective combinations created with initial model = 91.3

Plan Quality Scorecard:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015

Raw PQM / Max PQM: 89.82 / 100.00 PQM (%): 89.8%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [± 95]	95.2013	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [± 25]	26.8326	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [± 37.5]	33.9653	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [± 0]	0.3407	1.24	2	62.1%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [± 1]	0.7586	0.66	1	65.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [± 13]	13.6200	5.07	6	84.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [± 8]	9.3711	6.57	10	65.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [± 7]	7.9422	9.60	14	68.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [± 30]	29.7712	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [± 33]	32.8507	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [± 25]	24.1309	3.00	3	100.0%	[ROI Synonym]
[OPTIC] D[0.03cc] (Gy)	< 37.5 [± 30]	29.4969	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [± 30]	29.6603	3.00	3	100.0%	[ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [± 6]	5.9520	3.00	3	100.0%	[ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [± 6]	5.6379	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [± 10]	8.6202	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [± 10]	7.7717	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [± 4]	4.5785	1.81	2	90.4%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [± 4]	4.3939	1.87	2	93.4%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.5298	0.00	0	100.0%	
[OPTIC] Max dose (Gy)	≤ 37.49	30.5164	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3057	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9757	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.5338	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.82	100.00	89.8%	

Control Patient PQM from final recursively trained model and its auto-created optimization objectives = 89.82

Although the final model with its associated single set of auto-created optimization objectives didn't score higher than the highest score reached with three different sets of objectives tested with the initial model on this particular patient, it still created a plan that was better than the original manually planned case. The final model has been shown to be more consistent than the manually planned cases or the initial model, cumulatively, as demonstrated in Annex D.

Annex G: PQM Histogram, scoring table, and individual scorecards from manually planned cases used to create initial model

The cases used to create the initial model were all re-planned from original clinical cases with consistent starting objectives and beam arrangement. Re-planned cases were deemed necessary as original clinical cases had some undesirable variability in scores, which is to be expected since they were created manually by various dosimetrists with various optimization strategies and the original clinical plans were created before the PQM was developed so all planning goals weren't as clearly defined. PQM scores from original clinical cases are outside the scope of this document as they were not utilized for the creation of this model. Every effort was made to consistently manually re-plan each of these cases and achieve the highest possible PQM scores as these plans were originally expected to be the training set for the model. When these plans were created, the decision to use the recursive model creation process had not yet been made, so many hours and a large amount of work went into manually creating high scoring, high quality, and consistent plans for the RapidPlan model. Score percentages rather than raw PQM scores are often cited to provide relative plan scores since not all cases had all structures graded by the PQM.

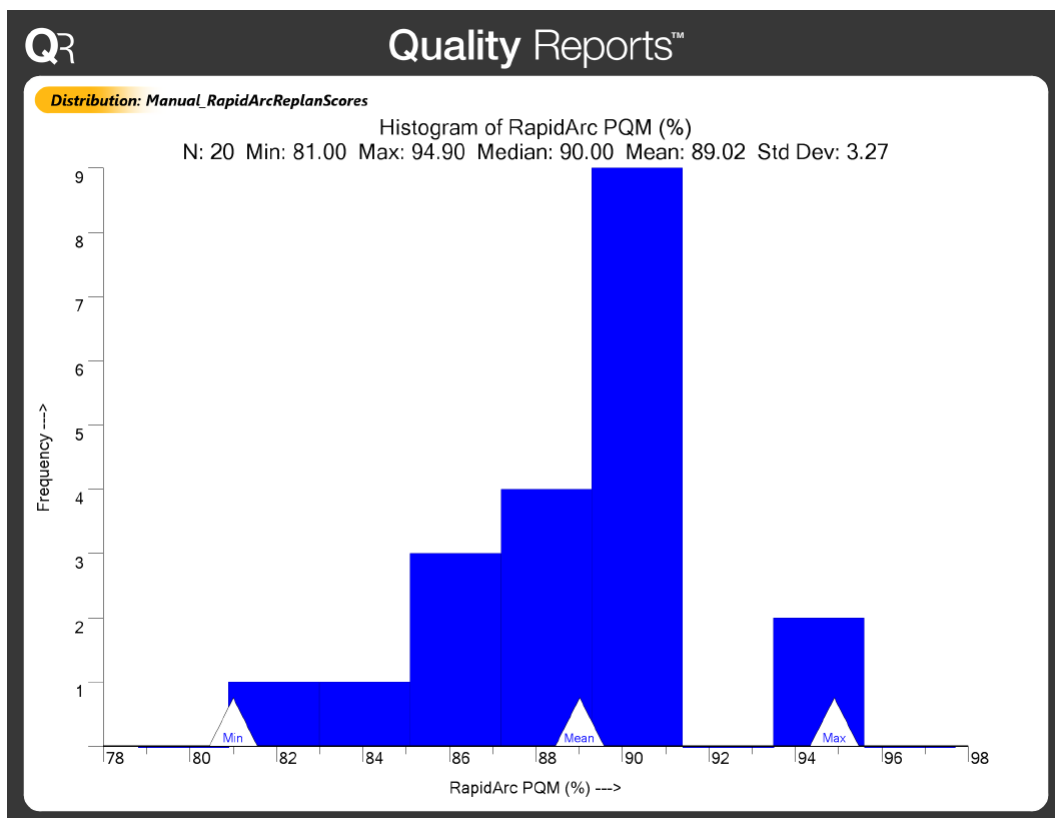


Figure 7: (repeated here for completeness) PQM score distribution from the 20 original plans made with manual (non KBP) methods, these plans became the training set for the initial model

	Raw PQM	PQM %	
Patient 1	89.66	89.7	Complete
Patient 2	85.91	85.9	Complete
Patient 3	82.76	88	no lacrimal struct
Patient 4	93.98	94	Complete
Patient 5	86.42	90	no lens
Patient 6	76.13	81	no lacrimal struct
Patient 7	85.47	90.9	no lacrimal struct
Patient 8	90.82	90.8	Complete
Patient 9	82.24	87.5	no lacrimal struct
Patient 10	85.47	90.9	no lacrimal struct
Patient 11	78.61	83.6	no lacrimal struct
Patient 12	85.19	90.6	no lacrimal struct
Patient 13	86.27	86.3	Complete
Patient 14	88.99	89	Complete
Patient 16	94.93	94.9	Complete
Patient 19	90.4	90.4	Complete
Patient 20	86.64	86.6	Complete
Patient 21	88.38	88.4	Complete
Patient 23	90.77	90.8	Complete
Patient 24	90.98	91	Complete

PQM score table from manually planned cases used to create initial model.



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: *_Brain 9-23-2015.*

Raw PQM / Max PQM: 89.66 / 100.00 PQM (%): 89.7%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.6722	9.34	10	93.4% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.3421	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1797	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4055	1.10	2	54.9% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7745	0.68	1	67.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.1846	5.72	6	95.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1477	7.13	10	71.3% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6703	10.87	14	77.7% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.7533	2.87	3	95.8%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7864	3.00	3	100.0%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	28.7747	2.66	3	88.6% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9612	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8390	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.3614	2.55	3	84.9% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.3928	2.54	3	84.5% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.5714	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.8980	3.00	3	100.0% [ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2871	1.57	2	78.5% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1001	1.63	2	81.7% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	32.4746	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6930	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	30.7467	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.3059	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	29.5147	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			89.66	100.00	89.7%

Patient1 PQM RapidArc manually planned = 89.7



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: *_Brain 9-23-2015.*

Raw PQM / Max PQM: 85.91 / 100.00 PQM (%): 85.9%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.7498	9.50	10	95.0% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.1662	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.7619	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4201	1.07	2	53.3% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7668	0.67	1	66.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.5483	3.68	6	61.3% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4650	6.34	10	63.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8508	10.03	14	71.6% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9821	3.00	3	100.0%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.4134	2.86	3	95.4%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.6032	2.95	3	98.2% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8579	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9135	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.7362	2.42	3	80.7% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.5742	2.48	3	82.5% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.2511	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1513	3.00	3	100.0% [ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.7684	1.41	2	70.5% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4446	1.52	2	75.9% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8435	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	31.8963	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	30.8832	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.7477	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	26.9380	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			85.91	100.00	85.9%

Patient2 PQM RapidArc manually planned = 85.9



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain 9-23-2015.

Raw PQM / Max PQM: 82.76 * / 94.00 * PQM (%): 88.0% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.9327	9.87	10	98.7% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.0242	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9527	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3821	1.15	2	57.5% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.8035	0.72	1	71.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.0424	5.94	6	98.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3138	6.72	10	67.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.1092	8.82	14	63.0% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.3080	2.95	3	98.3%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8588	3.00	3	100.0%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.9964	2.91	3	97.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.8587	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2054	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.1915	2.60	3	86.8% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.0224	2.66	3	88.6% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.7790	1.74	2	87.0% [ROI Synonym]
[RLENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9270	1.69	2	84.6% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.0192	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	29.4163	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	29.9194	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.2558	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	26.9082	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			82.76 *	94 *	88.0% *

Patient3 PQM RapidArc manually planned = 88.0



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain 9-23-2015.

Raw PQM / Max PQM: 93.98 / 100.00 PQM (%): 94.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	95.5957	10.00	10	100.0% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.4588	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8337	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4065	1.10	2	54.8% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7704	0.67	1	67.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	11.3357	6.00	6	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.5947	8.51	10	85.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5221	11.56	14	82.6% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1553	2.97	3	99.1%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7532	3.00	3	100.0%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	29.2464	2.61	3	87.1% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6993	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1199	2.98	3	99.3% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.3005	2.90	3	96.7% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.3450	2.89	3	96.2% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5241	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5535	3.00	3	100.0% [ROI Synonym]
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.3368	1.89	2	94.4% [ROI Synonym]
[RLENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.3294	1.89	2	94.5% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.1115	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.7066	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	31.0753	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9730	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	29.8640	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			93.98	100.00	94.0%

Patient4 PQM RapidArc manually planned = 94.0



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain 9-23-2015.

Raw PQM / Max PQM: 86.42 * / 96.00 * PQM (%): 90.0% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	95.1749	10.00	10	100.0% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.0905	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.2818	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3873	1.14	2	56.9% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7817	0.69	1	68.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.4040	6.00	6	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1045	7.24	10	72.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9141	9.73	14	69.5% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7385	3.00	3	100.0%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.3264	2.89	3	96.4%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.8471	2.83	3	94.4% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6642	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8347	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.5845	2.47	3	82.4% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.7240	2.43	3	80.8% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.4273	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.7537	3.00	3	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *	
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *	
[CHIASM] Max dose (Gy)	≤ 37.49	30.8350	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	31.2007	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	30.8134	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	34.4330	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	28.7378	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			86.42 *	96 *	90.0% *

Patient5 PQM RapidArc manually planned = 90.0



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain 9-23-2015.

Raw PQM / Max PQM: 76.13 * / 94.00 * PQM (%): 81.0% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.1643	8.33	10	83.3% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.8614	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.5470	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3873	1.14	2	57.0% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7628	0.66	1	66.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.4340	3.85	6	64.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.9316	5.17	10	51.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.1701	8.54	14	61.0% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2198	2.96	3	98.8%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.3364	2.89	3	96.3%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	30.2064	2.53	3	84.2% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7486	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9870	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.8759	2.37	3	79.2% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.7046	2.43	3	81.1% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3423	1.55	2	77.6% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.8821	1.71	2	85.3% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.2903	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.4346	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	30.8816	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.7314	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	30.9136	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			76.13 *	94 *	81.0% *

Patient6 PQM RapidArc manually planned = 81.0



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: _Brain 9-23-2015.

Raw PQM / Max PQM: 85.47 * / 94.00 * PQM (%): 90.9% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.9145	9.83	10	98.3% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.0524	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.3195	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3849	1.14	2	57.2% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7733	0.68	1	67.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.9415	6.00	6	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.9305	7.67	10	76.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6844	10.81	14	77.2% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9900	3.00	3	100.0%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.0721	2.98	3	99.2%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	19.5264	3.00	3	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5959	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9848	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.4870	2.50	3	83.5% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.1693	2.61	3	87.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2717	1.58	2	78.8% [ROI Synonym]
[RLENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9780	1.67	2	83.7% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3365	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.7322	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	31.0151	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.3234	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	20.5195	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			85.47 *	94 *	90.9% *

Patient7 PQM RapidArc manually planned = 90.9



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: _Brain 9-23-2015.

Raw PQM / Max PQM: 90.82 / 100.00 PQM (%): 90.8%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.8372	9.67	10	96.7% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.9915	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.0898	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3749	1.17	2	58.3% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7931	0.70	1	70.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.1628	5.76	6	95.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.9829	7.54	10	75.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6527	10.95	14	78.2% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9291	3.00	3	100.0%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.2464	2.92	3	97.3%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	23.0346	3.00	3	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0323	2.99	3	99.8% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9089	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.8330	2.39	3	79.6% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.7184	2.43	3	80.9% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9864	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.0877	3.00	3	100.0% [ROI Synonym]
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1348	1.62	2	81.1% [ROI Synonym]
[RLENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9905	1.67	2	83.5% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.1304	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.9421	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	30.7137	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	34.3579	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	25.1469	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			90.82	100.00	90.8%

Patient8 PQM RapidArc manually planned = 90.8



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 82.24 * / 94.00 * PQM (%): 87.5% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.4394	8.88	10	88.8% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.5324	13.00	13	100.0% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.0599	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3844	1.15	2	57.3% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7461	0.64	1	63.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.6380	5.04	6	84.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0131	7.47	10	74.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7875	10.32	14	73.7% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2653	2.96	3	98.5%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.3964	2.87	3	95.6%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	13.0099	3.00	3	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6208	3.00	3	100.0% [ROI Synonym]
[RCOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9354	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.6358	2.45	3	81.8% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.6173	2.46	3	82.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5337	1.49	2	74.4% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4622	1.51	2	75.6% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8071	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	31.0721	0.00	0	100.0% [ROI Synonym]
[RCOPTIC] Max dose (Gy)	≤ 37.49	30.6593	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.7743	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	14.4422	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			82.24 *	94 *	87.5% *

Patient9 PQM RapidArc manually planned = 87.5



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 85.47 * / 94.00 * PQM (%): 90.9% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.8020	9.60	10	96.0% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	24.6128	10.99	13	84.5% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.0719	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4312	1.04	2	52.1% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7519	0.65	1	64.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.0574	6.00	6	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.6485	8.38	10	83.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5332	11.51	14	82.2% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9543	3.00	3	100.0%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8032	3.00	3	100.0%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.8279	2.83	3	94.5% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0396	3.00	3	100.0% [ROI Synonym]
[RCOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6311	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.4882	2.84	3	94.6% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.2019	2.93	3	97.8% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.4449	1.85	2	92.6% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.4608	1.85	2	92.3% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.2883	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.3448	0.00	0	100.0% [ROI Synonym]
[RCOPTIC] Max dose (Gy)	≤ 37.49	30.6401	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.9151	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	28.7072	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			85.47 *	94 *	90.9% *

Patient10 PQM RapidArc manually planned = 90.9



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 78.61 * / 94.00 * PQM (%): 83.6% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.6662	9.33	10	93.3% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	24.9910	12.95	13	99.6% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1868	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4069	1.10	2	54.8% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7632	0.66	1	66.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.1950	4.21	6	70.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5165	6.21	10	62.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8792	9.90	14	70.7% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.4197	2.93	3	97.7%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.4105	2.86	3	95.4%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.5963	2.85	3	95.2% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.6342	2.89	3	96.5% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1944	2.97	3	98.9% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	8.8146	2.06	3	68.7% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	8.7084	2.10	3	69.9% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.1064	1.30	2	64.9% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.1544	1.28	2	64.1% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.9705	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	31.1702	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	31.3858	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.9616	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	27.4477	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			78.61 *	94 *	83.6% *

Patient11 PQM RapidArc manually planned = 81.6



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 85.19 * / 94.00 * PQM (%): 90.6% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_W3] V[30.0Gy] (%)	> 90 [≥ 95]	94.7861	9.57	10	95.7% [ROI Synonym]
[PTV_W3] D[98.0%] (Gy)	> 22.5 [≥ 25]	24.9873	12.93	13	99.5% [ROI Synonym]
[PTV_W3] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1984	13.00	13	100.0% [ROI Synonym]
[PTV_W3] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4244	1.06	2	52.8% [ROI Synonym]
[PTV_W3] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7815	0.69	1	68.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.0510	6.00	6	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0374	7.41	10	74.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8301	10.13	14	72.3% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2212	2.96	3	98.8%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.0482	2.98	3	99.5%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.6864	3.00	3	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6473	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6800	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.0638	2.65	3	88.2% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.4372	2.85	3	95.1% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	0.0000	2.00	2	100.0% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1226	1.96	2	98.0% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	32.3531	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6918	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	31.6820	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.6332	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	25.3190	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			85.19 *	94 *	90.6% *

Patient12 PQM RapidArc manually planned = 90.6



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain 9-23-2015.

Raw PQM / Max PQM: 86.27 / 100.00 PQM (%): 86.3%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.4003	8.80	10	88.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.6545	13.00	13	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.4675	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3972	1.12	2	55.9% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7792	0.68	1	68.5% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.0402	4.44	6	74.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2611	6.85	10	68.5% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8477	10.04	14	71.7% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1537	2.97	3	99.1%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.2164	2.93	3	97.6%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.9215	2.83	3	94.2% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7965	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8749	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	8.0950	2.30	3	76.7% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.8354	2.39	3	79.6% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.3235	2.90	3	96.8% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.7247	3.00	3	100.0% [ROI Synonym]
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2673	1.58	2	78.9% [ROI Synonym]
[RLENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	5.6851	1.44	2	71.9% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.9492	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.5691	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	30.5202	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.5068	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	28.9545	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			86.27	100.00	86.3%

Patient13 PQM RapidArc manually planned = 86.3



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain 9-23-2015.

Raw PQM / Max PQM: 88.99 / 100.00 PQM (%): 89.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2107	10.00	10	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.0586	13.00	13	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9419	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3685	1.18	2	59.1% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7740	0.68	1	67.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.5421	3.69	6	61.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0783	7.30	10	73.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6710	10.87	14	77.6% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1138	2.98	3	99.4%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.1282	2.96	3	98.6%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	29.6764	2.57	3	85.8% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6740	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1433	2.98	3	99.2% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.9899	2.67	3	89.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.8117	2.73	3	91.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.0981	2.97	3	99.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.3715	2.89	3	96.3% [ROI Synonym]
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9149	1.70	2	84.8% [ROI Synonym]
[RLENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5003	1.83	2	91.7% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7799	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6603	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	31.1578	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	34.3724	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	30.4773	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			88.99	100.00	89.0%

Patient14 PQM RapidArc manually planned = 89.0



Quality Reports™

PATIENT NAME	PATIENT ID	PATIENT POSITION	PLAN NAME / LABEL	DISEASE / COMMENTS
Patient ^ Anonymous		Head First Supine	HCSWB3arc	(CURATIVE)
INSTITUTION	PLANNER NAME(S)	PHYSICIAN NAME(S)	PLAN DATE	PLANNING SYSTEM
	SysAdmin		20150912	ARIA RadOnc 13.5.37 (Varian Medical S

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 94.93 / 100.00 PQM (%): 94.9%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	96.3185	10.00	10	100.0% [ROI: Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.6144	13.00	13	100.0% [ROI: Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9536	13.00	13	100.0% [ROI: Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3841	1.15	2	57.3% [ROI: Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7836	0.69	1	69.1% [ROI: Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	10.6641	6.00	6	100.0% [ROI: Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.5152	8.71	10	87.1% [ROI: Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.4800	11.76	14	84.0% [ROI: Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1340	2.98	3	99.3% [ROI: Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.1381	2.95	3	98.5% [ROI: Synonym]
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.7832	3.00	3	100.0% [ROI: Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6660	3.00	3	100.0% [ROI: Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9038	3.00	3	100.0% [ROI: Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.1783	2.94	3	98.0% [ROI: Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	5.9921	3.00	3	100.0% [ROI: Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7963	3.00	3	100.0% [ROI: Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1176	3.00	3	100.0% [ROI: Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.3262	1.89	2	94.6% [ROI: Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.4186	1.86	2	93.0% [ROI: Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.9067	0.00	0	100.0% [ROI: Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.8145	0.00	0	100.0% [ROI: Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3387	0.00	0	100.0% [ROI: Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.8727	0.00	0	100.0% [ROI: Synonym]
[CORD] Max dose (Gy)	≤ 37.49	25.6274	0.00	0	100.0% [ROI: Synonym]
Total [24 Metrics]			94.93	100.00	94.9%

Patient16 PQM RapidArc manually planned = 94.9



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 90.40 / 100.00 PQM (%): 90.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.5148	9.03	10	90.3% [ROI: Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.4749	13.00	13	100.0% [ROI: Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.2035	13.00	13	100.0% [ROI: Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4034	1.10	2	55.2% [ROI: Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7828	0.69	1	69.0% [ROI: Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.1131	6.00	6	100.0% [ROI: Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0074	7.48	10	74.8% [ROI: Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5987	11.21	14	80.0% [ROI: Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0094	3.00	3	99.9% [ROI: Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.7567	2.75	3	91.6% [ROI: Synonym]
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.4173	2.96	3	98.7% [ROI: Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6584	3.00	3	100.0% [ROI: Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8032	3.00	3	100.0% [ROI: Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.0470	2.65	3	88.4% [ROI: Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.2484	2.58	3	86.1% [ROI: Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.7959	2.76	3	92.0% [ROI: Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.1783	2.95	3	98.2% [ROI: Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.8124	1.73	2	86.5% [ROI: Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4764	1.51	2	75.4% [ROI: Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.9234	0.00	0	100.0% [ROI: Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6243	0.00	0	100.0% [ROI: Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.4432	0.00	0	100.0% [ROI: Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	35.1163	0.00	0	100.0% [ROI: Synonym]
[CORD] Max dose (Gy)	≤ 37.49	26.4565	0.00	0	100.0% [ROI: Synonym]
Total [24 Metrics]			90.40	100.00	90.4%

Patient19 PQM RapidArc manually planned = 90.4



Quality Reports™

Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain 9-23-2015.

Raw PQM / Max PQM: 86.64 / 100.00 PQM (%): 86.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.0179	8.04	10	80.4% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	24.9887	12.94	13	99.5% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.4084	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4108	1.09	2	54.4% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7840	0.69	1	69.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8206	4.77	6	79.5% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1397	7.15	10	71.5% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5874	11.26	14	80.4% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.3346	2.94	3	98.1% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.2730	2.91	3	97.0%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.6313	2.85	3	95.1% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7818	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6967	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	8.0495	2.32	3	77.2% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.9737	2.34	3	78.1% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.2427	2.93	3	97.6% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.4930	2.85	3	95.1% [ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.1555	1.28	2	64.1% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.1703	1.28	2	63.8% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.1215	0.00	0	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.7355	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	30.7177	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.6671	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	28.1953	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			86.64	100.00	86.6%

Patient20 PQM RapidArc manually planned = 86.6



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Plan Quality Scoresheet:

Brain 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain 9-23-2015.

Raw PQM / Max PQM: 88.38 / 100.00 PQM (%): 88.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.3240	8.65	10	86.5%
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.0739	13.00	13	100.0%
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.6024	13.00	13	100.0%
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4254	1.05	2	52.7%
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7763	0.68	1	68.0%
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.6303	6.00	6	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1562	7.11	10	71.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8090	10.22	14	73.0% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7984	3.00	3	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.6490	2.78	3	92.8%
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	17.2234	3.00	3	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3369	3.00	3	100.0% [ROI Synonym]
[RCPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4516	3.00	3	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.8429	2.39	3	79.5% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.9009	2.37	3	78.9% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5879	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.9775	3.00	3	100.0% [ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3206	1.56	2	78.0% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3045	1.57	2	78.3% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.4594	0.00	0	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.5928	0.00	0	100.0% [ROI Synonym]
[RCPTIC] Max dose (Gy)	≤ 37.49	31.3790	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	34.1673	0.00	0	100.0%
[CCORD] Max dose (Gy)	≤ 37.49	19.0957	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			88.38	100.00	88.4%

Patient21 PQM RapidArc manually planned = 88.4



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Plan Quality Scoresheet:

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This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain 9-23-2015.

Raw PQM / Max PQM: 90.77 / 100.00 PQM (%): 90.8%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.7753	9.55	10	95.5%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	24.6990	11.43	13	88.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.0109	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4178	1.07	2	53.6%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7687	0.67	1	67.0%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	11.7820	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.7552	8.11	10	81.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8079	10.23	14	73.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1548	2.97	3	99.1%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.0269	2.99	3	99.7%	
[CCORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	5.3032	3.00	3	100.0%	
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2578	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.6983	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.2713	2.91	3	97.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.3357	2.89	3	96.3%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.2610	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6375	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8314	2.00	2	100.0%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1739	1.94	2	97.1%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3465	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.5975	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.4028	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.9513	0.00	0	100.0%	
[CCORD] Max dose (Gy)	≤ 37.49	5.4230	0.00	0	100.0%	
Total [24 Metrics]			90.77	100.00	90.8%	

Patient23 PQM RapidArc manually planned = 90.8



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Plan Quality Scoresheet:

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Raw PQM / Max PQM: 90.98 / 100.00 PQM (%): 91.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.5559	9.11	10	91.1%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.2399	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9252	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.4082	1.09	2	54.6%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7890	0.70	1	69.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	11.9814	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.8426	7.89	10	78.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8034	10.25	14	73.2%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6984	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8336	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.5642	2.86	3	95.3%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4816	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6047	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.9144	2.70	3	89.8%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.9201	2.69	3	89.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3360	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.8000	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.4479	1.85	2	92.5%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5017	1.83	2	91.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.1568	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0161	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3542	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.0962	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	27.3864	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			90.98	100.00	91.0%	

Patient24 PQM RapidArc manually planned = 91.0

Annex H: Scoring table and explanations for each series of cases planed by the initial model with differing sets of DVH objectives and beam arrangements

As explained above, the initial model was created from manually optimized plans with a 3 arc beam arrangement. Auto-created optimization objectives were then tuned on the control patient. From there, finding one set of objectives that would provide the highest score using the initial model to re-plan the cases in the training set proved difficult. Furthermore, using a 4th arc (ie. 2nd vertex arc) to avoid accumulating excess MLC interleaf leakage was also investigated as feasible and/or optimal.

The first step was to plan 20 cases with the same set of “balanced” auto-created optimization objectives with both 3 and 4 arc arrangements. Then, whichever arc arrangement scored higher, that case was then tried with a new set of auto-created optimization objectives with more aggressive OAR sparing. If the more aggressive OAR sparing resulted in another yet higher scoring plan, a final set of “very extreme” auto-created optimization objectives were then attempted on the patient. As a result of this methodology, each of the 20 cases were planned utilizing the initial model at least three different times with different arc arrangements and auto-created optimization objectives. The results can be seen in the table below.

	3arc balanced	4arc balanced	3arc extreme	4arc extreme	3arc very extreme	4arc very extreme
Patient 1	87.7	88.02		88.64		85.56
Patient 2	80.35	87.61		85.45		90.07
Patient 4	92.01	91.59		90.81		91.69
Patient 5	86.3	87.8				86.7
Patient 6	84.69	84.15		88.64		82.43
Patient 8	90.12	90.48		88.97		
Patient 9	89	87.34	88.8			
Patient 10	88.14	92.15		89.55		
Patient 12	88.23	88.41		89.87		
Patient 13	87.58	89.38		89.25		
Patient 23	93.41	93.26	93.27			
Patient 29	88.3	88.5		90.6		
Patient 31	83.75	89.45		88.91		
Patient 32	91.24	91.54	91.09	91.36		
Patient 33	92.11	92.22		92.97		
Patient 36	90.44	91.13		90.78		
Patient 37	88.48	92.99		91.21		
Patient 38	88.03	90.55		89.44		
Patient 39	85.36	88.53		87.42		
Patient 40	85.21	88.54		89.36		
					**TOP SCORING	
					**NOT INCLUDED IN MODEL	

Figure 12: PQM scores comparing the different arc arrangements and auto-created optimization objectives. The best scoring plan on each patient was then used to train the final model (displayed in green above).

Objective set name	hippo+05 line	hippo line	hippo max	hippo min	hippo 5%
Balanced	120	120	150	n/a	n/a
Extreme	125	130	155	100	n/a
Very Extreme	130	140	160	115	125

Priorities that differed between auto-created optimization objectives sets in figure 12, above

Annex I: PQM Histogram and individual scorecards from recursively planned cases created with “**balanced**” priority hippocampal sparing objectives (**3 arc** beam arrangement)

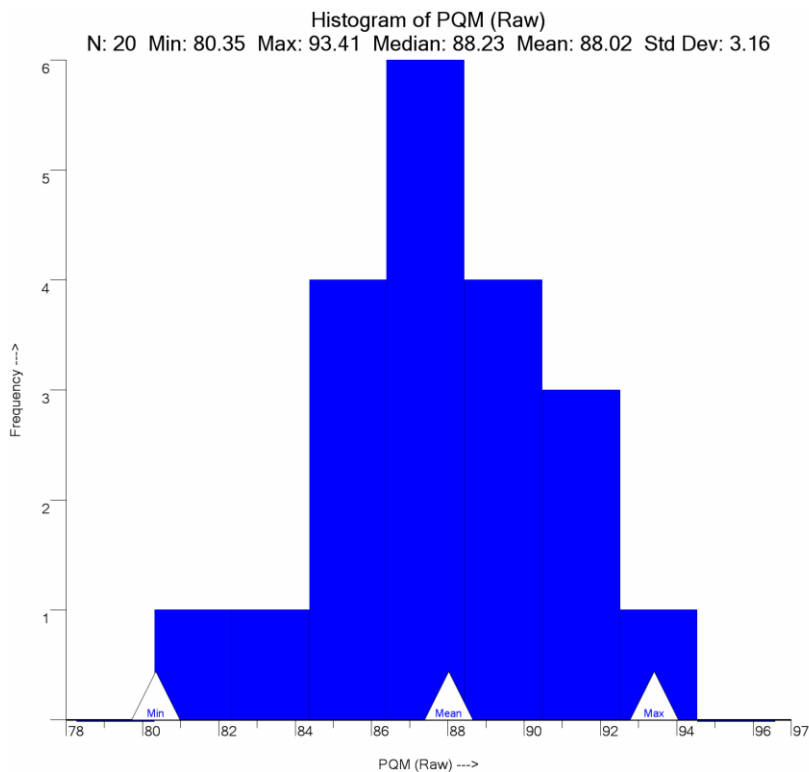


Figure 13: PQM score distribution from the 20 plans made with “balanced” objectives and 3 arc beam arrangement. Three of these plans were the highest scoring thus were used in the training set for the final model

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Plan Quality Scoresheet: Brain_9-23-2015					
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Raw PQM / Max PQM: 87.70 / 100.00 PQM (%): 87.7%					
Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1795	10.00	10	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1679	13.00	13	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4138	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3091	1.31	2	65.7% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7608	0.66	1	65.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.1900	4.22	6	70.3% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5117	6.22	10	62.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8285	10.13	14	72.4% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7517	3.00	3	100.0%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.2709	3.00	3	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.5125	3.00	3	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7108	3.00	3	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5204	3.00	3	100.0% [ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.3314	2.56	3	85.2% [ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3501	2.55	3	85.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.0265	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6632	3.00	3	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.7430	1.42	2	71.0% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1122	1.63	2	81.5% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.3235	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.4410	0.00	0	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.5482	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.3247	0.00	0	100.0%
[CORD] Max dose (Gy)	≤ 37.49	25.3894	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			87.70	100.00	87.7%

Patient1 PQM RapidArc, 3 arc, Initial model, balanced objectives = 87.7



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Brain_9-23-2015.

Raw PQM / Max PQM: 80.35 / 100.00 PQM (%): 80.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2964	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8641	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.4428	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3473	1.23	2	61.4%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7335	0.62	1	61.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	17.3950	0.00	6	0.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	10.3434	4.14	10	41.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8781	9.90	14	70.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2933	2.95	3	98.4%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6912	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.9560	2.91	3	97.1%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2160	2.96	3	98.8%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.4635	2.92	3	97.4%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.8150	2.40	3	79.8%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.5919	2.47	3	82.3%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.8634	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.7140	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.7951	1.40	2	70.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.6596	1.45	2	72.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3382	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.1089	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	31.3144	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7544	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.6816	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			80.35	100.00	80.4%	

Patient2 PQM RapidArc, 3 arc, Initial model, balanced objectives = 80.35



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 92.01 / 100.00 PQM (%): 92.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0186	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0851	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2050	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3135	1.30	2	65.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7766	0.68	1	68.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.2650	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1405	7.15	10	71.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8835	9.88	14	70.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4951	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4507	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.1205	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0020	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0289	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.1796	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.2133	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.1545	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.2384	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.7414	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8002	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.5096	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2534	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.8704	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5980	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.2864	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			92.01	100.00	92.0%	

Patient4 PQM RapidArc, 3 arc, Initial model, balanced objectives = 92.01 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 82.82 * / 96.00 * PQM (%): 86.3% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1330	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.4388	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4590	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3036	1.33	2	66.3%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7699	0.67	1	67.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	15.1933	2.71	6	45.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5557	6.11	10	61.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8973	9.81	14	70.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7829	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1906	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.8145	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1716	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4939	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.3766	2.54	3	84.7%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.0483	2.65	3	88.4%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6636	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.2619	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[CHIASM] Max dose (Gy)	≤ 37.49	30.6265	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	29.6691	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.1618	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.2033	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.6128	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			82.82 *	96 *	86.3% *	

Patient5 PQM RapidArc, 3 arc, Initial model, balanced objectives = 86.3



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 84.69 / 100.00 PQM (%): 84.7%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1536	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1702	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2839	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3099	1.31	2	65.6%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7809	0.69	1	68.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.9800	3.03	6	50.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.7995	5.50	10	55.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0644	9.03	14	64.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6407	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6607	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.1309	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2239	2.96	3	98.8%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5709	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.6053	2.46	3	82.2%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3778	2.54	3	84.7%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.0880	2.97	3	99.1%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.8967	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4446	1.52	2	75.9%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0044	1.67	2	83.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7726	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.0125	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.8515	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7623	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.2647	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			84.69	100.00	84.7%	

Patient6 PQM RapidArc, 3 arc, Initial model, balanced objectives = 84.69



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.12 / 100.00 PQM (%): 90.1%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3002	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0833	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4470	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3192	1.29	2	64.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7719	0.67	1	67.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.2350	5.65	6	94.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1541	7.11	10	71.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7955	10.29	14	73.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8676	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5204	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.8414	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6533	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3893	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.5544	2.48	3	82.7%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3375	2.55	3	85.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7958	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9578	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5387	1.49	2	74.4%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2454	1.58	2	79.2%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.5687	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.7984	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.1820	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6216	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.6068	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			90.12	100.00	90.1%	

Patient8 PQM RapidArc, 3 arc, Initial model, balanced objectives = 90.12



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.00 / 100.00 PQM (%): 89.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2794	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1375	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.6163	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3169	1.30	2	64.8%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7444	0.63	1	63.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8800	4.68	6	78.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2773	6.81	10	68.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8353	10.10	14	72.2%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7668	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5008	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.4500	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2956	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5724	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.9182	2.69	3	89.8%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.9045	2.70	3	90.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1285	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.4710	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3831	1.54	2	76.9%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3376	1.55	2	77.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.2330	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2451	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.4684	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6244	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.8843	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.00	100.00	89.0%	

Patient9 PQM RapidArc, 3 arc, Initial model, balanced objectives = 89.0 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015

Raw PQM / Max PQM: 88.14 / 100.00 PQM (%): 88.1%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3053	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9575	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7597	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3225	1.28	2	64.2%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7439	0.63	1	63.4%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8520	4.72	6	78.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4949	6.26	10	62.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9403	9.61	14	68.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9975	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7305	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.1329	2.99	3	99.6%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4791	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4359	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8453	2.72	3	90.6%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.6444	2.79	3	92.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.6249	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5434	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4986	1.50	2	75.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0947	1.64	2	81.8%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8035	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2212	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.9269	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9074	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.7769	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.14	100.00	88.1%	

Patient10 PQM RapidArc, 3 arc, Initial model, balanced objectives = 88.14



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015

Raw PQM / Max PQM: 88.23 / 100.00 PQM (%): 88.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2866	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8025	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.6045	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3336	1.26	2	62.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7687	0.67	1	67.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.9000	4.65	6	77.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4316	6.42	10	64.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9419	9.60	14	68.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6843	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8210	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	23.9712	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0161	3.00	3	99.9%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5895	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1057	2.63	3	87.7%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.7718	2.74	3	91.4%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1331	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3538	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5080	1.50	2	74.9%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.7325	1.76	2	87.8%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.2430	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.8766	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.2826	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.0664	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.3129	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.23	100.00	88.2%	

Patient12 PQM RapidArc, 3 arc, Initial model, balanced objectives = 88.23



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 87.58 / 100.00 PQM (%): 87.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2547	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0639	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4740	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3143	1.30	2	65.1%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7505	0.64	1	64.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.5767	5.13	6	85.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4377	6.41	10	64.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9787	9.43	14	67.4%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7326	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9304	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.3500	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6997	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5731	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.5390	2.49	3	82.9%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.6205	2.46	3	82.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5642	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1858	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	6.3648	1.21	2	60.6%	[ROI Synonym]
[RENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4798	1.51	2	75.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6052	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0817	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.1119	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.2012	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.6377	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			87.58	100.00	87.6%	

Patient13 PQM RapidArc, 3 arc, Initial model, balanced objectives = 87.58



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 93.41 / 100.00 PQM (%): 93.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1433	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.2604	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5819	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3581	1.20	2	60.2%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7665	0.67	1	66.6%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.3276	5.51	6	91.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.7304	8.17	10	81.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6656	10.89	14	77.8%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1142	2.98	3	99.4%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6490	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.1955	2.98	3	99.4%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1169	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9721	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	4.9993	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.2129	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.0955	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.2843	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	3.3159	2.00	2	100.0%	[ROI Synonym]
[RENES] D[0.03cc] (Gy)	< 10 [≤ 4]	3.4591	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3684	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2343	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0901	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8523	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.7695	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			93.41	100.00	93.4%	

Patient23 PQM RapidArc, 3 arc, Initial model, balanced objectives = 93.41 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

.Brain_9-23-2015.

Raw PQM / Max PQM: 88.30 / 100.00 PQM (%): 88.3%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.9778	9.96	10	99.6%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9079	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.3932	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3270	1.27	2	63.7%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7689	0.67	1	67.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.0800	4.38	6	73.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5042	6.24	10	62.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0987	8.87	14	63.4%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5877	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	31.9113	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.9907	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3767	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8092	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.0702	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.9096	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1808	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7045	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9482	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.2649	1.91	2	95.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.3453	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2303	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.5486	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	31.9449	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.3963	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.30	100.00	88.3%	

Patient29 PQM RapidArc, 3 arc, Initial model, balanced objectives = 88.3



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

.Brain_9-23-2015.

Raw PQM / Max PQM: 83.75 / 100.00 PQM (%): 83.7%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2880	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2154	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.6769	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3200	1.29	2	64.4%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7776	0.68	1	68.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.7700	3.35	6	55.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.8047	5.49	10	54.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.3277	7.80	14	55.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0055	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6012	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.8897	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4412	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4510	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.4778	2.51	3	83.6%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.1175	2.63	3	87.6%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.5316	2.84	3	94.7%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.4909	2.85	3	95.1%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3202	1.56	2	78.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.7484	1.75	2	87.5%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.4093	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6229	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.9307	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7448	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.9959	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			83.75	100.00	83.7%	

Patient31 PQM RapidArc, 3 arc, Initial model, balanced objectives = 83.75



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.24 / 100.00 PQM (%): 91.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1323	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1021	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.3418	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3245	1.28	2	63.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7904	0.70	1	70.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.3350	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0080	7.48	10	74.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8243	10.15	14	72.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5644	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1606	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	21.6207	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1269	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0080	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8462	2.72	3	90.6%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.5005	2.83	3	94.4%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3157	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1944	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2126	1.60	2	79.8%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5498	1.48	2	74.2%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	29.9806	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.4892	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.7534	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.2498	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	21.6781	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			91.24	100.00	91.2%	

Patient32 PQM RapidArc, 3 arc, Initial model, balanced objectives = 91.24



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 92.11 / 100.00 PQM (%): 92.1%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0244	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.3560	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4244	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3467	1.23	2	61.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7988	0.71	1	71.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.5500	5.18	6	86.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0191	7.45	10	74.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7407	10.54	14	75.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7091	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.3111	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.5967	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4459	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6789	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.0118	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.1811	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1417	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5575	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.6162	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.5186	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.7552	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2400	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.8155	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.4153	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4408	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			92.11	100.00	92.1%	

Patient33 PQM RapidArc, 3 arc, Initial model, balanced objectives = 92.11



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.44 / 100.00 PQM (%): 90.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.9858	9.97	10	99.7%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1777	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.0249	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3026	1.33	2	66.4%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7955	0.71	1	70.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.5100	5.24	6	87.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2146	6.96	10	69.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0211	9.23	14	66.0%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4718	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1607	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	21.0014	3.00	3	100.0%	
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.6937	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.7399	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.5142	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.6962	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5101	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5647	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9376	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.7971	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8262	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0194	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.7912	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.3209	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	21.1294	0.00	0	100.0%	
Total [24 Metrics]			90.44	100.00	90.4%	

Patient36 PQM RapidArc, 3 arc, Initial model, balanced objectives = 90.44



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.48 / 100.00 PQM (%): 88.5%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1168	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.6479	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9549	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3370	1.25	2	62.6%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7518	0.65	1	64.5%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8583	4.71	6	78.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3804	6.55	10	65.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7249	10.62	14	75.8%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1084	2.98	3	99.4%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9306	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	20.9901	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0084	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7580	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.6512	2.45	3	81.7%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.8175	2.39	3	79.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.2469	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3290	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.7962	1.40	2	70.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5501	1.48	2	74.2%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7152	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.7375	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.4054	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9764	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	21.0164	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.48	100.00	88.5%	

Patient37 PQM RapidArc, 3 arc, Initial model, balanced objectives = 88.48



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.03 / 100.00 PQM (%): 88.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2412	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1788	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8506	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3240	1.28	2	64.0%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7444	0.63	1	63.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.2750	4.09	6	68.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2563	6.86	10	68.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7054	10.71	14	76.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5697	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.2503	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.8811	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4082	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4129	3.00	3	100.0%	[ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.8417	2.39	3	79.5%	[ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.9278	2.36	3	78.6%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.4985	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.6181	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.0932	1.30	2	65.1%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.7568	1.41	2	70.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.9458	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0492	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0873	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5380	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.7120	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.03	100.00	88.0%	

Patient38 PQM RapidArc, 3 arc, Initial model, balanced objectives = 88.03



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 85.36 / 100.00 PQM (%): 85.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1509	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.6043	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.0453	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3494	1.22	2	61.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7404	0.63	1	62.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.6025	3.60	6	59.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5945	6.01	10	60.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0259	9.21	14	65.8%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1342	2.98	3	99.3%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7204	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.2000	2.98	3	99.4%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8156	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2006	2.97	3	98.9%	[ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.6076	2.46	3	82.1%	[ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.9130	2.36	3	78.7%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.8905	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.2516	2.92	3	97.5%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5217	1.49	2	74.6%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4624	1.51	2	75.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.9340	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.7438	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	31.2233	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7389	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.1454	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			85.36	100.00	85.4%	

Patient39 PQM RapidArc, 3 arc, Initial model, balanced objectives = 85.36



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 85.21 / 100.00 PQM (%): 85.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1937	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2102	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5523	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3108	1.31	2	65.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7617	0.66	1	66.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.0700	4.40	6	73.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.8489	5.38	10	53.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.2514	8.16	14	58.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8985	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5606	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.2025	2.89	3	96.4%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4394	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5876	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8643	2.71	3	90.4%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.8254	2.72	3	90.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.2494	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5695	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.6313	1.46	2	72.8%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4224	1.53	2	76.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6721	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.1210	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.2088	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8353	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	27.4500	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			85.21	100.00	85.2%	

Patient40 PQM RapidArc, 3 arc, Initial model, balanced objectives = 85.21

Annex J: PQM Histogram and individual scorecards from recursively planned cases created with “**balanced**” priority hippocampal sparing objectives (**4 arc** beam arrangement)

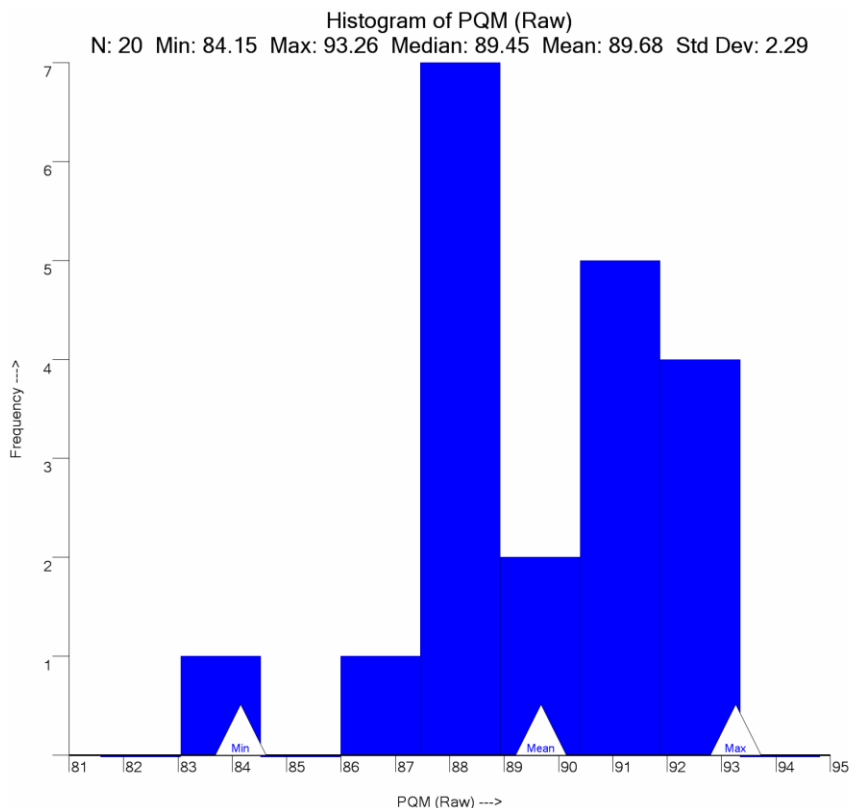


Figure 14: PQM score distribution from the 20 plans made with “balanced” objectives and 4 arc beam arrangement. 10 of these plans were the highest scoring thus were used in the training set for the final model.

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Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015

Raw PQM / Max PQM: 88.02 / 100.00 PQM (%): 88.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3526	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2623	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4349	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3041	1.32	2	66.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7623	0.66	1	66.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8463	4.73	6	78.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5508	6.12	10	61.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8898	9.85	14	70.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6057	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1009	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.4400	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7172	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5196	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1937	2.60	3	86.7%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3270	2.56	3	85.3%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.4991	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7552	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4130	1.53	2	76.5%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0713	1.64	2	82.1%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.3837	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.3330	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3215	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.1419	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4780	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.02	100.00	88.0%	

Patient1 PQM RapidArc, 4 arc, Initial model, balanced objectives = 88.02



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 87.61 / 100.00 PQM (%): 87.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2964	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.5250	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.6915	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3371	1.25	2	62.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7562	0.65	1	65.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.7300	3.41	6	56.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4457	6.39	10	63.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7062	10.70	14	76.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7770	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1312	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.4088	2.96	3	98.8%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4758	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5071	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1131	2.63	3	87.6%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.2176	2.59	3	86.5%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.8373	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9464	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3503	1.55	2	77.5%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5782	1.47	2	73.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.5089	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0192	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.4744	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.4505	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.2279	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			87.61	100.00	87.6%	

Patient2 PQM RapidArc, 4 arc, Initial model, balanced objectives = 87.61



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.59 / 100.00 PQM (%): 91.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1142	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9872	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.0290	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3103	1.31	2	65.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7765	0.68	1	68.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	11.9711	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1453	7.14	10	71.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9731	9.46	14	67.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5118	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.0007	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.0405	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1008	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9694	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.0856	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.1944	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.3832	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.4770	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.7076	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.6232	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.3416	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.1957	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.7112	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.2037	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.1297	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			91.59	100.00	91.6%	

Patient4 PQM RapidArc, 4 arc, Initial model, balanced objectives = 91.59



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 84.28 * / 96.00 * PQM (%): 87.8% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1589	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2695	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2107	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3014	1.33	2	66.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7723	0.67	1	67.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.4450	3.83	6	63.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4138	6.47	10	64.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9300	9.66	14	69.0%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7815	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.0706	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.5667	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2520	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0162	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.0072	2.66	3	88.8%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.0561	2.65	3	88.3%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5030	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7410	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[CHIASM] Max dose (Gy)	≤ 37.49	30.5443	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0232	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.5962	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.1127	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4713	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			84.28 *	96 *	87.8% *	

Patient5 PQM RapidArc, 4 arc, Initial model, balanced objectives = 87.8 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 84.15 / 100.00 PQM (%): 84.1%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3996	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2407	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5749	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3202	1.29	2	64.4%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7785	0.68	1	68.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	15.3160	2.53	6	42.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.8034	5.49	10	54.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.1160	8.79	14	62.8%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8635	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5207	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.2009	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8507	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1687	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1805	2.61	3	86.9%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3547	2.55	3	84.9%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.6049	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5351	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1956	1.60	2	80.1%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1756	1.61	2	80.4%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7587	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.0742	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.8933	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7099	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.3446	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			84.15	100.00	84.1%	

Patient6 PQM RapidArc, 4 arc, Initial model, balanced objectives = 84.15



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.48 / 100.00 PQM (%): 90.5%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3300	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0675	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4674	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3212	1.29	2	64.3%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7680	0.67	1	66.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.5500	5.18	6	86.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1313	7.17	10	71.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6598	10.92	14	78.0%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7791	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.3504	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.9343	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4535	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3944	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.4344	2.52	3	84.1%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.2341	2.59	3	86.3%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5736	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9077	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1889	1.60	2	80.2%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3621	1.55	2	77.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.4516	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.4276	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.1370	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.4632	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.5378	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			90.48	100.00	90.5%	

Patient8 PQM RapidArc, 4 arc, Initial model, balanced objectives = 90.48 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 87.34 / 100.00 PQM (%): 87.3%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.5811	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2400	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8319	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3215	1.29	2	64.3%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7366	0.62	1	62.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.5900	3.62	6	60.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4410	6.40	10	64.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8665	9.96	14	71.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9173	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8807	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.4350	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4744	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5265	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8096	2.73	3	91.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.0097	2.66	3	88.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5016	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.6086	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3714	1.54	2	77.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4360	1.52	2	76.1%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6416	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0372	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.2616	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9072	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.9367	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			87.34	100.00	87.3%	

Patient9 PQM RapidArc, 4 arc, Initial model, balanced objectives = 87.34



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

.Brain_9-23-2015.

Raw PQM / Max PQM: 92.15 / 100.00 PQM (%): 92.1%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2008	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7226	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.1716	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3124	1.31	2	65.3%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7551	0.65	1	65.0%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.7160	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0655	7.34	10	73.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7141	10.67	14	76.2%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5106	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	31.7405	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.4983	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0735	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.8930	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.2641	2.91	3	97.1%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.4739	2.84	3	94.7%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9092	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.2721	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.7153	1.76	2	88.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9903	1.67	2	83.5%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.2986	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	29.7163	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.4195	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	31.7851	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.0998	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			92.15	100.00	92.1%	

Patient10 PQM RapidArc, 4 arc, Initial model, balanced objectives = 92.15 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

.Brain_9-23-2015.

Raw PQM / Max PQM: 88.41 / 100.00 PQM (%): 88.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3105	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7887	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.3803	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3280	1.27	2	63.6%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7715	0.67	1	67.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.1575	4.26	6	71.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2938	6.77	10	67.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9558	9.54	14	68.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7171	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.3255	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.1012	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0290	3.00	3	99.8%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5229	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.7338	2.76	3	91.8%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.6522	2.78	3	92.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7962	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9698	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0032	1.67	2	83.3%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9198	1.69	2	84.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.3257	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.0265	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0221	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6621	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.1586	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.41	100.00	88.4%	

Patient12 PQM RapidArc, 4 arc, Initial model, balanced objectives = 88.41



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.38 / 100.00 PQM (%): 89.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2583	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0959	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2919	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3086	1.31	2	65.7%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7635	0.66	1	66.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.5675	5.15	6	85.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2656	6.84	10	68.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8004	10.26	14	73.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6240	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	31.9604	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.3500	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3265	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9659	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.0502	2.65	3	88.3%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.2123	2.60	3	86.5%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6631	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5120	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.9778	1.34	2	67.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3100	1.56	2	78.2%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7063	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0686	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.4976	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	31.9954	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.5566	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.38	100.00	89.4%	

Patient13 PQM RapidArc, 4 arc, Initial model, balanced objectives = 89.38 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 93.41 / 100.00 PQM (%): 93.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1433	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.2604	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5819	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3581	1.20	2	60.2%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7665	0.67	1	66.6%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.3276	5.51	6	91.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.7304	8.17	10	81.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6656	10.89	14	77.8%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1142	2.98	3	99.4%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6490	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.1955	2.98	3	99.4%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1169	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9721	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	4.9993	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.2129	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.0955	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.2843	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.3159	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.4591	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3684	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2343	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0901	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8523	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.7695	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			93.41	100.00	93.4%	

Patient23 PQM RapidArc, 4 arc, Initial model, balanced objectives = 93.41



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

.Brain_9-23-2015.

Raw PQM / Max PQM: 88.50 / 100.00 PQM (%): 88.5%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0816	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8668	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.1926	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3204	1.29	2	64.4%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7718	0.67	1	67.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.2267	4.16	6	69.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4287	6.43	10	64.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0704	9.00	14	64.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5061	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.0513	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.9307	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3831	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4383	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.3598	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.7147	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7025	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.7021	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9141	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1505	1.95	2	97.5%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.1649	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.4199	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0018	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.0942	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4817	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.50	100.00	88.5%	

Patient29 PQM RapidArc, 4 arc, Initial model, balanced objectives = 88.50



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

.Brain_9-23-2015.

Raw PQM / Max PQM: 89.45 / 100.00 PQM (%): 89.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1379	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0724	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2827	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3135	1.30	2	65.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7857	0.69	1	69.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.2038	5.69	6	94.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3414	6.65	10	66.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.1227	8.76	14	62.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5727	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1512	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.7697	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9216	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9254	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.6236	2.79	3	93.1%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.3569	2.88	3	96.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.6859	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.4118	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5358	1.82	2	91.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.4320	1.86	2	92.8%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7053	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.5317	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.4193	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6340	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.0397	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.45	100.00	89.4%	

Patient31 PQM RapidArc, 4 arc, Initial model, balanced objectives = 89.45 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.54 / 100.00 PQM (%): 91.5%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1483	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8731	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5065	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3326	1.26	2	63.0%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7879	0.70	1	69.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.4000	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] Mean dose (Gy)	< 12 [≤ 8]	8.9803	7.55	10	75.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7393	10.55	14	75.4%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7305	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4906	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	22.2007	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2593	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1905	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.9736	2.68	3	89.2%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.7130	2.76	3	92.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9119	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.4421	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4493	1.52	2	75.8%	[ROI Synonym]
[RLENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4058	1.53	2	76.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.3054	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2747	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.6986	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6186	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	22.4209	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			91.54	100.00	91.5%	

Patient32 PQM RapidArc, 4 arc, Initial model, balanced objectives = 91.54 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 92.22 / 100.00 PQM (%): 92.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1261	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.4127	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4484	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3483	1.23	2	61.3%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7982	0.71	1	71.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.9800	4.53	6	75.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] Mean dose (Gy)	< 12 [≤ 8]	9.0041	7.49	10	74.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5866	11.26	14	80.4%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7707	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4911	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.7350	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4770	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5410	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.1250	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.3980	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.8693	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1585	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8285	2.00	2	100.0%	[ROI Synonym]
[RLENES] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8670	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3416	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6889	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.5483	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5030	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.8614	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			92.22	100.00	92.2%	

Patient33 PQM RapidArc, 4 arc, Initial model, balanced objectives = 92.22



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.13 / 100.00 PQM (%): 91.1%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0157	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9707	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	32.8326	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3011	1.33	2	66.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.8010	0.72	1	71.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.4667	5.30	6	88.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1838	7.04	10	70.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9073	9.77	14	69.8%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3309	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5607	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	21.3914	3.00	3	100.0%	
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.7408	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.6573	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.4807	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.7711	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.1773	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.7576	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9852	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.0689	1.98	2	98.9%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.0763	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.9030	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.2759	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5999	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	21.5259	0.00	0	100.0%	
Total [24 Metrics]			91.13	100.00	91.1%	

Patient36 PQM RapidArc, 4 arc, Initial model, balanced objectives = 91.13 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 92.99 / 100.00 PQM (%): 93.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1168	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.4813	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2507	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3306	1.27	2	63.3%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7700	0.67	1	67.1%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.1600	5.76	6	96.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.8039	7.99	10	79.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.4979	11.68	14	83.4%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4396	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4306	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	21.8901	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1837	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9334	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8310	2.72	3	90.8%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.8343	2.72	3	90.7%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.1367	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.4384	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3936	1.54	2	76.8%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0495	1.65	2	82.5%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.3682	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.9280	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.4864	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6406	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	22.0880	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			92.99	100.00	93.0%	

Patient37 PQM RapidArc, 4 arc, Initial model, balanced objectives = 92.99 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.55 / 100.00 PQM (%): 90.5%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2061	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0413	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4090	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3169	1.30	2	64.8%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7600	0.66	1	65.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.7200	4.92	6	82.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0214	7.45	10	74.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6831	10.81	14	77.2%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3798	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1703	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.7300	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9287	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0323	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.0565	2.65	3	88.3%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3606	2.55	3	84.9%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.2727	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9466	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1528	1.62	2	80.8%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1825	1.61	2	80.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.5975	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.4563	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3044	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.2466	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4771	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			90.55	100.00	90.5%	

Patient38 PQM RapidArc, 4 arc, Initial model, balanced objectives = 90.55 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.53 / 100.00 PQM (%): 88.5%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1877	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.4369	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8279	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3531	1.22	2	60.8%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7511	0.64	1	64.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.9200	4.62	6	77.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2619	6.85	10	68.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8918	9.84	14	70.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9006	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7704	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.9560	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5151	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5575	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.0499	2.65	3	88.3%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3395	2.55	3	85.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.2587	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.7134	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2857	1.57	2	78.6%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2358	1.59	2	79.4%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7897	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2153	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3790	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8018	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.0515	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.53	100.00	88.5%	

Patient39 PQM RapidArc, 4 arc, Initial model, balanced objectives = 88.53 (case used to train final model)

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.54 / 100.00 PQM (%): 88.5%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance/Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1599	10.00	10	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1645	13.00	13	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2185	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3083	1.31	2	65.7% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7750	0.68	1	67.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.6643	5.00	6	83.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4439	6.39	10	63.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0678	9.02	14	64.4% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3211	3.00	3	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.3706	3.00	3	100.0% [ROI Synonym]
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.8383	2.92	3	97.5% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.8559	3.00	3	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1115	3.00	3	100.0% [ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.2513	2.92	3	97.2% [ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.1957	2.93	3	97.8% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.2211	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1800	3.00	3	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2840	1.57	2	78.6% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.6387	1.79	2	89.4% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.0400	0.00	0	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.4181	0.00	0	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.7441	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7834	0.00	0	100.0% [ROI Synonym]
[CORD] Max dose (Gy)	≤ 37.49	26.5692	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			88.54	100.00	88.5%

Patient40 PQM RapidArc, 4 arc, Initial model, balanced objectives = 88.54

Annex K: PQM Histogram and individual scorecards from recursively planned cases created with “**extreme**” priority hippocampal sparing objectives (4 arc beam arrangement)

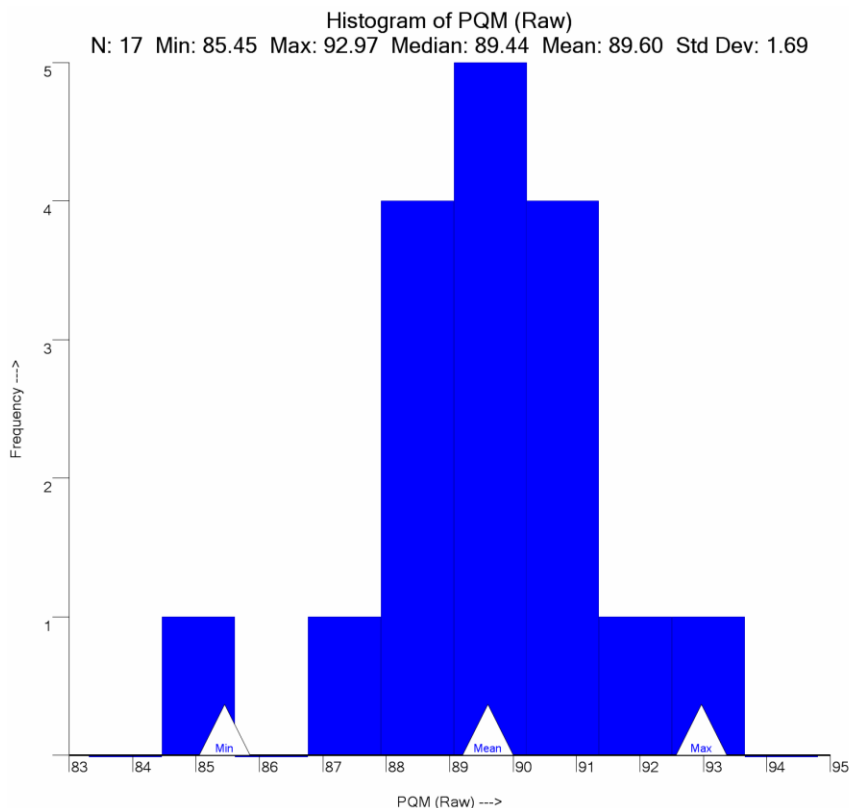


Figure 14: PQM score distribution from the 17 plans made with “extreme” objectives and 4 arc beam arrangement. Six of these plans were the highest scoring thus were used in the training set for the final model.

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Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.64 / 100.00

PQM (%): 88.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance/Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.5353	10.00	10	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2879	13.00	13	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7641	13.00	13	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3172	1.30	2	64.8% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7598	0.66	1	65.7% [ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.6100	5.09	6	84.8% [ROI Synonym]
[HIPPOCAMPUS_TOTAL] Mean dose (Gy)	< 12 [≤ 8]	9.4117	6.47	10	64.7% [ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8265	10.14	14	72.5% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9576	3.00	3	100.0%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6209	3.00	3	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.6617	3.00	3	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5775	3.00	3	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5298	3.00	3	100.0% [ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.3947	2.54	3	84.5% [ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3006	2.57	3	85.5% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.1104	3.00	3	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.3419	3.00	3	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.0966	1.30	2	65.1% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2399	1.59	2	79.3% [ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8886	0.00	0	100.0%
[LOPTIC] Max dose (Gy)	≤ 37.49	30.1144	0.00	0	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0742	0.00	0	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8554	0.00	0	100.0%
[CORD] Max dose (Gy)	≤ 37.49	25.4857	0.00	0	100.0% [ROI Synonym]
Total [24 Metrics]			88.64	100.00	88.6%

Patient1 PQM RapidArc, 4 arc, Initial model, extreme objectives = 88.64 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 85.45 / 100.00 PQM (%): 85.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3059	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.5050	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1448	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3492	1.22	2	61.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7456	0.64	1	63.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	15.2233	2.67	6	44.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.6808	5.80	10	58.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8289	10.13	14	72.4%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0653	2.99	3	99.6%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5012	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.7522	2.93	3	97.7%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9396	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0416	2.99	3	99.8%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.4626	2.51	3	83.7%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.4016	2.53	3	84.4%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5259	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1335	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5531	1.48	2	74.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3419	1.55	2	77.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7275	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6285	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.9702	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7713	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.6269	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			85.45	100.00	85.4%	

Patient2 PQM RapidArc, 4 arc, Initial model, extreme objectives = 85.45



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.81 / 100.00 PQM (%): 90.8%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.7167	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1101	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8719	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3305	1.27	2	63.3%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7537	0.65	1	64.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.9367	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2781	6.80	10	68.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9687	9.48	14	67.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.3117	2.95	3	98.3%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	34.0207	2.66	3	88.7%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.4805	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8745	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7789	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.4490	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.5563	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.6063	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.2593	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9273	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9327	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3986	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.3280	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.4492	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	34.1391	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.5693	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			90.81	100.00	90.8%	

Patient4 PQM RapidArc, 4 arc, Initial model, extreme objectives = 90.81



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.64 / 100.00 PQM (%): 88.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.5353	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.2879	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7641	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3172	1.30	2	64.8%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7598	0.66	1	65.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.6100	5.09	6	84.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4117	6.47	10	64.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8265	10.14	14	72.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9576	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6209	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.6617	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5775	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5298	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.3947	2.54	3	84.5%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3006	2.57	3	85.5%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.1104	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.3419	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.0966	1.30	2	65.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2399	1.59	2	79.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8886	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.1144	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0742	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8554	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4857	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.64	100.00	88.6%	

Patient6 PQM RapidArc, 4 arc, Initial model, extreme objectives = 88.64 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.97 / 100.00 PQM (%): 89.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2233	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7667	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.0547	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3441	1.24	2	61.8%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7490	0.64	1	64.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.3450	5.48	6	91.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3003	6.75	10	67.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7608	10.45	14	74.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2070	2.97	3	98.9%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9104	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.2050	2.98	3	99.4%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1484	2.98	3	99.2%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7351	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	8.2086	2.26	3	75.5%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.8850	2.37	3	79.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3885	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5880	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.0482	1.32	2	65.9%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3974	1.53	2	76.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.9105	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.1118	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.2556	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.5719	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.0084	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.97	100.00	89.0%	

Patient8 PQM RapidArc, 4 arc, Initial model, extreme objectives = 88.97



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.55 / 100.00 PQM (%): 89.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3301	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7192	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9143	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3343	1.26	2	62.9%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7362	0.62	1	62.3%	
[HIPPOCAMPUS_TOTAL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.0900	5.87	6	97.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] Mean dose (Gy)	< 12 [≤ 8]	9.3972	6.51	10	65.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8370	10.09	14	72.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2243	2.96	3	98.8%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7805	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.0500	3.00	3	99.8%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6676	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7511	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.9611	2.68	3	89.3%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.9737	2.68	3	89.2%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3307	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1042	3.00	3	100.0%	[ROI Synonym]
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	5.8111	1.40	2	69.8%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5030	1.50	2	75.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.9874	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6389	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.6607	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.0708	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.7458	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.55	100.00	89.6%	

Patient10 PQM RapidArc, 4 arc, Initial model, extreme objectives = 89.55



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.87 / 100.00 PQM (%): 89.9%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3639	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.6679	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5986	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3413	1.24	2	62.1%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7679	0.67	1	66.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.0117	5.98	6	99.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] Mean dose (Gy)	< 12 [≤ 8]	9.3169	6.71	10	67.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9226	9.69	14	69.2%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9005	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4409	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.0112	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2614	2.96	3	98.5%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7916	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.9894	2.67	3	89.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.8270	2.72	3	90.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7956	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.0802	3.00	3	100.0%	[ROI Synonym]
[LENSE] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2984	1.57	2	78.4%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0384	1.65	2	82.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6162	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.2046	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.6709	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5368	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.4166	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.87	100.00	89.9%	

Patient12 PQM RapidArc, 4 arc, Initial model, extreme objectives = 89.87 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.25 / 100.00 PQM (%): 89.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2417	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7992	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.3924	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3188	1.29	2	64.6%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7584	0.65	1	65.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.2000	5.70	6	95.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2311	6.92	10	69.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9249	9.68	14	69.2%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7040	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	31.9252	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.5000	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0665	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0032	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1753	2.61	3	86.9%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3985	2.53	3	84.5%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.3956	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6874	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.8930	1.37	2	68.5%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5459	1.48	2	74.2%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8284	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	29.7313	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.4000	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.2484	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4938	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.25	100.00	89.2%	

Patient13 PQM RapidArc, 4 arc, Initial model, extreme objectives = 89.25



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.60 / 100.00 PQM (%): 90.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1302	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.6991	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5026	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3330	1.26	2	63.0%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7672	0.67	1	66.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.1967	5.70	6	95.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3638	6.59	10	65.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9675	9.49	14	67.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6542	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4413	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.0207	3.00	3	99.9%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3090	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5851	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.3402	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.7501	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3383	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5645	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9450	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.3288	1.89	2	94.5%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.0312	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.3782	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3903	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.4712	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.3637	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			90.60	100.00	90.6%	

Patient29 PQM RapidArc, 4 arc, Initial model, extreme objectives = 90.6 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.91 / 100.00 PQM (%): 88.9%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1521	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9634	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8250	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3367	1.25	2	62.6%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7765	0.68	1	68.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.0733	5.89	6	98.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4297	6.43	10	64.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.1079	8.83	14	63.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8546	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.2312	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.9897	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1950	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.0938	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1807	2.61	3	86.9%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.6696	2.78	3	92.6%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.8034	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.9163	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0202	1.66	2	83.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.6198	1.79	2	89.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8349	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.7736	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.9183	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5464	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.3785	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.91	100.00	88.9%	

Patient31 PQM RapidArc, 4 arc, Initial model, extreme objectives = 88.91



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.36 / 100.00 PQM (%): 91.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.9682	9.94	10	99.4%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.0424	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.2620	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3233	1.28	2	64.1%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7944	0.71	1	70.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.4800	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.9326	7.67	10	76.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8683	9.95	14	71.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5989	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.1206	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	21.7207	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.8556	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9303	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.5388	2.82	3	94.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.4269	2.86	3	95.3%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9145	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5384	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2044	1.60	2	79.9%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3772	1.54	2	77.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.2992	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.5112	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.6005	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.3224	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	22.2531	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			91.36	100.00	91.4%	

Patient32 PQM RapidArc, 4 arc, Initial model, extreme objectives = 91.36



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 92.97 / 100.00 PQM (%): 93.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0214	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.2480	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7040	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3585	1.20	2	60.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7915	0.70	1	70.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.4000	5.40	6	90.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0680	7.33	10	73.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5722	11.33	14	80.9%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9479	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6011	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.7514	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7274	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7693	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.1452	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.2476	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1617	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5567	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8191	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.6995	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.7629	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.5156	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.8179	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7464	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.8407	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			92.97	100.00	93.0%	

Patient33 PQM RapidArc, 4 arc, Initial model, extreme objectives = 92.97 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.78 / 100.00 PQM (%): 90.8%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0065	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7558	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.1540	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3180	1.29	2	64.7%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7954	0.71	1	70.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.2680	5.60	6	93.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2467	6.88	10	68.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9906	9.38	14	67.0%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6708	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4107	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	21.2714	3.00	3	100.0%	
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.8254	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9885	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.6370	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.9239	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6002	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.4643	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1219	1.96	2	98.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1129	1.96	2	98.1%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.0503	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2932	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.7328	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6240	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	21.3892	0.00	0	100.0%	
Total [24 Metrics]			90.78	100.00	90.8%	

Patient36 PQM RapidArc, 4 arc, Initial model, extreme objectives = 90.78



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015

Raw PQM / Max PQM: 91.21 / 100.00 PQM (%): 91.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0986	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.4879	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8205	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3384	1.25	2	62.4%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7524	0.65	1	64.6%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.3980	5.40	6	90.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0340	7.42	10	74.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5507	11.43	14	81.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1420	2.98	3	99.2%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8906	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	21.4101	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5599	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4916	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.2039	2.60	3	86.6%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.2711	2.58	3	85.9%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.2030	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6098	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.9373	1.35	2	67.7%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3112	1.56	2	78.1%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6779	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.0238	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0321	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.0546	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	21.5664	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			91.21	100.00	91.2%	

Patient37 PQM RapidArc, 4 arc, Initial model, extreme objectives = 91.21



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015

Raw PQM / Max PQM: 89.44 / 100.00 PQM (%): 89.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2534	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9991	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7576	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3249	1.28	2	63.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7427	0.63	1	63.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.5150	5.23	6	87.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1931	7.02	10	70.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6986	10.74	14	76.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6776	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5203	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.1320	2.99	3	99.6%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4160	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7245	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.6652	2.44	3	81.5%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	8.0016	2.33	3	77.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.2991	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5505	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.7790	1.41	2	70.4%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.8756	1.37	2	68.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.4543	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.9319	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.4551	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.6429	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.6886	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.44	100.00	89.4%	

Patient38 PQM RapidArc, 4 arc, Initial model, extreme objectives = 89.44



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 87.42 / 100.00 PQM (%): 87.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1482	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.3611	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1183	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3631	1.19	2	59.7%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7410	0.63	1	63.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8250	4.76	6	79.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3642	6.59	10	65.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9658	9.49	14	67.8%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1308	2.98	3	99.3%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6503	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.2400	2.98	3	99.3%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7721	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9388	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.4855	2.50	3	83.5%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.7040	2.43	3	81.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.7373	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.9660	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.7672	1.41	2	70.5%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.6432	1.45	2	72.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6085	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	30.3896	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.7404	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.0417	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.1381	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			87.42	100.00	87.4%	

Patient39 PQM RapidArc, 4 arc, Initial model, extreme objectives = 87.42



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.36 / 100.00 PQM (%): 89.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1747	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1177	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4071	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3149	1.30	2	65.0%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7654	0.66	1	66.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.3229	5.52	6	91.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4866	6.28	10	62.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9403	9.61	14	68.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5938	3.00	3	100.0%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.3906	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.2380	2.89	3	96.2%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1734	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2066	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.4629	2.85	3	94.9%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.4455	2.85	3	95.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.1831	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.5387	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0940	1.64	2	81.8%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.7026	1.77	2	88.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.4918	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	29.8405	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.8195	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5046	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.9081	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.36	100.00	89.4%	

Patient40 PQM RapidArc, 4 arc, Initial model, extreme objectives = 89.36 (case used to train final model)

Annex L: Individual scorecards from recursively planned cases created with “very extreme” priority hippocampal sparing objectives

“Very Extreme” objectives created the highest scoring plan only once and often created noticeably worse plans. Due to some very obvious decreases in PQM score, very extreme objectives were retired earlier in the process, only five cases were planned with this objective set.

QR

Quality Reports™

Plan Quality Scoresheet:Brain, 9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: .Brain, 9-23-2015.

Raw PQM / Max PQM: 85.56 / 100.00 PQM (%): 85.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1078	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9398	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1882	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3348	1.26	2	62.8%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7355	0.62	1	62.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.3275	4.01	6	66.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.7879	5.53	10	55.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6881	10.79	14	77.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2121	2.96	3	98.8%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.1509	2.95	3	98.3%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.0320	3.00	3	99.9%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.4372	2.93	3	97.6%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1478	2.98	3	99.2%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	8.4942	2.17	3	72.3%	[ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	8.7270	2.09	3	69.7%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.0043	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.7925	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	7.0537	0.98	2	49.1%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.1088	1.30	2	64.9%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6564	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.9527	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.8431	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.3598	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.1175	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			85.56	100.00	85.6%	

Patient1 PQM RapidArc, 4 arc, Initial model, very extreme objectives = 85.56



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.07 / 100.00 PQM (%): 90.1%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3757	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.2983	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1222	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3613	1.20	2	59.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7463	0.64	1	63.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.4075	5.39	6	89.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3000	6.75	10	67.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6879	10.79	14	77.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0221	3.00	3	99.9%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4612	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.8400	2.92	3	97.5%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6605	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8343	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1796	2.61	3	86.9%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.2093	2.60	3	86.6%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.1369	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.7858	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2284	1.59	2	79.5%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2235	1.59	2	79.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.0025	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.5380	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.7872	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8532	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.6174	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			90.07	100.00	90.1%	

Patient2 PQM RapidArc, 4 arc, Initial model, very extreme objectives = 90.07 (case used to train final model)



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.69 / 100.00 PQM (%): 91.7%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3545	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8426	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7991	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3356	1.25	2	62.7%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7515	0.65	1	64.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.7200	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2196	6.95	10	69.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8841	9.87	14	70.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1801	2.97	3	99.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8256	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.3705	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7374	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6724	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.3460	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.4000	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.7209	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.4105	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.7282	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8285	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.1781	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.2282	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.5647	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8256	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.5001	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			91.69	100.00	91.7%	

Patient4 PQM RapidArc, 4 arc, Initial model, very extreme objectives = 91.69



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 83.19 * / 96.00 * PQM (%): 86.7% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.4478	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1379	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7799	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3231	1.28	2	64.1%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7553	0.65	1	65.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.2850	4.07	6	67.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.6244	5.94	10	59.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9821	9.42	14	67.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.3774	2.94	3	97.9%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8206	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.0900	2.99	3	99.7%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8761	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6341	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.8533	2.38	3	79.4%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.4558	2.51	3	83.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.0459	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3984	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[CHIASM] Max dose (Gy)	≤ 37.49	31.4603	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.5516	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.5070	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9388	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.9516	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			83.19 *	96 *	86.7% *	

Patient5 PQM RapidArc, 4 arc, Initial model, very extreme objectives = 86.7



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 82.43 / 100.00 PQM (%): 82.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.4232	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9457	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8964	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3367	1.25	2	62.6%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7618	0.66	1	66.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	15.0100	2.99	6	49.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.8611	5.35	10	53.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.3291	7.80	14	55.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0683	2.99	3	99.6%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8407	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.2609	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0691	2.99	3	99.6%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0808	2.99	3	99.6%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.9764	2.34	3	78.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.6665	2.44	3	81.5%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.5879	2.82	3	94.1%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.3744	2.89	3	96.3%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.9137	1.36	2	68.1%	[ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2941	1.57	2	78.4%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8338	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.0628	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	31.0941	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.1323	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.2796	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			82.43	100.00	82.4%	

Patient6 PQM RapidArc, 4 arc, Initial model, very extreme objectives = 82.41

Annex M: PQM Histogram and individual scorecards from final model re-planning the cases in the training set (4 arc beam arrangement)

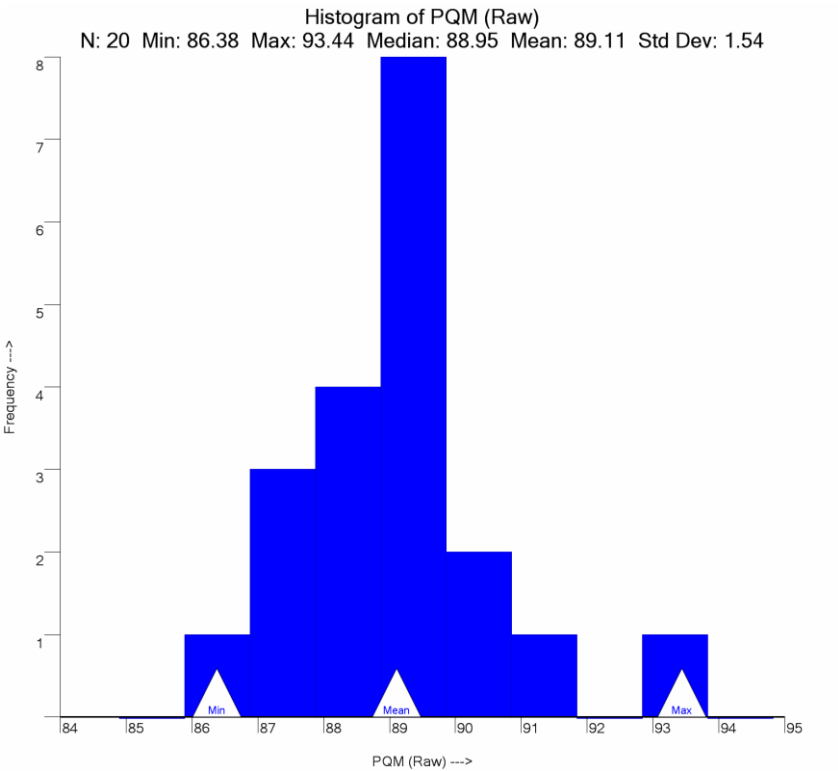


Figure 9: (included again here for completeness) PQM score distribution from the 20 cases in the final RapidPlan model’s training set. All cases were re-planned by the final model with the final set of auto-created optimization objectives.



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.41 / 100.00 PQM (%): 89.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1699	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.1599	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.2065	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3384	1.25	2	62.4%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7999	0.71	1	71.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.4200	5.37	6	89.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3436	6.64	10	66.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8228	10.16	14	72.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7471	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.5909	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.8514	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5464	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4214	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.1876	2.60	3	86.8%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.0253	2.66	3	88.6%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.8176	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.4278	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.9036	1.37	2	68.3%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0617	1.65	2	82.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.8064	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	29.9614	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.9072	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8477	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4109	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.41	100.00	89.4%	

Patient1 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 89.41



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.57 / 100.00 PQM (%): 88.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	94.6367	9.27	10	92.7%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.8975	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1373	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3723	1.17	2	58.6%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7486	0.64	1	64.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8683	4.70	6	78.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2957	6.76	10	67.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7322	10.58	14	75.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7804	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4812	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.4514	2.96	3	98.6%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4567	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5209	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8025	2.73	3	91.1%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.9413	2.69	3	89.5%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.8384	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.1471	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3719	1.54	2	77.1%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4230	1.53	2	76.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.4943	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	29.8923	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.8094	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5375	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.5738	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.57	100.00	88.6%	

Patient2 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.57



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 91.67 / 100.00 PQM (%): 91.7%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0820	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9850	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.8412	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3430	1.24	2	61.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7661	0.67	1	66.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.1260	5.81	6	96.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] Mean dose (Gy)	< 12 [≤ 8]	9.2007	7.00	10	70.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8672	9.95	14	71.1%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9570	3.00	3	100.0%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6407	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.2905	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3620	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3786	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.3322	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.1530	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	5.9797	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	5.2005	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8679	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.7683	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.1231	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.3077	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.0762	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7037	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.5440	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			91.67	100.00	91.7%	

Patient4 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 91.67



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 85.42 * / 96.00 * PQM (%): 89.0% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1481	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8844	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.5888	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3248	1.28	2	63.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7722	0.67	1	67.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.9067	4.64	6	77.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] Mean dose (Gy)	< 12 [≤ 8]	9.3834	6.54	10	65.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTAL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9091	9.76	14	69.7%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0594	2.99	3	99.7%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.3606	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.7567	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3036	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.1480	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8140	2.73	3	91.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.5607	2.81	3	93.8%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.9012	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.4546	3.00	3	100.0%	[ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *		
[CHIASM] Max dose (Gy)	≤ 37.49	31.0440	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.1773	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.6646	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.5617	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.9109	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			85.42 *	96 *	89.0% *	

Patient5 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 89.0



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 86.38 / 100.00 PQM (%): 86.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1148	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9888	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7789	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3313	1.26	2	63.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7729	0.68	1	67.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.9650	4.55	6	75.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.6831	5.79	10	57.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.1555	8.61	14	61.5%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0107	3.00	3	99.9%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.1907	2.94	3	97.9%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.1909	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6910	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4999	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.0591	2.65	3	88.2%	[ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.0743	2.64	3	88.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.0859	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.0851	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2250	1.59	2	79.6%	[ROI Synonym]
[RLENES] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9893	1.67	2	83.5%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6180	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.3170	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.1884	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.3477	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.5951	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			86.38	100.00	86.4%	

Patient6 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 86.38



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 88.93 / 100.00 PQM (%): 88.9%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1178	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8533	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.2647	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3554	1.21	2	60.5%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7598	0.66	1	65.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.9075	4.64	6	77.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2875	6.78	10	67.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8511	10.03	14	71.6%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1380	2.98	3	99.2%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9404	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.0430	3.00	3	99.9%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.8933	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9802	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	7.0614	2.65	3	88.2%	[ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.8943	2.70	3	90.1%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.5279	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.8050	3.00	3	100.0%	[ROI Synonym]
[LENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0669	1.64	2	82.2%	[ROI Synonym]
[RLENES] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0480	1.65	2	82.5%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6380	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.3364	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.8086	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9759	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.0632	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			88.93	100.00	88.9%	

Patient8 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.93



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.65 / 100.00 PQM (%): 89.7%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	97.1936	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	29.4814	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.2551	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.2083	1.54	2	76.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7418	0.63	1	63.1%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.1467	4.28	6	71.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2560	6.86	10	68.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7409	10.54	14	75.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0646	2.99	3	99.6%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7608	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.6833	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7220	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6231	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.6048	2.80	3	93.3%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.5177	2.83	3	94.2%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.4368	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9425	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3274	1.56	2	77.9%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1163	1.63	2	81.4%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.6030	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.6626	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.2260	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8859	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.7646	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.65	100.00	89.7%	

Patient9 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 89.65



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 89.25 / 100.00 PQM (%): 89.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3341	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.6538	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.3597	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3568	1.21	2	60.4%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7317	0.62	1	61.7%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.4260	5.36	6	89.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4046	6.49	10	64.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9922	9.37	14	66.9%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.3757	2.94	3	97.9%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7105	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.0150	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9200	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6752	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.3024	2.90	3	96.6%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.2931	2.90	3	96.7%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.8465	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.5749	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.9295	1.69	2	84.5%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.6760	1.77	2	88.7%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.2769	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	31.1297	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.2540	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7734	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.9631	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			89.25	100.00	89.2%	

Patient10 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 89.25



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 87.76 / 100.00 PQM (%): 87.8%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1789	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.5993	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7749	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3494	1.22	2	61.2%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7602	0.66	1	65.7%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.7225	4.92	6	81.9%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4987	6.25	10	62.5%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0730	8.99	14	64.2%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0799	2.99	3	99.6%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.6509	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.2912	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7387	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4585	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8152	2.73	3	90.9%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	6.7857	2.74	3	91.3%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.9048	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	10.5616	2.83	3	94.4%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1287	1.62	2	81.2%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5759	1.81	2	90.4%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.7503	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.3507	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.2137	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.7901	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	24.5307	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			87.76	100.00	87.8%	

Patient12 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 87.76



Quality Reports™

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 87.43 / 100.00 PQM (%): 87.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.3058	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9468	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.3565	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3520	1.22	2	60.9%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7434	0.63	1	63.3%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.6550	5.02	6	83.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4485	6.38	10	63.8%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0702	9.01	14	64.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.3108	2.95	3	98.3%	
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9204	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	24.6625	3.00	3	100.0%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7177	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2317	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	6.8755	2.71	3	90.3%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	7.3320	2.56	3	85.2%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5271	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.5540	3.00	3	100.0%	[ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.6579	1.45	2	72.4%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.4631	1.51	2	75.6%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.4979	0.00	0	100.0%	
[LOPTIC] Max dose (Gy)	≤ 37.49	30.2524	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	29.6942	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.9678	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.7472	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			87.43	100.00	87.4%	

Patient13 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 87.43



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 93.44 / 100.00 PQM (%): 93.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1050	10.00	10	100.0%	
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.0770	13.00	13	100.0%	
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.0731	13.00	13	100.0%	
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3785	1.16	2	57.9%	
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7616	0.66	1	65.9%	
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.7119	6.00	6	100.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.7835	8.04	10	80.4%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.7120	10.68	14	76.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.4396	2.93	3	97.6%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8571	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.2730	2.98	3	99.2%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7236	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3426	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	5.2664	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.3560	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.4946	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.2781	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.5293	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8316	2.00	2	100.0%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	31.3904	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	31.0810	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.3449	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	33.1927	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	26.1678	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			93.44	100.00	93.4%	

Patient23 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 93.44



Quality Reports™

Plan Quality Scoresheet:

Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 87.21 / 100.00 PQM (%): 87.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance	Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1539	10.00	10	100.0%	[ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.5512	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9127	13.00	13	100.0%	[ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3475	1.23	2	61.4%	[ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7521	0.65	1	64.6%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.3533	3.97	6	66.2%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5994	6.00	10	60.0%	[ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.1909	8.44	14	60.3%	[ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0364	2.99	3	99.8%	[ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7113	3.00	3	100.0%	
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.3807	2.97	3	98.8%	[ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9418	3.00	3	100.0%	[ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9022	3.00	3	100.0%	[ROI Synonym]
[LEVE] Mean dose (Gy)	< 15 [≤ 6]	4.8328	3.00	3	100.0%	[ROI Synonym]
[REVE] Mean dose (Gy)	< 15 [≤ 6]	5.6184	3.00	3	100.0%	[ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.7168	3.00	3	100.0%	[ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	6.8982	3.00	3	100.0%	[ROI Synonym]
[LENSS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.6434	2.00	2	100.0%	[ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1012	1.97	2	98.3%	[ROI Synonym]
[CHIASM] Max dose (Gy)	≤ 37.49	30.5635	0.00	0	100.0%	[ROI Synonym]
[LOPTIC] Max dose (Gy)	≤ 37.49	31.0392	0.00	0	100.0%	[ROI Synonym]
[ROPTIC] Max dose (Gy)	≤ 37.49	30.8170	0.00	0	100.0%	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	≤ 37.49	32.8575	0.00	0	100.0%	
[CORD] Max dose (Gy)	≤ 37.49	25.4742	0.00	0	100.0%	[ROI Synonym]
Total [24 Metrics]			87.21	100.00	87.2%	

Patient29 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 87.21

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 88.63 / 100.00 PQM (%): 88.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2661	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.8453	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.1018	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3517	1.22	2.00	60.9% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7745	0.68	1.00	67.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.3000	5.55	6.00	92.5% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4429	6.39	10.00	63.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.2151	8.33	14.00	59.5% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1092	2.98	3.00	99.4% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8460	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.3157	2.97	3.00	99.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4354	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3503	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.3630	2.88	3.00	96.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.1588	2.95	3.00	98.2% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.4111	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.8375	3.00	3.00	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.4113	1.86	2.00	93.1% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5504	1.82	2.00	90.8% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	30.9414	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.2347	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.4702	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.3916	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	26.8826	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			88.63	100.00	88.6%

Patient31 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.63

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm:

Brain_9-23-2015.

Raw PQM / Max PQM: 90.19 / 100.00 PQM (%): 90.2%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0617	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7575	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.9546	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3464	1.23	2.00	61.5% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7811	0.69	1.00	68.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.3332	5.50	6.00	91.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2262	6.93	10.00	69.3% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8441	10.06	14.00	71.9% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0747	2.99	3.00	99.6% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8018	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.1018	2.90	3.00	96.7% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3213	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4817	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.7207	2.76	3.00	92.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.2680	2.91	3.00	97.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.5463	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.4953	3.00	3.00	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2411	1.59	2.00	79.3% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0920	1.64	2.00	81.8% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	30.8553	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.5120	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.1848	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.4234	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.4591	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			90.19	100.00	90.2%

Patient32 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 90.19

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 88.95 / 100.00 PQM (%): 89.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.0590	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.3470	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.6925	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3918	1.13	2.00	56.5% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7824	0.69	1.00	68.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.1285	4.31	6.00	71.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.2728	6.82	10.00	68.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0038	9.32	14.00	66.5% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.4235	2.93	3.00	97.6% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.2739	2.91	3.00	97.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.1235	2.99	3.00	99.6% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.2243	2.96	3.00	98.8% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9463	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	5.5080	3.00	3.00	100.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	5.3100	3.00	3.00	100.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.3649	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	9.1060	3.00	3.00	100.0% [ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.2822	1.91	2.00	95.1% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.5492	2.00	2.00	100.0% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	32.4012	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.7426	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.7898	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.7425	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.2520	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			88.95	100.00	89.0%

Patient33 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.95

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 88.63 / 100.00 PQM (%): 88.6%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1045	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9833	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7670	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3294	1.27	2.00	63.4% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7836	0.69	1.00	69.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.2065	4.19	6.00	69.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4078	6.48	10.00	64.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0059	9.31	14.00	66.5% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1388	2.98	3.00	99.2% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8012	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.8582	2.92	3.00	97.4%
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.5145	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3084	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	5.8579	3.00	3.00	100.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	5.9062	3.00	3.00	100.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.5659	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.8436	3.00	3.00	100.0% [ROI Synonym]
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.4437	1.85	2.00	92.6% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1739	1.94	2.00	97.1% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	31.4422	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.3571	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	29.9500	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.7445	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.1771	0.00	0.00	100.0%
Total [24 Metrics]			88.63	100.00	88.6%

Patient36 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.63

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 90.42 / 100.00 PQM (%): 90.4%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1375	10.00	10.00	100.0%
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.6284	13.00	13.00	100.0%
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.4604	13.00	13.00	100.0%
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3530	1.22	2.00	60.8%
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7503	0.64	1.00	64.3%
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.6945	4.96	6.00	82.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1695	7.08	10.00	70.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.6064	11.17	14.00	79.8% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.4629	2.92	3.00	97.4% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.0967	2.97	3.00	98.9%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.3780	2.87	3.00	95.8% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1348	2.98	3.00	99.3% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7595	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.8007	2.73	3.00	91.1% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.6298	2.79	3.00	93.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.6066	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.0377	3.00	3.00	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.5528	1.48	2.00	74.1% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.1641	1.61	2.00	80.6% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	31.4973	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.6076	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.4117	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.8439	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.6905	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			90.42	100.00	90.4%

Patient37 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 90.42

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 88.70 / 100.00 PQM (%): 88.7%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1400	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7682	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.2771	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3527	1.22	2.00	60.8% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7380	0.63	1.00	62.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.0882	4.37	6.00	72.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1821	7.04	10.00	70.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.8305	10.12	14.00	72.3% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1830	2.97	3.00	99.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9778	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.1175	2.90	3.00	96.6% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2913	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6927	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.8350	2.72	3.00	90.7% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	7.2382	2.59	3.00	86.2% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.8047	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.6198	3.00	3.00	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2265	1.59	2.00	79.6% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.3517	1.55	2.00	77.5% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	32.3247	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	29.9328	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	31.0679	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.9450	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.6046	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			88.70	100.00	88.7%

Patient38 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.7

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 88.95 / 100.00 PQM (%): 88.9%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1706	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.3329	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.3347	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3737	1.17	2.00	58.5% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7450	0.64	1.00	63.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.9278	4.61	6.00	76.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1998	7.00	10.00	70.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9117	9.75	14.00	69.6% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.1467	2.98	3.00	99.2% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9491	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.7263	2.93	3.00	97.8% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0422	2.99	3.00	99.8% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7266	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.6160	2.79	3.00	93.2% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.9014	2.70	3.00	90.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.4260	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.1693	3.00	3.00	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.0015	1.67	2.00	83.3% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.8240	1.73	2.00	86.3% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	31.1618	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	31.1193	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.2589	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.5768	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.3959	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			88.95	100.00	88.9%

Patient39 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.95

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 88.98 / 100.00 PQM (%): 89.0%

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1473	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.9242	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7435	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3274	1.27	2.00	63.6% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7620	0.66	1.00	66.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	13.8170	4.77	6.00	79.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.4503	6.37	10.00	63.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9778	9.44	14.00	67.4% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7796	3.00	3.00	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.8975	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	26.0048	2.91	3.00	97.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4639	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4789	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	5.9436	3.00	3.00	100.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	5.9791	3.00	3.00	100.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	7.3522	3.00	3.00	100.0% [ROI Synonym]
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	8.3781	3.00	3.00	100.0% [ROI Synonym]
[LENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.8449	1.72	2.00	85.9% [ROI Synonym]
[RENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5004	1.83	2.00	91.7% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	30.6257	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.0567	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.3175	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	34.0237	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.6982	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			88.98	100.00	89.0%

Patient40 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 88.98

Annex N: PQM Histogram and individual scorecards from final model on external validation cases (4 arc beam arrangement)

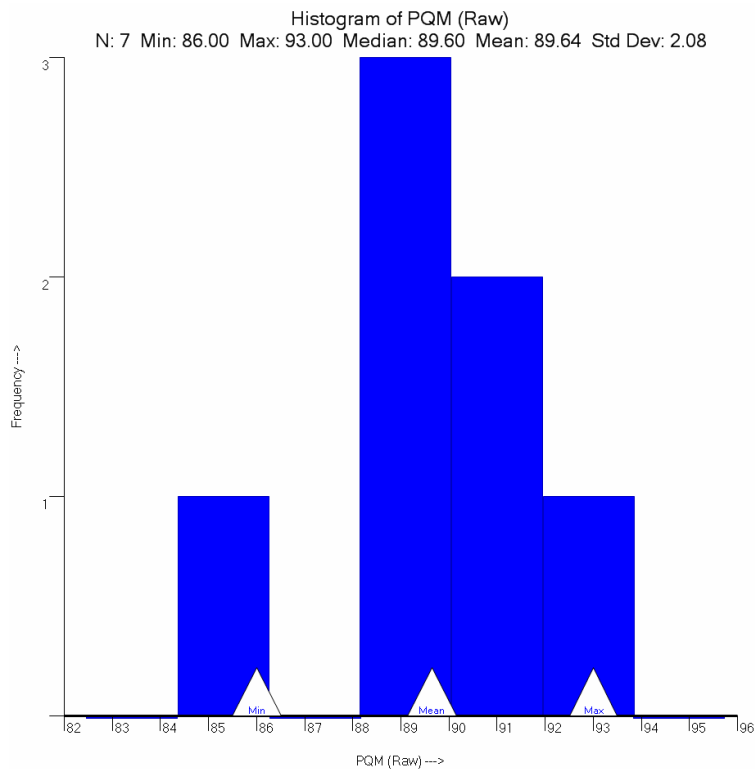
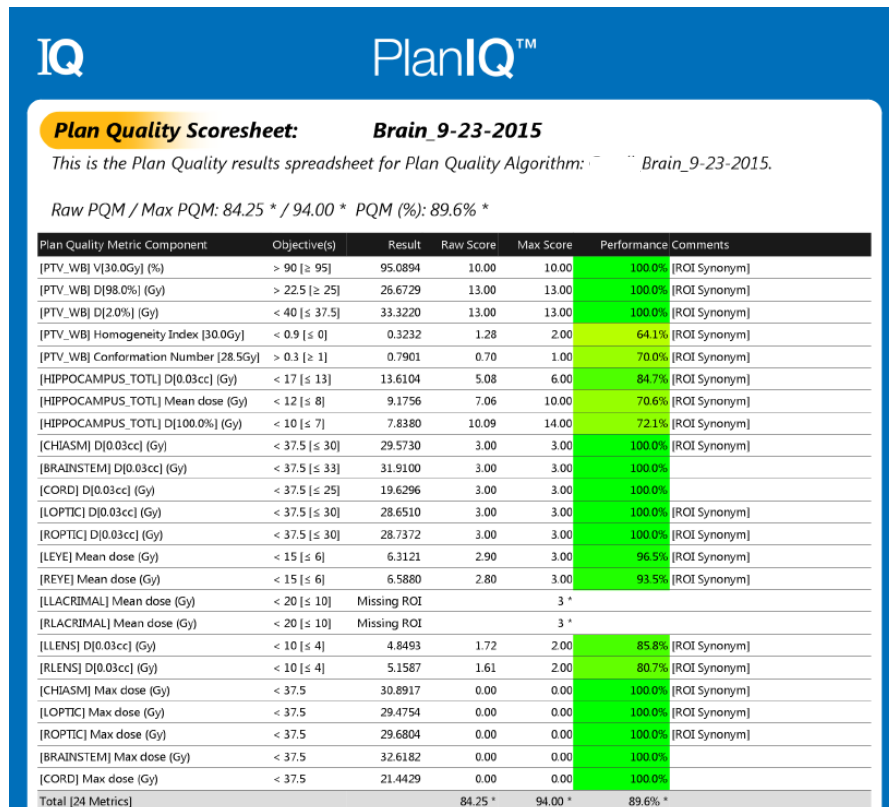


Figure 15: PQM score distribution from the 7 external validations plans made with the final RapidPlan model



External Validation Patient1 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 89.6

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 80.86 * / 94.00 * PQM (%): 86.0% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1073	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.7603	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.6079	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3739	1.17	2.00	58.5% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7507	0.64	1.00	64.4% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.9125	6.00	6.00	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.5713	6.07	10.00	60.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0625	9.04	14.00	64.6% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.9362	3.00	3.00	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7948	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.9853	2.91	3.00	97.0%
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6181	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4923	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	7.9090	2.36	3.00	78.8% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	8.3309	2.22	3.00	74.1% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.2430	1.25	2.00	62.6% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	6.4485	1.18	2.00	59.2% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	30.8010	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.8028	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.6313	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.5109	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	27.6180	0.00	0.00	100.0%
Total [24 Metrics]		80.86 *	94.00 *		86.0% *

External Validation Patient2 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 86.0

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 77.71 * / 86.00 * PQM (%): 90.4% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1194	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.1229	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.7287	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3756	1.17	2.00	58.3% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7638	0.66	1.00	66.3% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.9690	6.00	6.00	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.0481	7.38	10.00	73.8% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9562	9.54	14.00	68.1% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.6307	3.00	3.00	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.9862	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.3934	2.96	3.00	98.8% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2898	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]			3 *	[ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	4.6565	3.00	3.00	100.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	Missing ROI		3 *	
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.7380	2.00	2.00	100.0% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	Missing ROI		2 *	
[CHIASM] Max dose (Gy)	< 37.5	30.5906	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.1909	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5			0 *	[ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	34.2393	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	26.6035	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]		77.71 *	86.00 *		90.4% *

External Validation Patient3 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 90.4

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 84.62 * / 91.00 * PQM (%): 93.0% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1292	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	25.9393	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.5104	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3912	1.13	2.00	56.5% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7349	0.62	1.00	62.1% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.7964	6.00	6.00	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	8.9513	7.62	10.00	76.2% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.5756	11.31	14.00	80.8% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.0664	2.99	3.00	99.6%
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.1700	2.94	3.00	98.1%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	Missing ROI		3 *	
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.4243	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.1145	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	5.6180	3.00	3.00	100.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	5.4976	3.00	3.00	100.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.7885	2.00	2.00	100.0% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.8921	2.00	2.00	100.0% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	31.0620	0.00	0.00	100.0%
[LOPTIC] Max dose (Gy)	< 37.5	30.6675	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	30.4026	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.8700	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	Missing ROI		0 *	
Total [24 Metrics]			84.62 *	91.00 *	93.0% *

External Validation Patient4 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 93.0

Plan Quality Scoresheet: Brain_9-23-2015

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 84.76 * / 94.00 * PQM (%): 90.2% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2968	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	28.6937	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.3854	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.2183	1.51	2.00	75.7% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7592	0.66	1.00	65.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.4346	6.00	6.00	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3244	6.69	10.00	66.9% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9496	9.57	14.00	68.3% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2553	3.00	3.00	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.4040	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	25.3706	2.97	3.00	98.9% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.3723	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.2847	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	5.8901	3.00	3.00	100.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	5.9337	3.00	3.00	100.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.5946	1.80	2.00	90.1% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2962	1.57	2.00	78.4% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	29.9796	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	29.5528	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	28.6907	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	32.9164	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	26.5354	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]			84.76 *	94.00 *	90.2% *

External Validation Patient5 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 90.2

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 83.89 * / 94.00 * PQM (%): 89.2% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.2028	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	26.0835	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	34.6540	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3897	1.13	2.00	56.7% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7360	0.62	1.00	62.3% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	14.0567	4.41	6.00	73.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.1309	7.17	10.00	71.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	7.9022	9.79	14.00	69.9% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	30.7013	2.88	3.00	96.1% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	33.2445	2.92	3.00	97.3%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	10.8851	3.00	3.00	100.0% [ROI Synonym]
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.7354	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.5232	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	5.9125	3.00	3.00	100.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	5.7369	3.00	3.00	100.0% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.1297	1.96	2.00	97.8% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	3.9385	2.00	2.00	100.0% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	31.5430	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	31.8441	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	29.4566	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	34.0101	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	11.4113	0.00	0.00	100.0% [ROI Synonym]
Total [24 Metrics]		83.89 *		94.00 *	89.2% *

External Validation Patient6 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 89.2

Plan Quality Scoresheet:**Brain_9-23-2015**

This is the Plan Quality results spreadsheet for Plan Quality Algorithm: Brain_9-23-2015.

Raw PQM / Max PQM: 83.77 * / 94.00 * PQM (%): 89.1% *

Plan Quality Metric Component	Objective(s)	Result	Raw Score	Max Score	Performance Comments
[PTV_WB] V[30.0Gy] (%)	> 90 [≥ 95]	95.1974	10.00	10.00	100.0% [ROI Synonym]
[PTV_WB] D[98.0%] (Gy)	> 22.5 [≥ 25]	27.3130	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] D[2.0%] (Gy)	< 40 [≤ 37.5]	33.4708	13.00	13.00	100.0% [ROI Synonym]
[PTV_WB] Homogeneity Index [30.0Gy]	< 0.9 [≤ 0]	0.3177	1.29	2.00	64.7% [ROI Synonym]
[PTV_WB] Conformation Number [28.5Gy]	> 0.3 [≥ 1]	0.7735	0.68	1.00	67.6% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[0.03cc] (Gy)	< 17 [≤ 13]	12.9056	6.00	6.00	100.0% [ROI Synonym]
[HIPPOCAMPUS_TOTL] Mean dose (Gy)	< 12 [≤ 8]	9.3721	6.57	10.00	65.7% [ROI Synonym]
[HIPPOCAMPUS_TOTL] D[100.0%] (Gy)	< 10 [≤ 7]	8.0372	9.16	14.00	65.4% [ROI Synonym]
[CHIASM] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.3854	3.00	3.00	100.0% [ROI Synonym]
[BRAINSTEM] D[0.03cc] (Gy)	< 37.5 [≤ 33]	32.7517	3.00	3.00	100.0%
[CORD] D[0.03cc] (Gy)	< 37.5 [≤ 25]	14.6901	3.00	3.00	100.0%
[LOPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	29.2894	3.00	3.00	100.0% [ROI Synonym]
[ROPTIC] D[0.03cc] (Gy)	< 37.5 [≤ 30]	28.9716	3.00	3.00	100.0% [ROI Synonym]
[LEYE] Mean dose (Gy)	< 15 [≤ 6]	6.5365	2.82	3.00	94.0% [ROI Synonym]
[REYE] Mean dose (Gy)	< 15 [≤ 6]	6.2796	2.91	3.00	96.9% [ROI Synonym]
[LLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[RLACRIMAL] Mean dose (Gy)	< 20 [≤ 10]	Missing ROI		3 *	
[LLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	5.2345	1.59	2.00	79.4% [ROI Synonym]
[RLENS] D[0.03cc] (Gy)	< 10 [≤ 4]	4.7264	1.76	2.00	87.9% [ROI Synonym]
[CHIASM] Max dose (Gy)	< 37.5	30.7111	0.00	0.00	100.0% [ROI Synonym]
[LOPTIC] Max dose (Gy)	< 37.5	30.1139	0.00	0.00	100.0% [ROI Synonym]
[ROPTIC] Max dose (Gy)	< 37.5	29.4898	0.00	0.00	100.0% [ROI Synonym]
[BRAINSTEM] Max dose (Gy)	< 37.5	33.3533	0.00	0.00	100.0%
[CORD] Max dose (Gy)	< 37.5	15.5649	0.00	0.00	100.0%
Total [24 Metrics]		83.77 *		94.00 *	89.1% *

External Validation Patient7 PQM RapidArc, 4 arc, final model, final auto-created optimization objectives = 89.1

Annex O: Acknowledgements

Manual plans created by Anthony Magliari, MS CMD and Vanessa Magliari CMD

Model generated plans created by Anthony and Vanessa Magliari and Robert Foster MS DABR CMD

Non Hippocampus OAR Contours verified and corrected by Robert Foster

External Verification plans created by Robert Foster

Clinical Description document created by Anthony Magliari and Robert Foster

RapidPlan Model created in Eclipse v13.5, Varian Medical Systems

PQM Scorecards created with PlanIQ (formerly Quality Reports), Sun Nuclear Corporation

Special Thanks to:

Charles Holcombe, MS

Greg Robinson, MS CMD

Helen Phillips, MHA

Annex P: Release, distribution and compatibility

This RapidPlan model is released under the General Public License (GPL) and is free to use. Modifications to the model should be shared for the benefit of the community; however, the sharing requirement will not be enforced.

This RapidPlan model is to be distributed exclusively via the links found on OncoPeer (www.oncopeer.com), please do not re-distribute this model as number of downloads will be tracked from the links on OncoPeer (strictly to judge the success of this project).

This RapidPlan model was created and tested with Eclipse v13.5 but is also compatible with Eclipse v13.6 and v13.7+.