The purpose of this document is to describe the radiation oncology data migration process from IMPAC Multi-ACCESS™/Elekta MOSAIQ®/Siemens LANTIS™ (third-party database) to the ARIA® oncology information system. The Third-Party Database Migration with Analytics service allows customers to have data from a single, third-party database migrated to a new or existing single ARIA system. The analytics option allows the ARIA Unified Reports Application (AURA) data warehouse to be populated with discrete RT data from the third-party system. Data from the AURA data warehouse can be viewed in a subset* of stock as well as customized AURA reports and InSightive™ analytics† dashboards. This document also identifies considerations/limitations of the migration process and is divided into sections as follows:

- Process for data transfer
- Supported data elements and transfer techniques
- Data fields to be transferred into ARIA and AURA data warehouse
- Data fields not transferred
- Important notes

* A full list of supported stock reports and dashboards is available in the Customer Release Note available on myVarian.
† InSightive Analytics licenses need to be purchased separately.

Process for data transfer

The migration process relies on cooperation between the assigned data migration analyst and the customer. It is recommended that the customer provides one person (preferably with clinical, decision-making ability) to act as a point of contact for the migration analyst. This person must be able to perform and/or delegate client-side tasks necessary to the migration process.

The migration process is performed remotely using the SmartConnect® technology solution. The customer should ensure that Varian can install SmartConnect to allow remote access to both test and production environments.

At a high level, the process is separated into a few distinct phases. First, a pre-migration analysis of the third-party database is performed by the migration analyst. A report is generated which is provided to the customer and a meeting is scheduled to review the report. The report contains information about the third-party database, as well as a list of edits necessary to bring over the largest percentage of data possible. These edits are necessary due to several structural differences between the third-party data source and the target ARIA system. The edits
to the third-party data must be performed by the customer. Completion of these edits is very important to the project overall, as certain milestones rely on the completion of this step.

Next the migration analyst performs a test migration of the various elements (patient demographic data, RT data, etc.). Testing work is completed using a copy of the third-party database loaded onto the ARIA test system (T-Box). After the test migration is complete, the customer must thoroughly review the results within ARIA on the T-Box. This is an iterative process — the customer gives the migration analyst feedback regarding the test migration, and the analyst may repeat portions of the test migration to resolve issues. This process repeats until the customer is satisfied with the test migration and gives approval to proceed.

Finally, the migration of third-party data into the ARIA system will be carried out according to a project-specific timeline. The migration analyst and Varian project manager work together to create a detailed timeline and track progress during regular project calls. Since the process operates on copies of the third-party system, the customer must be finished entering data into the third-party system before data can be migrated to the production environment.

**Supported data elements and transfer techniques**

The following elements are transferred into the ARIA database using FHIR (Fast Healthcare Interoperability Resources):

- Demographics
- Referring physician master file
- Diagnosis and staging (Detailed diagnosis data is included with the RT Report.)

RT data is consolidated into a PDF-based report and is transferred using Varian’s web service platform. The report is attached to the patient’s chart and is accessible within the documents workspace of ARIA.

RT data is also transferred as discrete data fields to the AURA data warehouse.

Patient documents and clinical notes are transferred using Varian’s web service platform and will be visible within the ARIA documents workspace.

**NOTE regarding documents:** The database analyst will provide a list of document types stored in the third-party system – the customer (normally working with a Varian clinical consultant) must use this list to create a mapping document to specify which document types in the third-party database map to equivalent document types in ARIA.

**NOTE regarding clinical notes:** Clinical notes are combined (sorted by date and note type) and stored in ARIA as a single document per patient.

**NOTE regarding referring physician transfer:** If IEM/ARIA Connect interfaces are implemented or if there is a pre-existing library of referring physicians, the referring physician ID coming from the third-party database must match the ID coming through the interfaces and/or the ID that is already present in the existing library. If the IDs from the third-party database do not meet this requirement, an import of this data will lead to incomplete or duplicate referring physician records.
Data elements transferred into ARIA as discrete fields

### Demographics
- Name
- Address
- Home phone
- Business phone
- Date of birth
- Patient IDs (1 primary + 5 alternate IDs)
- Social security number (SSN)
- Sex
- Race
- Marital status
- Religion
- Patient ID photo (one photo per patient, source files must be: JPEG, TIFF, BMP or PNG)
- Physician
- Attending physician name
- Attending physician ID
- Referring physician name
- Referring physician ID

### Next of kin
- Name
- Address
- Phone
- Relationship
- Emergency contacts are brought over as a next of kin with type Emergency

### Diagnosis/staging
- ICD9 or ICD10 diagnosis code
- Date of diagnosis
- Diagnosis rank
- TNM stage (Non-standard TNM staging data not supported)

### Patient clinical notes
- Note type
- Subject
- Author
- Editor
- Creation date
- Note text

### Escribe and Escan documents
- Patient
- Provider who dictated document (author)
- Document type
- Date of service
- Provider who approved document (if any)
- Document (.doc, .rtf, .tif, .jpeg, .pdf and .bmp)

### Data elements transferred within the RT Report PDF document

#### Base demographic record
- Patient IDs (5 base IDs + SSN)
- Patient name
- Hospital name
- Clinical status
- Sex
- Date of birth
- Referring physician
- Attending physician
- Photo (source files must be: JPEG, TIFF, BMP or PNG)

#### Diagnosis
- Diagnosis date
- Diagnosis code
- Confirmation status
- Description
- Category
- Morphology
- TNM
- Stage
- Primary site

#### Treatment summary
- Plan name
- Technique
- Treatment start date
- Treatment end date
- Number of days under treatment
- Fractions treated
- Dose delivered
Reference point summary
• Plan name
• Contributing field
• Coefficient

Plan summary
• Plan name
• Course
• Intent
• Planned dose per fraction
• Approval user
• Approval date
• Notes
• Dose delivered to date

Plan details
• Plan name
• Fraction pattern
• Planned number of fractions
• Planned dose per fraction
• Last modified user
• Last modification date
• Fractions delivered
• Dose delivered

Field summary
• Field name
• Machine name
• MLC leaves
• Energy
• Beam type
• MU

Field details
• Field name
• MU
• Source to surface distance (SSD)
• Tolerance
• Dose
• Source to axis distance (SAD)
• Approval user
• Approval date

• Last modified user
• Notes
• Beam type
• Modality
• Dose rate
• Port image planned MU
• Port image open MU
• Port image delta
• Wedge
• Block
• Applicator
• Compensator
• Bolus
• Gantry angle
• Gantry direction
• Collimator angle
• Field Type X
• Field Type Y
• Field Size X
• Field Size Y
• Collimator X1, X2
• Collimator Y1, Y2
• MLC A (values)
• MLC B (values)
• Arc stop
• Couch vertical
• Couch lateral
• Couch longitudinal
• Couch isocenter angle
• Couch ECC angle

Treatment history (1 line per treatment)
• Plan name
• Field name
• Treatment date
• Treatment time
• MU
• Fraction number
• Dose delivered
Data fields not transferred to ARIA, AURA data warehouse or in the PDF RT Report

- Treatment image data
- DRRs
- Field photos
- Billing data
- In-vivo dosimetry data
- Insurance data
- Current medication list
- Clinical assessments
- Vital signs data
- Lab data

Important notes

- The T-Box needs to be configured as part of the Varian clinical network and support:
  - Communication from T-Box to database server on port 1433 for Microsoft® SQL server
  - File sharing from production servers to T-Box and vice versa
  - FHIR communications from T-Box to production servers on port 44350
  - Communication from T-Box to the ARIA web server on ports 56001 and 55051
- The T-Box and production environments must be accessible remotely through SmartConnect.
- A copy of Microsoft® Word™ and Adobe® Reader® must be installed on the T-Box to open documents and reports for verification during the testing process.
- The AURA data warehouse server will need disk space provisioned over and above the base AURA database server requirement to accommodate the addition of third-party data and to permanently house the staging copy of the third-party database. Final space requirements cannot be determined until Varian has received a copy of the third-party database for processing.
- The staging copy of the third-party database must be backed up to preserve it for future AURA maintenance requirements
- The Analytics option is not available for customers using the enterprise data warehouse (EDW).

Decisions and actions

- The data migrated into ARIA is not the legal record of treatment. The original third-party database or charts must be archived and will remain the legal record of treatment.
- It must be determined which system has the master copy of ADT data (third-party database or ARIA). That is, it needs to be established if the third-party system will overwrite any existing base demographic records in ARIA.
- A prerequisite of all migrations is that the source database contains a consistent and unique patient ID scheme. If the migration is to an existing Eclipse™ treatment planning system/ARIA system or if IEM/ARIA Connect interfaces are implemented, the patient ID scheme of the source system must not clash or overlap with the existing patient population. Failing to reconcile patient IDs will result in duplicated or errant merges of patient records.
- It is the responsibility of the customer to reconcile all issues identified in the pre-migration report, as well as any issues raised during the testing phase. Varian cannot reconcile erroneous or missing data in the third-party database and Varian cannot move forward with the production migration until all issues have been resolved.
- Treatment plans for active patients must be manually re-planned and verified according to the treatment planning switchover process during the cutover to ARIA.

Data

- Only the latest plan revision is migrated.
- All migrated data is flagged as completed and cannot be used directly for treatment delivery.
- There is a possibility of a plan name clash, which would result in what may look like a plan revision in reports.
- Reference points between existing data and imported data cannot be linked. Cumulative dose across all reference points will still be accurate.
- Differences in handling of prescriptions, referred to as field-level scheduling:
  - In the third-party database, you can make changes to a field independently from the prescription the field is assigned to. In ARIA, a change to the field results in a new prescription.
  - Example: Two fields are each prescribed to receive 200 cGy. After two fractions, a change is made to the field size, resulting in two new fields. When this data is converted, all fields are converted, resulting in a prescription with four fields, each receiving 200 cGy. ARIA expects each field to be treated every fraction, so the prescription is recalculated based on four fields receiving 200 cGy for every fraction.
  - It is important to note that the delivered dose is tracked accurately.
- The third-party database’s storage of the treatment session may result in a rounding error.
- In the third-party database, a treatment stores the MUs delivered, but stores an approximation of the cGys delivered. In some cases, this may result in a slight rounding error upon conversion.
- For example, the treatment history may display a value of 179.9 cGy delivered, instead of 180. Over the course of many fractions delivered, this may result in a difference of a few cGy.
- The customer will be provided with a list of affected patients prior to the production migration.

**Limitations of migrating non-linac- and/or non-gantry-based field and treatment data:**

- Brachytherapy (LDR, HDR, injections, implants) can only be migrated if they have been entered into the third-party database as gantry-based external beam fields. These fields will appear in ARIA as if external beam therapy was used.
- The ability to migrate CyberKnife®, proton and cobalt therapy fields also depends on the existence of gantry-based linac data in the source system. These fields will appear in ARIA as linac, gantry-based fields.
- Mismatch of total dose per plan between AURA and third-party database in Reference Point History report. This is isolated to cases where fields have been shared across plans and multiple reference points. The migration analyst will provide the customer with a list of patients affected by this issue prior to migration.
  - Lantis version 4 is not supported for the Analytics option, but can be migrated with the RT PDF Report alone (Accelerated Migration).
  - All imaging sessions will be marked as “PORT” in AURA reports populated with data from the Analytics option.
  - Accessories (wedge, applicator, compensator), reference image indicator and overrides are not available in AURA reports populated with data from the Analytics option.
  - Courses will not be linked to diagnosis in AURA reports populated with data from the Analytics option.
  - Discrete RT treatment data is not available directly in ARIA workspaces or AURA “Live Reports”, because migrated RT data resides in the AURA data warehouse.
  - Legacy “Report Manager” reports are not supported, because ARIA rather than AURA is the data source for these reports.

**Medical Advice Disclaimer**
Varian as a medical device manufacturer cannot and does not recommend specific treatment approaches. Individual treatment results may vary.