RAYPLAN 2024A

Release Notes

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Disclaimer

Japan: For the regulatory information in Japan, refer to RSJ-C-02-003 Disclaimer for the Japanese market.

Declaration of conformity

CE 2862

Complies with Medical Device Regulation (MDR) 2017/745. A copy of the corresponding Declaration of Conformity is available on request.

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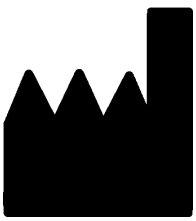
1 INTRODUCTION

1.1 ABOUT THIS DOCUMENT

This document contains important notes about the RayPlan 2024A system. It contains information related to patient safety and lists new features, known issues and possible workarounds.

Every user of RayPlan 2024A must be familiar with these known issues. Contact the manufacturer for any questions about the content.

1.2 MANUFACTURER CONTACT INFORMATION



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1.3 REPORTING OF INCIDENTS AND ERRORS IN SYSTEM OPERATION

Report incidents and errors to the RaySearch support email: support@raysearchlabs.com or to your local support organization via telephone.

Any serious incident that has occurred in relation to the device must be reported to the manufacturer.

Depending on applicable regulations, incidents may also need to be reported to national authorities. For the European Union, serious incidents must be reported to the competent authority of the European Union Member State in which the user and/or patient is established.

2 NEWS AND IMPROVEMENTS IN RAYPLAN 2024A

This chapter describes the news and improvements in RayPlan 2024A compared to RayPlan 2023B.

2.1 RESOLVED FIELD SAFETY NOTICES (FSNS)

There are no resolved field safety notices (FSNs) in RayPlan 2024A.

2.2 NEW AND SIGNIFICANTLY UPDATED WARNINGS

For the complete list of warnings, see *RSL-D-RP-2024A-IFU, RayPlan 2024A Instructions for Use*.

2.2.1 New warnings

WARNING!

Treatment data stored in secondary databases. Do not upgrade secondary databases that hold treatment related data outside of the system connected to RayCare. These secondary databases shall remain in their current schema version.

(824240)

WARNING!

Ensure that all clinically relevant fixation and support ROIs are included in the beam set. By default, all Fixation and Support ROIs will be included in all beam sets. All Fixation and Support ROIs that are included in a beam set will be used for dose computation for the beam set. If a Fixation or Support ROI has been excluded from a beam set, it will be disregarded in the dose computation for that beam set.

Support and Fixation ROIs included in the beam set will be:

- marked with a blue beam set icon in the ROI list
- marked with a checked checkbox in the Fixation and support tab
- shown with solid line style in the 2D patient views
- included in the Material patient view when the beam set is selected.

(713679)

WARNING!

High-dose Technique Type settings. Thresholds should only be set for treatment techniques intended for use with high dose technique types. The thresholds allow a safety control of the treatment machine to be overridden. This could potentially lead to a harmful treatment if the values are set incorrectly. An appropriate Maximum beam MU limit should also be set.

(825142)

2.2.2 Significantly updated warnings

WARNING!

Material visualization. The material view displays the combined voxel densities from image set values and material override. Any material override ROIs inside the External ROI, ROIs of type Fixation and Support included in the selected beam set, and ROIs of type Bolus assigned to the selected beam are included in this density computation. The displayed density values are the voxel densities used for dose computation.

The user is advised to carefully review the material values to ensure that the input to the dose computation is correct.

Note that for Brachy TG43, material visualization is not available. For Brachy TG43 dose computation the entire patient is considered to be water.

2638

WARNING!

Assignment of CBCT density table. For direct usage of the raw CBCT information in dose computation, RayPlan uses an image-specific CBCT density table. Since there is a limited set of density levels specified for a CBCT compared to what is normally specified for a CT, dose computation on CBCT images may be less accurate than using CT images or converted CBCT images. The accuracy of the dose computation using CBCT with an assigned density table relates to the tuning of this table, and how well the real density in the patient maps to the selected densities in the table.

Always review the density table before it is used in dose computation. The review can be performed through spot check of selected slices in the Create Density Table for CBCT dialog where the effect of the density table is visualized.

Dose calculation on raw CBCT image data sets is only supported for photons.

(9355)

WARNING!

Beam models must be validated before clinical use. It is the responsibility of the user to validate and commission all beam models before they are used to create clinical external beam radiotherapy treatment plans.

RayPlan is developed to be used by trained Radiation Oncology professionals. We strongly suggest that users adhere to recommendations published in AAPM TG40, TG142, TG53, TG135, IAEA TRS 430, IAEA TRS 483 and other standards to ensure accurate treatment plans.

Computed dose accuracy depends directly on the beam model quality. Beam model insufficiency may lead to deviations between approved and delivered dose. All parameter values and plan QA and QC shall be reviewed and approved by qualified physicists. The dose calculation must be validated for all commissioned CT machines.

- The computed dose shall be validated for all relevant clinical situations including, but not limited to, variation in SAD, SSD, field-size, field-shape, off-axis position (x, y and diagonal), collimation type, degree of modulation, leakage dose (variation in MU/Gy or NP/Gy), couch/gantry/collimator angles, CyberKnife node sets, patient/phantom material composition and patient/phantom material geometry.
- The computed dose shall be validated for all clinically relevant dose grid resolutions.
- Known limitations are described in the *RSL-D-RP-2024A-REF, RayPlan 2024A Reference Manual*. Additional limits of operation for each beam model must be identified during validation and adhered to during planning.

For photons:

Special care should be taken before using RayPlan with MLC leaves smaller than 5 mm, materials that differ from common patient materials, blocks, small circular cones, wedges (in particular off-axis wedges), complex VMAT plans, rotational plans with small field sizes, Siemens mARC plans and wave arc plans, especially with larger ring rotation than 15 degrees.

Note that:

- a beam model validated for 3D-CRT is not necessarily suitable for IMRT plans.
- a beam model validated for SMLC is not necessarily suitable for DMLC plans.
- a beam model validated for SMLC or DMLC is not necessarily suitable for VMAT plans.
- a beam model validated for VMAT is not necessarily suitable for plans created using sliding window VMAT sequencing.

- a beam model commissioned for one photon dose engine (Collapsed Cone or Monte Carlo) is not suitable for the other dose engine without adaptation of the beam model parameters.

Validation must be performed for each selected treatment technique using Beam 3D modeling or RayPlan. For C-arm and CyberKnife LINACs, see warning 3438. For TomoTherapy treatment machines, see also warning 10172.

For electrons:

Validation must include relevant applicator geometries, field sizes without cutout, field sizes and field shapes with cutout, field shape orientations for rectangular applicators, cutout materials and thicknesses, air gaps to isocenter and D50 water ranges per nominal beam energy. Only Cerrobend cutouts with straight edges, i.e., parallel to the beam axis line, are supported.

(4001)

2.3 CLINICAL GOALS PER BEAM SET OR PLAN

- It is now possible to associate clinical goals to either the plan or a beam set within the plan.
- In the regular planning modules (e.g., Plan optimization), the result of the clinical goal is calculated using the dose given by their association.
- In modules where doses can be compared (e.g., Plan evaluation), clinical goals can still be evaluated against multiple doses at the same time.
- The associations are stored in clinical goal templates. The association can be manually configured when applying the template, similar to how ROIs can be configured.
- The tables in plan and beam set reports have been updated. The clinical goals tables available in reports are 'clinical goals associated to plan', 'clinical goals associated to beam set' and 'clinical goals (evaluation dose)'.

2.4 SELECTION OF FIXATION AND SUPPORT ROI PER BEAM SET

- It is now possible to select Fixation and Support ROIs per beam set. This makes it possible to contour for example multiple couches to be used for different modalities.
- Only selected Fixation and Support ROIs will be included in dose computation, SSD calculation, beam entry validation, dose computations on other image sets and perturbed dose calculations.
- By default, all Fixation and Support ROIs will be included in a beam set.
- When approving a beam set or a plan, only the Fixation and Support ROIs included in the beam set will be included in the approval. Any excluded Fixation and Support ROIs will remain unapproved. All other ROIs and POIs will be approved as usual.

- In the plan report, there is a new table for each beam set displaying the used Fixation and Support ROIs and their material properties.

2.5 PERFORMANCE IMPROVEMENTS

- It is now faster to save a case, especially for patients with a very large number of plans.
- It is now faster to open a planning module, especially when having triangulated ROIs.
- The computation of voxel volumes is now faster. This is detected as faster initial phase of optimization and dose computation when the dose grid has been set or changed.
- *Copy to all* of *Visualization settings* in the ROI/POI details is now faster.

2.6 GENERAL SYSTEM IMPROVEMENTS

- ROI and POI lists are now initially sorted alphabetically.
- Sorting on sub columns is now enabled for some tables. For example, ROI details can be sorted on visualization sub columns.
- Static tables in reports can be configured to be output in landscape orientation.
- The entire toolbar in 3DCRT and VSIM module is now fully visible (there is no need to scroll to see prescription) due to compacted *Aperture shapes* toolbar (labels are removed and icons are moved).
- In the Material patient view, which shows material values on the dose grid resolution, bolus is included when beam dose for a beam with a bolus ROI assigned is selected.
- When loading clinical goal templates or optimization function templates it is now possible to select if existing functions should be replaced. This is similar to the current behavior for loading beam list templates.

2.7 PATIENT MODELING

- Creating structures from a template now has the option to automatically update derived ROIs for all initialization options. Existing protocols will get the default behavior, i.e., to update the derived ROIs when running a protocol with a structure template.
- There is a new option under *Basic shapes* for creation of ellipsoid ROIs.
- There is a tool for segmentation of vessels in lungs.
- Default names for MBS ROIs now follow the TG263 standard.
- Non-uniform expansion and contraction of ROIs have been improved.
    - A new algorithm uses grayscale values at the edges of ROIs to get smoother expansions and contractions. The algorithm is run on GPU.

  - For large ROIs and for large margins the old algorithm is still used, which creates a binary border to the ROI before expansion or contraction. This is to avoid long computation times.

- To delete multiple contours (keeping every n:th) now works in all view directions; transversal, sagittal, coronal and slice aligned (for oblique image sets).
- The floating view in *Image registration* has been updated, and it now works like it did in RayPlan 11A and earlier RayPlan versions.

2.8 BRACHYTHERAPY PLANNING

- Channel numbers are now displayed in the 3D views.

2.9 PLAN OPTIMIZATION

- A *Copy* button has been added to the *Objectives/constraints* tab.
- Function values are no longer automatically computed after final dose.
- The sliding window VMAT sequencing algorithm has been modified to create control points with a gantry spacing of exactly 2 degrees, as opposed to a gantry spacing of maximum 2 degrees.

2.10 GENERAL PHOTON PLANNING

- Support for High-Dose Technique Type.
  - In RayPlan Physics, it is possible to define thresholds for different treatment techniques.
  - During DICOM export, the tag (300A, 00C7) in RTPlan is set to *SRS* for beams where MU exceeds the threshold.

2.11 ELECTRON PLANNING

- It is now possible to compute dose for Varian TrueBeam with HDMLC for applicators larger in the y-direction than the extension of the MLC. (There was an issue stopping this in RayPlan 2023B.)

2.12 PLAN EVALUATION

- The results of the clinical goals are now displayed in separate columns, one for each evaluated dose distribution. Previously, the clinical goals were duplicated on multiple rows.
  - The clinical goals are evaluated against the dose(s) displayed in the 2D patient views, but also against the plan and beam set doses they are associated with. (See *section 2.3 Clinical goals per beam set or plan on page 13* for details on clinical goal association.)
  - The evaluation of the comparison dose(s) is displayed in a separate section within the clinical goals list, named *Comparison*.

2.13 DICOM

- The way RayPlan handles DICOM data when a filter is applied has been updated. Previously, the datasets were passed on to the filter using the same Transfer Syntax as it was received with. This has now been updated so that the Transfer Syntax Implicit VR Little Endian will always be used.
- The population of the DICOM attributes Prescription Description (300A,000E) and Dose Reference Description (300A,0016) has been updated. Previously, default values were used to populate these attributes. For the Dose Reference Description, it is now possible to select between four different default modes for populating the values. This setting can be configured per machine.

  It is also possible to set user defined overrides for both attributes, either in the RayPlan user interface or via scripting.

  This functionality will replace parts of the DICOM filter 'RSL-D-61-393 Modify RTPLAN for Mosaiq'.
- It is now possible to set a dose rate for RayPlan setup beams when using a Linac treatment machine. A new setting for this is available in RayPlan Physics.
- An option has been added to Linac machines to export the Referenced Reference Image Sequence (300A,0016). This sequence contains references to RT Images (DRRs). This option is a temporary solution that will most likely be removed in future versions.
- An issue causing incorrectly exported nominal jaw positions for electron plans where all Applicator IDs are equal in the machine model has been fixed. Correct nominal jaw positions are now exported for this setup. It will also no longer be possible to commission machines with non-unique Applicator IDs. For use cases where this is desired, the setting Export applicator IDs as in the DICOM tab shall be used instead.

2.14 VISUALIZATION

- Relative dose value has been added to Dose cloud visualization.
  - The dose cloud setting (relative/absolute) is linked to the color table. If the color table is relative, '100% equals' text will correspond to 'primary prescription' and if the color table is absolute, it will correspond to 'max dose'.
- The *Show beam parts*, *Volume rendering settings* and *DRR settings* dialogs are now non-modal and no longer block interaction with other parts of RayPlan.
- Beam gantry angle is now displayed in BEV.

2.15 RAYPHYSICS

2.15.1 Electron beam commissioning

- It is now possible to compute dose for Varian TrueBeam with HDMLC for applicators larger in the y-direction than the extension of the MLC. (There was an issue stopping this in RayPlan 2023B.) The solution causes minor changes in dose for larger applicators, compared to previous version. Machine models for Varian TrueBeam with HDMLC should be reviewed.

2.16 RAYPLAN 2024A DOSE ENGINE UPDATES

The changes to the dose engines for RayPlan 2024A are listed below.

Dose engine	2023B	2024A	Requires recommissioning	Dose effect[i]	Comment
All	-	-	-	Negligible	New algorithm for converting ROI triangle meshes into voxel volumes which has negligible effect on computed 3D dose. ROI volumes might be slightly different when comparing with an identical ROI in previous versions of RayPlan.
Photon Collapsed Cone	5.8	5.9	No	Negligible	No changes to the dose engine.
Photon Monte Carlo	3.0	3.1	No	Negligible	No changes to the dose engine.

Dose engine	2023B	2024A	Requires recommissioning	Dose effect[i]	Comment
Electron Monte Carlo	5.0	5.1	No	Negligible, except for Varian TrueBeam with HDMLC where minor changes can be seen, especially for larger applicators.	The platform used for GPU computations in RayPlan (CUDA) has been upgraded to a new version. This has a minor effect on the computed Electron Monte Carlo dose, which due to the statistical nature can be very sensitive to even small disturbances. For dose calculation with low statistical uncertainty, the difference in dose compared to previous version is negligible. An issue has been resolved; it was not possible to compute dose in RayPlan 2023B for Varian TrueBeam with HDMLC for applicators larger in the y-direction than the extension of the MLC. The changes made to fix this issue causes minor changes in dose for larger applicators, compared to previous version.
Brachy TG43	1.4	1.5	No	Negligible	No changes to the dose engine.

i The dose effect (Negligible/Minor/Major) refers to the effect when recommissioning of the machine model is not performed. After successful recommissioning the dose changes should be minor.

2.17 CHANGED BEHAVIOR OF PREVIOUSLY RELEASED FUNCTIONALITY

- Note that RayPlan 11A introduced some changes regarding prescriptions. This information is important if upgrading from a RayPlan version earlier than 11A:
  - Prescriptions will always prescribe dose for each beam set separately. Prescriptions defined in RayPlan versions prior to 11A relating to beam set + background dose are obsolete. Beam sets with such prescriptions cannot be approved and the prescription will not be included when the beam set is DICOM exported.

- Prescription percentage is no longer included in exported prescription dose levels. In RayPlan versions prior to 11A, the Prescription percentage defined in RayPlan was included in the exported Target Prescription Dose. This has been changed so that only the Prescribed dose defined in RayPlan is exported as Target Prescription Dose. This change also affects exported nominal dose contributions.
- In RayPlan versions prior to 11A, the Dose Reference UID exported in RayPlan plans was based on the SOP Instance UID of the RT Plan/RT Ion Plan. This has been changed so that different prescriptions can have the same Dose Reference UID. Because of this change, the Dose Reference UID of plans exported prior to 11A has been updated so that if the plan is re-exported a different value will be used.

- Note that RayPlan 11A introduced some changes regarding Setup imaging systems. This information is important if upgrading from a RayPlan version earlier than 11A:
  - A Setup imaging system (in earlier versions called Setup imaging device) can now have one or several Setup imagers. This enables multiple setup DRRs for treatment beams as well as a separate identifier name per setup imager.
    + Setup imagers can be gantry-mounted or fixed.
    + Each setup imager has a unique name which is shown in its corresponding DRR view and is exported as a DICOM-RT Image.
    + A beam using a setup imaging system with multiple imagers will get multiple DRRs, one for each imager. This is available for both setup beams and treatment beams.

- Note that RayPlan 11B introduced changes in the dose statistics calculations. This means that small differences in evaluated dose statistics are expected when comparing to a prior version.

  This affects:
  - DVHs
  - Dose statistics
  - Clinical goals
  - Prescription evaluation
  - Optimization objective values

  This change also applies to approved beam sets and plans, meaning that, for example, prescription and clinical goals fulfillment may change when opening a previously approved beam set or plan from a RayPlan version prior to 11B.

  The dose statistics accuracy improvement is more noticeable with increasing dose range (difference between minimum and maximum dose within an ROI), and only minor differences are expected for ROIs with dose ranges smaller than 100 Gy. The updated dose statistics no longer interpolates values for Dose at volume, $D(v)$, and Volume at dose, $V(d)$. For $D(v)$,

the minimum dose received by the accumulated volume v is instead returned. For $V(d)$, the accumulated volume that receives at least the dose d is returned. When the number of voxels within an ROI is small, the discretization of the volume will become apparent in the resulting dose statistics. Multiple dose statistics measures (e.g., D5 and D2) may get the same value when there are steep dose gradients within the ROI, and similarly, the dose ranges lacking volume will appear as horizontal steps in the DVH.

- Note that RayPlan 2024A introduces the possibility to associate a clinical goal to either the beam set dose or the plan dose. This information regarding existing plans and templates with clinical goals is important if upgrading from a RayPlan version earlier than 2024A:
    - Physical clinical goals in single beam set plans will now be automatically associated with that beam set.
    - For plans with multiple beam sets, physical clinical goals will be duplicated to ensure all possible associations within the plan. For example, a plan with two beam sets will yield three corresponding copies of each clinical goal: one for the plan and one for each of the two beam sets.
    - Clinical goals defined in templates will be assigned to beam set with name 'BeamSet1'. Users who plan with multiple beam sets are advised to update their templates with the correct association and beam set name.
- It is now possible to exclude Fixation and Support ROIs from a beam set. If an ROI is excluded it will be disregarded when computing dose for the beam set.
- Boli that are not used in any beam will not be displayed in 3D/Room view/DRR/Setup DRR/BEV views.
- The Material patient view which shows material values on the dose grid resolution is more limited in RayPlan 2024A compared to previous versions. The material distribution can now only be seen for beam doses and beam set doses when there is computed dose.
- Between RayPlan 2023B and RayPlan 2024A, an error in the algorithm for centering of imported dose curves in RayPlan Physics has been corrected. In RayPlan 2023B and previous versions, the calculated dose curve center point could sometimes be wrong for noisy profile curves. The measured curves visualized in RayPlan 2024A will use the centering after correction of the error, even when the dose curves were imported in a previous RayPlan version. This applies to both commissioned and uncommissioned machine models. When reviewing a machine model created in a previous version, there may be differences in alignment between measured and computed curves in RayPlan 2024A compared to the alignment in previous RayPlan versions. Only the measured curves might be changed, computed curves will not change. Gamma and dose difference curves will not change either and will show the difference between measured and computed curves as it was in the RayPlan version where the curves were computed.
- The way UIDs are generated for RT Images (DRRs) has been updated. If the same DRR is exported from 2024A or any previous version, different DICOM instances will be created.

- The Dose Reference UID generation was updated in RayPlan 2023B. If a beam set with a prescription is exported in a prior version and a second beam set with a prescription for the same treatment site and dose volume is exported in 2023B or later, the Dose Reference UIDs will not match. RayCare connected patients are not affected by this.
- A limitation on the MLC leaf motion during VMAT optimization has been removed for machines with discrete dose rates.

3 KNOWN ISSUES RELATED TO PATIENT SAFETY

There are no known issues related to patient safety in RayPlan 2024A.

Note: *Additional release notes may potentially be distributed shortly after installation.*

4 OTHER KNOWN ISSUES

4.1 GENERAL

Material distribution can only be seen when dose is computed

When the 2D patient views are set to show mass density in dose grid resolution (material visualization view), the material information is only displayed after a dose has been computed. The user is advised to always examine the material visualization view after dose computation to understand which mass density values the dose has been computed on. It is of special importance in MR-only planning for photons, where the dose computation relies on accurate material override assignment to the External ROI and other relevant structures.

(826963)

The auto recovery feature does not handle all types of crashes

The auto recovery feature does not handle all types of crashes and sometimes when trying to recover from a crash RayPlan will show an error message with the text "Unfortunately auto recovery does not work for this case yet". If RayPlan crashes during auto recovery, the auto recovery screen will pop up next time RayPlan is started. If this is the case, discard the changes or try to apply a limited number of actions to prevent RayPlan from crashing.

(144699)

Limitations when using RayPlan with large image set

RayPlan now supports import of large image sets (>2GB), but some functionality will be slow or cause crashes when using such large image sets:

- Smart brush/Smart contour/2D region growing are slow when a new slice is loaded
- Creating large ROIs with gray-level thresholding might cause a crash

(144212)

Slight inconsistency in dose display

The following applies to all patient views where dose can be viewed on a patient image slice. If a slice is positioned exactly on the border between two voxels, and dose interpolation is disabled, the dose value presented in the view by the "Dose: XX Gy" annotation can differ from the actual presented color, with regards to the dose color table.

This is caused by the text value and the rendered dose color being fetched from different voxels. Both values are essentially correct, but they are not consistent.

The same can occur in the dose difference view, where the difference might seem larger than it actually is, because of neighboring voxels being compared.

(284619)

Cut plane indicators are not displayed in 2D patient views

The cut planes, used to limit the CT data used for computing a DRR, are not visualized in regular 2D patient views. To be able to view and use cut planes, use the DRR settings window.

(146375)

No warning is given when deleting a case containing approved plans

When a patient containing an approved plan is selected for deletion, the user will be notified and given the opportunity to cancel the deletion. However, if a case containing an approved plan is selected for deletion for a patient with multiple cases, no warning will be given to the user that an approved plan is about to be deleted.

(770318)

4.2 IMPORT, EXPORT AND PLAN REPORTS

Import of approved plan causes all existing ROIs to be approved

When importing an approved plan to a patient with existing unapproved ROIs, the existing ROIs can become automatically approved. If this occurs, a UI message is given at import stating that the plan approval status will be transferred to the RTStruct.

336266

Laser export not possible for decubitus patients

Using the laser export functionality in the Virtual simulation module with a decubitus patient causes RayPlan to crash.

(331880)

RayPlan sometimes reports a successful TomoTherapy plan export as failed

When sending a RayPlan TomoTherapy plan to iDMS via RayGateway, there is a timeout in the connection between RayPlan and RayGateway after 10 minutes. If the transfer is still ongoing when the timeout starts, RayPlan will report a failed plan export even though the transfer is still in progress.

If this happens, review the RayGateway log to determine if the transfer was successful or not.

338918

Report Templates must be upgraded after upgrade to RayPlan 2024A

The upgrade to RayPlan 2024A requires upgrade of all Report Templates. Also note that if a Report Template from an older version is added using Clinic Settings, this template must be upgraded to be used for report generation.

Report Templates are upgraded using the Report Designer. Export the Report Template from Clinic Settings and open it in the Report Designer. Save the upgraded Report Template and add it in Clinic Settings. Do not forget to delete the old version of the Report Template.

(138338)

4.3 BRACHYTHERAPY PLANNING

Mismatch of planned number of fractions and prescription between RayPlan and SagiNova

There is a mismatch in the interpretation of the DICOM RT Plan attributes *Planned number of fractions* (300A, 0078) and *Target prescription dose* (300A,0026) in RayPlan compared to the brachytherapy afterloading system SagiNova. This applies specifically to SagiNova versions 2.1.4.0 or earlier. If the clinic is using a version later that 2.1.4.0, contact customer support to verify whether the issue persists.

When exporting plans from RayPlan:

- The target prescription dose is exported as the prescription dose per fraction multiplied by the number of fractions of the beam set.
- The planned number of fractions is exported as the number of fractions for the beam set.

When importing plans into SagiNova for treatment delivery:

- The prescription is interpreted as the prescription dose per fraction.
- The number of fractions is interpreted as the total number of fractions, including fractions for any previously delivered plans.

Possible consequences are:

- At treatment delivery, what is displayed as prescription per fraction on the SagiNova console is actually the total prescription dose for all fractions.
- It might not be possible to deliver more than one plan for each patient.

Consult with SagiNova application specialists for appropriate solutions.

(285641)

4.4 PLAN DESIGN AND 3D-CRT BEAM DESIGN

Center beam in field and collimator rotation may not keep the desired beam openings for certain MLCs

Center beam in field and collimator rotation in combination with "Keep edited opening" might expand the opening. Review apertures after use and if possible use a collimator rotation state with "Auto conform".

(144701)

4.5 PLAN OPTIMIZATION

No feasibility check of max leaf speed performed for DMLC beams after dose scaling

DMLC plans that result from an optimization are feasible with respect to all machine constraints. However, manual rescaling of dose (MU) after optimization may result in violation of the maximum leaf speed depending on the dose rate used during treatment delivery.

(138830)

4.6 CYBERKNIFE PLANNING

Verifying deliverability of CyberKnife plans

CyberKnife plans created in RayPlan may, for about 1% of the cases, fail the deliverability validation. Such plans will not be deliverable. The affected beam angles will be identified by the deliverability checks that are run at plan approval and plan export.

(344672)

4.7 RAYPHYSICS

Updated recommendations for detector height usage

Between RayPlan 11A and RayPlan 11B, recommendations on the usage of detector height and depth offset for depth dose curves have been updated. If the previous recommendations were followed, the modeling of the build-up region for photon beam models could lead to surface dose overestimation in computed 3D dose. When upgrading to a RayPlan version newer than 11A, it is recommended to review and, if needed, update photon beam models with respect to the new recommendations. Refer to section *Detector height and depth offset* in *RSL-D-RP-2024A-REF, RayPlan 2024A Reference Manual*, section *Depth offset and detector height* in *RSL-D-RP-2024A-RPHY, RayPlan 2024A RayPlan Physics Manual* and *RSL-D-RP-2024A-BCDS, RayPlan 2024A Beam Commissioning Data Specification* for information about the new recommendations.

(410561)

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RayPlan 2024A Release Notes

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