Instructions for Use

IN THIS ARTICLE

ProKnow DS is a cloud-based RT-PACS (Radiation Therapy Picture/Patient Archiving and Communication System). This article describes how and when you should use ProKnow DS as well as the requirements for using the system within its defined operating conditions.

- Indications for Use

- Intended Uses

- User Responsibilities

- Additional Instructions for Use

- Support

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Indications for Use

ProKnow DS is a patient data archive, information management, and analytics software system with a focus on the data and images specific to radiation oncology patients. Users may upload digital patient data created by other devices to ProKnow DS to securely archive, display, and analyze the data. Users can view and navigate patient images, drawn anatomy, calculated dose, and plan details derived from the source files. Users can create or edit anatomy structures to be used either prospectively (e.g., as an input to treatment planning) or retrospectively (e.g., for data analysis, research, and outcomes studies). Users can extract metrics for any single patient, or across a collection of patients, then view results as tables or graphically. ProKnow DS is to be used as an accessory system to perform data archive, review, and analysis, and is not to be used for diagnosis, treatment, or as the sole form of plan approval.

Users of ProKnow DS should be trained medical professionals including, but not limited to, radiologists, oncologists, physicists, medical technologists, dosimetrists, and physicians. Users should be familiar with the different sources of input data (such as images, structure sets, treatment plans, and calculated dose) as well as how to understand and interpret derived metrics (e.g., dose-volume histograms).

CAUTION: Unites States federal law restricts this device to sale by or on the order of a physician.

Intended Uses

The specific intended uses of ProKnow DS are summarized below:

1. ProKnow DS provides a scalable and secure data archive for binary digital imaging and communications in medicine (DICOM) data with a focus on radiotherapy (DICOM RT). The input data objects are created by other medical devices and uploaded to ProKnow DS for storage and processing. These input medical devices may include imaging systems, manual and auto-contouring systems, treatment planning systems, and other medical software/devices that output applicable data.

2. ProKnow DS has an interactive viewer that can be used to display and analyze patient data such as images (e.g., CT and MR), contoured anatomical structures, treatment plan information, calculated radiation dose grids, and dose volume histograms (DVH).

3. ProKnow DS provides anatomy contouring tools for the purpose of (1) creating new anatomy structure sets (i.e., a set of user-defined anatomy contours) and (2) editing structure sets created by another system and uploaded to ProKnow DS. The users' new or edited structure sets can be downloaded in the industry standard DICOM RT Structure Set format to serve as an input to other software systems.

4. ProKnow DS allows the user to create lists of user-defined metrics, and optionally per-metric performance objectives, which can be extracted and viewed per patient dataset. Metrics can be of two types: (1) derived, which are metrics extracted from the input DICOM objects or computed DVH data, and (2) custom, which are user-defined text or numeric fields and their user-supplied values. Tabulated results are displayed and can be used to facilitate and standardize tasks such as plan evaluation and peer review.

5. ProKnow DS allows the user to define and track "collections" of patient datasets (i.e., cohorts) from which metrics from all patients in the collection can be extracted and analyzed as a population using interactive graphical tools such as histograms and scatterplots.

User Responsibilities

It is the responsibility of those utilizing this application to ensure all that all usages of this product relating to patient treatments are performed by trained and qualified personnel and that such personnel are aware that the quality of any generated patient data is highly dependent on the quality and correctness of the input data. If any questions or uncertainties exist regarding the quality, units, or identification of input data, they must be investigated and resolved before the data are used. **It is the user's responsibility to validate the correctness of all patient data within the context of their normal treatment planning workflow**. This general liability on the end users should be understood and communicated to all users, and a representative with signatory authority from each organization using ProKnow DS must sign an *End User License Agreement* on behalf of the organization indicating understanding of the responsibilities for quality, accuracy, and security described herein.

CAUTION: It is critical that all users read these Instructions for Use and the associated support material carefully and completely and consult the provided Online Help and other training materials to ensure proper use of the application and proper interpretation of results.

Additional Instructions for Use

The remainder of the instructions for use are separated into respective sections of the following document.

- System Requirements

- Cybersecurity Requirements

- Coordinates and Units of Measures

- Known Limitations

- Release Notes

Support

For questions, comments, support requests, bug reporting, or to schedule a training session, please contact our customer support team at: support@proknow.com. We believe we can provide the most effective assistance via email versus the phone. The main reasons for this are as follows:

- With email support we can thoroughly investigate an issue before replying without putting you on hold.

- With email support we are able to join forces with other engineers to get to the bottom of a tricky issue or question. This is much harder with phone support and our 100% remote team.

- With email support we can easily respond to an email sent outside of our business hours. Following up with voice messages can often become a game of phone tag.

- With email support we have access to entire threads of conversation that we use to continuously improve our products and services. Generally with phone support, only a limited number of notes are available.

About

ProKnow DS is developed by Elekta.

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These Instructions for Use are available in English. Should you require printed versions, please request materials from your local Elekta service organization. Alternatively, you may also download a printable PDF copy of these Instructions for Use at any time from the Release Notes support article.

The MD symbol on the About ProKnow DS dialog in the ProKnow DS application indicates that the product is a Medical Device. To access a complete glossary of symbols, please visit ElektaCareCommunity.com.

Product UDI: (01)00860000358705

System Requirements

> ## IN THIS ARTICLE
>
> The purpose of this document is to provide an indication of the minimum and recommended system requirements to be able to access ProKnow DS.
>
> - Internet Reliability
>
> - Supported Browsers
>
> - Hardware Requirements
>
> - Mobile Devices

Internet Reliability

It is critical that users maintain sufficiently performant and reliable internet connectivity while using ProKnow DS. The Hardware Requirements section below lists specific download and upload recommendations, however, the reliability of the internet connectivity is also very important. ProKnow DS has been designed to be resilient to internet connectivity issues, however, it is impossible to predict all side-effects when operating with an unreliable internet connection. As such, it is important that all users are made aware that it is their responsibility to verify the correctness of data entered or uploaded into the system, especially in the event of an internet connectivity issue while working in ProKnow DS.

Supported Browsers

The ProKnow DS application is a browser-based (i.e., web-based), client-side application that utilizes the latest HTML5 and JavaScript capabilities to achieve a high-performance, interactive user experience. Since ProKnow is browser-based, there is no need to download and install any additional local software beyond a supported internet browser. In order to maintain a safe and consistent operating experience, however, ProKnow DS limits official support to the latest versions of the following browsers:

- Google Chrome

- Mozilla Firefox

These browsers were selected for their consistently high performance, support of key web technologies, cross-platform availability, and cost (both are free). While other modern browsers (Microsoft Edge, Apple Safari, etc.) may function properly while using ProKnow DS, we make no guarantee of performance, stability, or accuracy while using an unsupported browser. Furthermore, in order to obtain technical support for ProKnow DS, all users must be using one of the officially supported browsers.

Hardware Requirements

Despite being a web-based application, ProKnow DS performs computationally intensive visualization and processing of patient data. As such, it is important that the underlying system used to access the application is able to adequately perform the necessary operations. In addition, it is important to have a reliable and sufficiently fast internet connection while using ProKnow DS. The following hardware specifications represent our **minimum** suggested requirements:

Operating Systems	Windows 7, Windows 10, and macOS High Sierra
Processor	Dual Core 2.2+ GHz Intel or equivalent processor
Memory	8 GB
Video	WebGL compatible graphics card
Display	1280 x 800 effective display resolution (1900 x 1080 recommended)
Internet Download	30+ Mbps high speed internet connection
Internet Upload	5+ Mbps upload
Input Device	Pointer-based interface (i.e., non-touch)

Mobile Devices

The prevalence of mobile devices (e.g., phones and tablets) makes it important to note that although we do not prevent access to ProKnow DS from mobile devices, any device used to access ProKnow DS MUST meet all minimum System Requirements in order to be supported. The most notable requirement that many phones and tablets will not meet is the minimum effective display resolution. Please note that effective display resolution is different than the native resolution of the display. Many devices are designed with high density displays (e.g., retina displays) that have a native resolution of 2 or 4 times the effective display resolution. Given the amount of information displayed while using ProKnow DS, the effective resolution of the device must meet or exceed the specifications listed above in order to properly render all of the content at one time. Another requirement that many mobile devices will not meet is that the primary input device MUST support a pointer-based interface (not touch-based). Touch-based interfaces are difficult to accurately interpret when performing high-accuracy operations such as contouring. Although these two requirements will prevent most mobile devices from meeting the system requirements, there are modern tablets (e.g., Microsoft Surfaces) that are 100% compatible with the minimum requirements and would therefore be fully supported.

Known Limitations

Below are listed the known application limitations, defects, or inconsistencies.

Importing

- ProKnow DS currently supports exporting structures that are closed and located on a single plane; it will not export any ROIs with 'Contour Geometric Type' (3006,0042) set to `POINT`, `OPEN_PLANAR`, or `OPEN_NONPLANAR`. ProKnow DS will read these contour sequences, however, if you edit the structure set, any newly generated RT Structure Set files will only include ROIs with 'Contour Geometric Type' (3006,0042) of `CLOSED_PLANAR` (all other contour data will be omitted).

Coordinates and Units of Measure

The following is a list of several important items that users should understand in regards to the information displays in ProKnow:

- ProKnow exclusively uses the IEC Patient coordinate system for displaying position information.

- All linear dimensions are shown in millimeters (mm), unless otherwise noted.

- All angular dimensions are shown in degrees (deg), unless otherwise noted.

- All volume measures are shown in cubic centimeters (cc), unless otherwise noted.

- All radiation dose quantities are shown in Gray (Gy), unless otherwise noted.

- All date/time values are provided in a locale specific format based on the current user's browser settings.

2022-06-10

Cybersecurity Requirements

IN THIS ARTICLE

ProKnow DS is a cloud-based RT-PACS (Radiation Therapy Picture/Patient Archiving and Communication System), and as such, understanding the importance of Cybersecurity and the responsibility shared between ProKnow and the end user is critical to using the software in a safe and secure manner—especially when storing Patient Health Information (PHI) and/or Individually Identifiable Health Information (IIHI) in ProKnow DS. This article describes both the approach taken to Cybersecurity as well as the recommended cybersecurity controls for the intended use environment.

- Shared Responsibility

- Principle of Least Privilege

- Workstation Security

- Password Safety

- Multi-Factor Authentication

Shared Responsibility

ProKnow DS is built on Microsoft Azure, and follows Azure security best practices pertaining to the design of its network architecture and access model. As a cloud-based vendor, it is our responsibility to design, develop, and deploy a secure system to help protect the confidentiality of both our customers and their patients. However, **realizing a secure, cloud-based environment is ultimately a shared responsibility shared between ProKnow and our customers**. ProKnow can relieve customers' operational burden as it pertains to managing the information technology infrastructure, but it is the customer's responsibility to employ responsible access rights, manage the security of individual client workstations (including the operating systems and browsers used to access ProKnow DS), and ensure that their users have the necessary training related to safe computer usage. This article describes the recommended and suggested cybersecurity controls that should be employed by organization administrators and users of ProKnow DS to ensure a safe and secure environment.

Principle of Least Privilege

The principle of least privilege (PoLP, also commonly referred to as the principle of minimal privilege or the principle of least authority) requires that within a particular environment, every agent (such as a process, a user, or a program, depending on the subject) must be able to access only the information and resources that are necessary for its legitimate business purposes. Practically speaking, this principle implies that user accounts should only be granted access to the specific functions that they require to perform their assigned job duties.

ProKnow DS manages the access and permissions of users via its Identity and Access Management services—specifically through the use of Users, Roles, and Workspaces. In this respect, it is the responsibility of the organization administrator to ensure that the organization's users are only granted the necessary privileges that are essential to performing their intended functions. For example, the ability to create API Keys should be restricted to users who have demonstrated that they understand the importance of securing any API Keys that they create for their account.

Workstation Security

It is important to understand that a system is only as secure as the **least secure** component in the system. Imagine that you are in a public place working on sensitive information on your laptop. What is more likely: that a hacker halfway across the world is able to intercept and decode your network packets or that the person sitting behind you looks over your shoulder at your computer screen? This simple example illustrates the importance of being aware of basic workstation security. Workstation security involves being mindful of simple but critical safety measures related to your physical workstation. All personnel using ProKnow DS should be aware of and abide by the following guidelines and best-practices:

- Do not open, browse, or compose content in ProKnow DS in public areas where it would be easy for others to eavesdrop. If you need to use ProKnow DS in a public area (or on a public web meeting), use Anonymized Mode to temporarily hide PHI from the user interface.

- Do not open, browse, or compose content in ProKnow DS while connected to insecure or public wireless networks.

- All computing devices used to access ProKnow DS should be secured with a password-protected screensaver with the automatic activation feature set to 10 minutes or less.

- Users should be instructed to always lock the screen or log off when leaving a device unattended.

In addition to utilizing proper secure workstation behavior, it is also critical that:

- All client workstations used to access ProKnow DS are up to date with necessary operating system security patches and updates,

- All client workstations utilize one of the supported browsers and that all browsers are updated to the latest version,

- All client workstations employ sufficient anti-virus and malware protection to ensure that client operations or behavior is not compromised.

Ultimately, it is the responsibility of each user to employ safe computer-use practices to help ensure that the entire system remains secure.

Password Safety

The easiest way to secure your accounts is to ensure your users utilize strong, unique passwords for all of their accounts. Strong passwords are long—the more characters you have the stronger the password. It is

recommended that a minimum of 14 characters be used in each of your passwords. In addition, the use of passphrases (passwords made up of multiple words) is highly encouraged. Examples include "It's time for vacation" or "block-curious-sunny-leaves". Passphrases are both easy to remember and type, yet meet the strength requirements. Poor or weak passwords have the following characteristics:

- Contain less than eight characters.

- Contain personal information such as birthdates, addresses, phone numbers, or names of family members, pets, friends, companies, and fantasy characters.

- Contain alphabetical, numerical, or key patterns such as `aaabbb`, `qwerty`, `zyxwvuts`, or `123321`.

- Are some version of `Welcome123`, `Password123`, `Changeme123`, etc.

For an overview of the characteristics of a strong password, see Implement Proper Password Strength Controls on the OWASP website. NIST recommends a minimum character length of 8, and suggests that length is a better indicator of strength than complexity. In addition to constructing sufficiently strong passwords, it is important to keep in mind the following additional aspects of password safety:

- Passwords must not be shared with anyone, including supervisors and coworkers. All passwords are to be treated as sensitive, confidential information.

- Passwords must not be inserted into email messages or other forms of electronic communication, nor revealed over the phone to anyone.

- Passwords should only be stored in approved "password managers" with sufficient encryption protection.

ProKnow DS provides two methods to enforce password safety across your organization. The first is through requiring sufficiently strong passwords during user creation. ProKnow DS allows each organization to configure their required password strength to 3 different levels:

- **Fair**: at least 8 characters including a lower-case letter, an upper-case letter, and a number.

- **Good**: at least 8 characters including at least 3 of the following 4 types of characters: a lower-case letter, an upper-case letter, a number, a special character (such as !@#$%^&*).

- **Excellent**: at least 10 characters including at least 3 of the following 4 types of characters: a lower-case letter, an upper-case letter, a number, a special character (such as `!@#$%^&*`). Not more than 2 identical characters in a row (e.g., `111` is not allowed).

By default, ProKnow DS is configured to require all passwords to be at least "Fair" strength, however, you may contact ProKnow DS support at any time to change the password requirements for your organization.

The second method that can be used to enforce password safety is to utilize a federated login system (e.g., SAML 2.0). By leveraging a federated login system, your organization is able to completely control the management of the password requirements (including expiration) as well as access rules. Oftentimes this

also has the added benefit that your users will be able to use their existing network credentials to access ProKnow DS. In order to use a federated login system, it must be a supported identity provider. Once you've confirmed that your login system is supported, you may contact ProKnow DS support to integrate your identity provider with your ProKnow DS account.

Multi-Factor Authentication

MFA, sometimes referred to as two-factor authentication or 2FA, is a security enhancement that allows you to present two pieces of evidence, i.e., your credentials, when logging in to an account. Your credentials fall into any of these three categories: (1) something you know (like a password or PIN), (2) something you have (like a smart card or phone), or (3) something you are (like your fingerprint). Your credentials must come from two different categories to enhance security, so entering two different passwords would not be considered multi-factor. In fact, you have probably already use multi-factor authentication in some form, for example, you've used MFA if you've:

- swiped your bank card (something you have) at the ATM and then entered your personal identification number (something you know), or

- logged into a website with your username and password (something you know) and then had to enter a time-based one-time password from an application like Google Authenticator from your phone (something you have).

MFA helps protect you by adding an additional layer of security, making it harder for others to log in as if they were you. Your information is safer because thieves would need to steal both your password and your phone (for instance). You would definitely notice if your phone went missing, so you'd report it before a thief could use it to log in. In addition, your phone should be locked—requiring a PIN or fingerprint to unlock—rendering it even less useful if someone wants to use your MFA credentials.

Using 2FA is one of the top three things that security experts do to protect their security online, according to a recent Google survey.

ProKnow DS allows users to individually configure two-factor authentication for their account, as well as organization administrators to require that all of their users use Multi-Factor Authentication (please contact ProKnow DS support in order to enable this option for your organization). It is **highly recommended** that all users of ProKnow DS utilize two-factor authentication to reduce the risk of unauthorized access.

Tutorial: Logging In for the First Time and Beyond

IN THIS ARTICLE

Once an organization administrator has created your account, use this tutorial to learn how to sign in for the first time and for subsequent browsing sessions.

- Logging In for the First Time

- Logging In for Subsequent Browsing Sessions

Logging In for the First Time

If you're brand new to ProKnow, you need to initialize your password. Simply following the instructions for Resetting Your Password. Once you've reset your password, you can follow the standard instructions for Logging In to Your Account.

Looking to Bolster Your Account Security with Two-Factor Authentication?

Enabling two-factor authentication is a great way to improve your account security. Check out our instructions for Setting Up Two-Factor Authentication to get started.

Logging In for Subsequent Browsing Sessions

For all subsequent browsing sessions you can follow the instructions for Logging In to Your Account to login to ProKnow DS.

Tutorial: Re-Associating DICOM Objects

> **IN THIS ARTICLE**
>
> Sometimes your DICOM objects may not be associated correctly, causing an errant hierarchy of data objects in the patient module. This article explains why that might happen, and how you can use built-in tools to rectify it.
>
> - DICOM Object Associations
>
> - What Causes DICOM Associations To Be Broken?

DICOM Object Associations

Within a patient record, ProKnow will automatically determine the associations of DICOM objects (e.g., image set, structure set, plan, and dose) based on the file content. These associations will determine the default organizational hierarchy within a patient record, such as:

- The image set to which an RT Structure Set is assigned

- The RT Structure Set to which an RT Plan is assigned

- The RT Plan to which an RT Dose is assigned

A typical hierarchy in ProKnow's Browse module will look like the following figure. Notice that the root object is the image set under which is organized the RT Structure Set, RT Plan, and RT Dose.
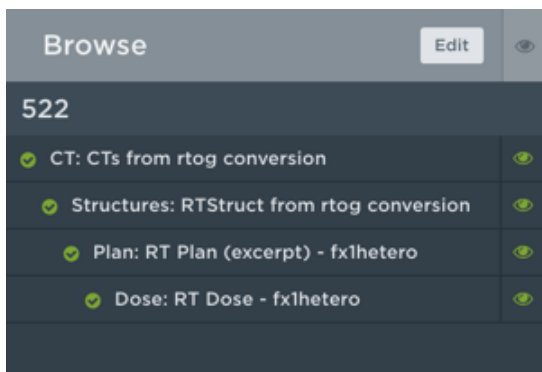
What Causes DICOM Associations To Be Broken?

If DICOM associations in the DICOM source files have been broken (or are wrong or invalid), then you will not see DICOM objects as you expect in the patient module. The most common error is if an RT Plan is not associated with the RT Structure Set, but you can also have failures of an RT Structure Set to be associated with its image set, or RT Dose with its plan. This will result in failure to be able to analyze your data. For

instance, structures will not be displayed with the imageset, or DVH data will not be calculated if an RT Dose is not downstream of an RT Structure Set.

If you transfer data directly from your TPS (or other system), you will not see this problem unless there is an error in how that system writes DICOM data.

If errors are found, it is most often because some data have been stripped from or changed in the DICOM files after their creation (e.g., a poorly designed anonymization/de-identification process can sometimes break DICOM associations). If this happens, you can establish entity associations across multiple patients at once or manually re-associate the objects from the patient module.

- Establish Entity Associations Across Multiple Patients
  Use this method if you have many patients with objects to correct and if the following conditions are met:

    1. There is no parent entity already found and…

    2. A single entity is found in the same study that is a valid parent entity type.

- Manually Re-Associating Objects from the Patients Module
  Use this method if you only have one or two patients with objects to correct or if the re-association will be a complex operation.

Tutorial: Overview of Patient Modules

IN THIS ARTICLE

We summarize the main modules in the patient viewer. They are each accessible via the vertical tabs at the left of the patient viewer, as seen in Figure 1.

- Browse

- Structures

- Plan

- Dose

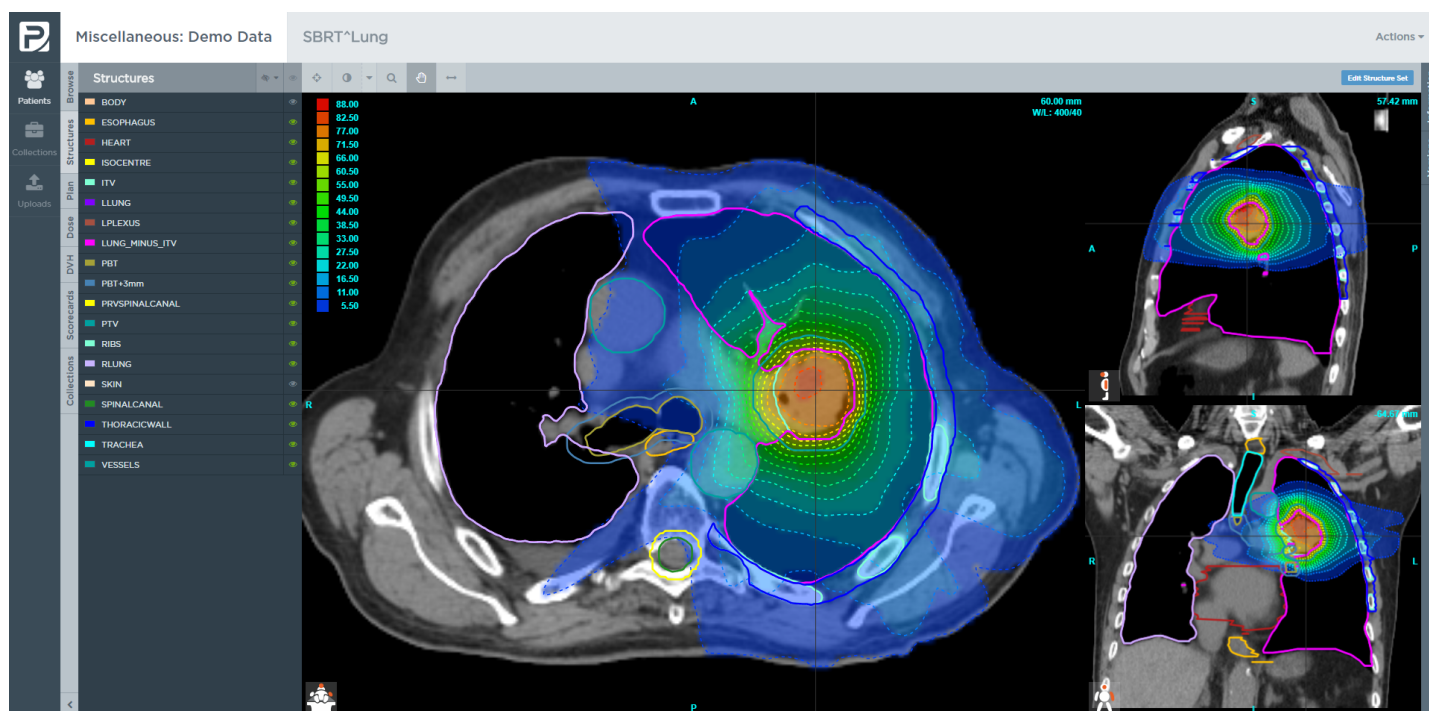- DVH

- Scorecards

- Collections

Figure 1. Patient module and interactive patient viewer. The tabs explained below can be activated from the vertical tab collection on the left of the viewer.

Browse

The Browse tab is where you go to do the following:

- See the DICOM objects you have uploaded for this patient, along with their associations (and, if necessary, to manually re-associate the DICOM objects).

- Select which data objects to display and toggle

- Edit or delete the DICOM objects.

- Interact with (navigate, zoom, pan, window/level) the 3-plane viewer.

Structures

The Structures tab is where you go to do the following:

- Edit the structure set by creating new, or editing existing, anatomical contours.

- Turn structure display on or off, individually or all together.

- Interact with (navigate, zoom, pan, window/level) the 3-plane viewer.

Plan

The Plan tab is where you go to do the following:

- View the RT Plan summary information.

- View the RT Plan's beam or brachy source spreadsheet, either in compact (summary) or expanded (comprehensive) form.

- Interact with (navigate, zoom, pan, window/level) the 3-plane viewer.

Dose

The Dose tab is where you go to do the following:

- Customize/set the normalization dose.

- Customize the isodose levels viewed, along with the dose colorwash opacity.

- Interact with (navigate, zoom, pan, window/level) the 3-plane viewer.

DVH

The DVH tab is where you go to do the following:

- Turn DVH curve display on or off by structure name.

- View a spreadsheet of min, max, and mean dose (Gy) and structure volume (cc).

- Set DVH curve type from cumulative (%) vs. dose, cumulative (cc) vs. dose, or differential (cc) vs. dose.

- Download raw DVH data.

Scorecards

The Scorecards tab is where you go to do the following:

- Load custom templates of important metrics to extract and analyze vs. their respective objectives.

- Create new sets of metrics and objectives.

- Save new sets of metrics and objectives as templates, to re-use for any workspace or across all workspaces (if you have "All Workspaces" permissions).

- Set DVH curve type from cumulative (%) vs. dose, cumulative (cc) vs. dose, or differential (cc) vs. dose.

- Download the raw data from a scorecard spreadsheet.

Collections

The Collections tab is where you go to do the following:

- See which collection(s) the patient is currently assigned to.

- Assign/unassign a patient to/from existing collections.

Release Notes

ProKnow DS v1.31.1 (a2ab904f)

June 10, 2022 — Download ProKnow DS v1.31.1 User Guide

What's New

- In the Manage Access dialog, we introduced the ability to change the grouping behavior. In addition to grouping by the Role, rows can now be grouped by the Name and Type columns. It is also possible to toggle grouping off, allowing you to view the list of role assignments as a flat list.

- The Show All toggle in the Manage Access dialog now hides irrelevant custom roles in the off position.

- We added the ability to add multiple users to a group at once via the Add Member dialog.

- We made some improvements to our authentication flow to make the system more secure and able to handle a robust set of deployment configurations.

Bug Fixes

- We fixed a defect that could be observed when refreshing the page while previewing an old version of a structure set. Under certain conditions, the wrong structure set version could be displayed.

- We fixed an issue where a structure set could not be downloaded after edits were made to the original uploaded contours.

- We fixed a defect that was preventing scorecard templates from being created from a patient scorecard.

- We fixed an issue where the organization name and subdomain were not being populated correctly in the main ProKnow pulldown menu.

- We fixed performance issues that could be observed when uploading or deleting several users at once.

- We added a warning message when comparing DVH curves where one or more DVHs are not available due to a missing structure set.

- We fixed an security defect that could expose a patient's MRN and name to unauthorized users in the organization if (1) the patient had at least one checklist that belonged to a configured workflow and (2) if the user without PHI permissions visited the Workflows page.

- We fixed an error with dose composition tool that was preventing users from compositing doses produced from certain Tomotherapy plans in certain situations.

ProKnow DS v1.31.0 (e1363ca2)

March 18, 2022 — Download ProKnow DS v1.31.0 User Guide

What's New

- ProKnow introduced new mechanisms for managing users and their access to resources. These new tools are now flexible enough for large enterprises and easy enough for small organizations as well. Refer to Understanding the Updated Identity and Access Controls article for more information on the new permissions system.

- New Spyglass and Image Pattern tools for comparing fused image sets were added.

- We introduced the ability to review SROs within the Fusion tab to allow you to view translation and rotation values.

Bug Fixes

- We fixed an issue where renaming rules were not generating a new structure set version. Now any time a renaming rule changes ROI names, we generate a new structure set version and corresponding DICOM file.

- Patient upload times are now time zone sensitive.

- We added icons to identify workspace and organization collections with the same name.

- We fixed an issue when creating new structures using uniform margins that some negative values were being inappropriately rejected.

ProKnow DS v1.30.0 (4617a141)

January 15, 2022 — Download ProKnow DS v1.30.0 User Guide

What's New

- ProKnow now records an audit log of your organization's activity in ProKnow. You can view, filter, and download this data from the Monitoring Logs area of the user interface.

- We've made some improvements to the DICOM Conformance Statement.

Bug Fixes

- We fixed an issue that was preventing users from visiting the patients Structures tab if a structure set was not active.

ProKnow DS v1.29.1 (cd6f05e5)

November 5, 2021 — Download ProKnow DS v1.29.1 User Guide

What's New

- We've improved the labels for the buttons for copying contours from neighboring slices. They are now labeled "Copy from Previous Slice" and "Copy from Next Slice."

Bug Fixes

- We've fixed an issue where patient scorecard relative metrics were not displaying the prescription properly when downloaded as a CSV.

- We've fixed a couple issues on the workflows page to ensure that only the requested patients are returned.

- We've fixed an issue that could cause Auto-Segmentation to fail when the structure set description started with a space.

- We've established consistency for the structure set description label between several dialogs.

- We've fixed an issue in patient scorecards where certain numbers were being displayed with an unnecessary number of decimal places.

- We've fixed an issue where the DVH legend could not be seen when comparing DVH curves between multiple doses on a white background.

- We've fixed an issue where the Structures tab was inaccessible if there was no active structure set

ProKnow DS v1.29.0 (afa7fb96)

September 10, 2021 — Download ProKnow DS v1.29.0 User Guide

What's New

- We've introduced the ability to create a ring structure based on an existing structure.

- Lists of patients now highlight the last patient that was opened.

- We've introduced the ability to select multiple histogram bars using the Control (Windows) or Command (Mac) key.

- We've improved the error message reported when attempting to upload a deformable SRO.

- Patients without dose entities can now be added to a collection from the patients list.

- We've introduced the ability to toggle a dose grid bounding box on and off.

- We've introduced the ability to toggle whether non-active performance bins for patient scorecards are visually de-emphasized relative to the active performance bin.

- We've introduced the ability to filter algorithm documents.

- We've introduced 3 new computed dose metrics and their relative metric variants: dose spillage, gradient index, and modified gradient index.

- We now require the View PHI permissions for viewing patient documents and notes.

- We've introduced a new permission for managing collaborator access for a given patient.

- We've introduced the ability to invoke auto-segmentation on an existing structure set.

Bug Fixes

- We've fixed the scrolling behavior for the computed metric select dialog.

- We've fixed a bug preventing the user interface from properly redirecting to the original page requested after the user logs in.

- When auto-generating dose levels in the user interface, we now handle edge cases involving a prescription of 0 or max dose of 0.

- We now prevent importing a structure set into an existing structure set while contouring if the structure sets are in different frames of reference.

- The system now properly handles a margin of 0 when creating a structure based on a margin in or around an existing structure set.

ProKnow DS v1.28.0 (580c06f3)

June 19, 2021 — Download ProKnow DS v1.28.0 User Guide

What's New

- We've introduced the ability to configure algorithms in a workspace.

- We've made some improvements to the way that patient CSV imports and exports work. Exports will now export the patient ID column as `ID` (previously, `Patient ID`). Importing a CSV will now automatically look for the `ID` or `Patient ID` columns when associating CSV columns with import fields but will favor the `ID` column if both are present. As before, you will always have the ability to manually associate the columns prior to initiating the import.

- We updated our manufacturer information in the About menu.

- We've added a helpful dialog that prevents you from losing work when you accidentally navigate away from a page or dialog that you are currently editing. The dialog will prompt you to decide whether you wish to navigate away from the current page or keep working.

- We've introduced the ability to merge structure sets. This includes the ability to merge one or more structure sets to produce a new structure set (from the Patient Browse tab) as well as the ability to import structures from another structure set into the structure set that you are editing.

Bug Fixes

- We've fixed how the user interface handles situations in which there are no numeric metrics available to display in a collection histogram.

- We've fixed an issue where text was not wrapping properly in the Collection Bookmarks right sidebar.
- We've fixed an issue where structures with the type `UNSPECIFIED` were being exported to CSV with a blank cell for the type column. Structures with the type `UNSPECIFIED` will now be exported to CSV with the type `UNSPECIFIED`.
- We've fixed an issue where users were unable to filter patients in a collection by custom metric if the patient did not have a representative entity.

ProKnow DS v1.27.1 (ec584bcd)

May 6, 2021 — Download ProKnow DS v1.27.1 User Guide

Bug Fixes

- We fixed an issue causing collection API routes to be inaccessible when using an API key.
- We fixed the tooltips for the absolute Homogeneity Index and relative Homogeneity Index.

ProKnow DS v1.27.0 (acfc841f)

April 30, 2021 — Download ProKnow DS v1.27.0 User Guide

What's New

- We've introduced the ability to define and manage structure set templates for your organization. A user may use a structure set template to initialize a new structure set with a set of empty structures or to update the list of structure for an active structure set draft.
- We've added support for Contour Data (3006,0050) with an explicit value representation (VR) of `UN`.
- We've added support for plan prescription dose references of type UNSPECIFIED.
- We've added support for unknown RT Plan Relationship (300A,0055) values.

Bug Fixes

- We fixed an issue in which numeric choice custom metrics could not be used to group collection histograms and scatterplots.
- We fixed an issue preventing numeric choice custom metrics from showing up in the correlation finder.
- We fixed an issue where relative computed metrics were not being copied properly as part of a patient copy operation.
- We fixed an issue where metrics could not be added without an active dose.

ProKnow DS v1.26.1 (e8ffb259)

March 19, 2021 — Download ProKnow DS v1.26.1 User Guide

Bug Fixes

- We've fixed an issue causing SROs to become unaccessible if moved as part of a patient move operation. This release repairs these SROs so that they are now accessible.

ProKnow DS v1.26.0 (3c267f07)

February 26, 2021 — Download ProKnow DS v1.26.0 User Guide

What's New

- We've added the ability to edit the type of an existing custom metric. This includes adding, updating, and removing choices for a Choices custom metric as well as converting a custom metric from one type to another.

- We've added several relative scorecard metrics to the list of available computed metrics. This will allow you to define dose metrics that are relative to a specified prescription dose. In order for relative dose metrics to be computed, the dose must have a parent plan with the specified prescription dose reference description, and that dose reference must have a prescribed dose value.

- While processing DICOM files, the patient name will now be checked for consistency in a case-insensitive manner.

- The current tool (i.e., Slice Navigation, Zoom, Pan) will be saved and recalled when switching patients.

- Plans with non-standard general accessory types (300A,0423) will now be accepted.

Bug Fixes

- We've fixed a few bugs with the Active Objects panel on the patient scorecards tab.

- We've fixed an error that was preventing users from download the collection scorecard metric values if a custom metric did not have data for any entities across the collection.

- We've fixed an issue where filtering the list of scorecard templates while editing a scorecard would leave the user interface in a broken state.

- We've fixed an error that was causing the items in the structure set versions right sidebar to scroll unnecessarily.

ProKnow DS v1.25.1 (74bd3995)

January 22, 2021 — Download ProKnow DS v1.25.1 User Guide

Bug Fixes

- We've fixed an issue with patient scorecards that was preventing custom metric values from being saved for patients without entities.

- We've fixed an issue that was causing SROs to be applied in some situations where they were not needed (the secondary image set was already in the same frame of reference as the primary image set).

- We've fixed an issue that prevented users from navigating to the scorecard templates page from another Organization Settings page using the vertical tabs to the left of the sidebar.

ProKnow DS v1.25.0 (13b4c392)

January 8, 2021 — Download ProKnow DS v1.25.0 User Guide

What's New

- We've added the ability to download the collection scorecard metric values for all patients represented in the collection.

- Uploading DICOM files now requires the Upload DICOM permission. As part of the upgrade, users were granted this permission if they had both View PHI and Write Patients permissions.

- We've improved the presentation of scorecards metrics so that computed and custom metrics appear on the same page without having to switch tabs.

- Previously, patient scorecards belonged to dose objects. Now, however, all patient scorecards will belong to the patient and the metrics will reflect the current primary entities. All scorecards that were previously defined for doses have been moved to the patient.

Bug Fixes

- We've fixed a rendering bug that could cause sagittal and coronal reconstructions of structure sets to incorrectly display gaps between contour slices in some very rare cases where the image and structure set slices were slightly misaligned.

- We've fixed an issue preventing synonym renaming rules (i.e., "is one of...") from taking effect on new uploads. Note that this issue did not prevent the rule from being executed manually.

ProKnow DS v1.24.1 (c409b833)

November 9, 2020 — Download ProKnow DS v1.24.1 User Guide

Bug Fixes

- We've fixed several issues related to plans created in ProKnow. This includes a few issues that could cause miscellaneous actions (e.g., DVH calculation, scorecard PDF generation) to fail when performed on a plan created in ProKnow.

- When a Cumulative meterset metric fails due to missing plan delivery information, the failure description will now include the more general message: "No plan delivery information available." Previously, the message would have read, "No associated plan," which would have been inaccurate in cases where the plan was created in ProKnow.

ProKnow DS v1.24.0 (d85aa891)

November 4, 2020 — Download ProKnow DS v1.24.0 User Guide

What's New

- We've introduced the ability to create plan objects for the purpose of defining plan prescriptions. Please note that ProKnow does not provide any capabilities to design or simulate plans (i.e., it is not a Treatment Planning System). Additionally, plans created within ProKnow are not able to be exported as DICOM.

- Prescription information for the selected plan is now available in the Prescription right sidebar. Use this sidebar to view and edit the prescription description as well as the list of dose references. In a future release, these dose references may be used as inputs to prescription-based dose metrics.

- We've added a new mechanism to produce dose levels for a patient with an active dose. Previously, a normalization dose had to be provided through manual input. With this release, the dose levels may now be derived from a plan's dose references with a prescribed dose. In addition, the default dose levels will now be derived from the plan's dose references if available. Please see Patient — Dose for a complete description.

- We've relaxed DICOM UID validation. Previously, the system required at least two numeric components separated by a period. With this change, the system now only requires one numeric component.

Bug Fixes

- We've fixed the article Is there a way to export files directly from my TPS? to remove an incorrect reference to anonymization as an available feature.

- We've fixed an issue that could cause conflicts with records when some have leading or trailing whitespace and others do not.

- We've fixed an issue that could cause DICOM RT Plans to fail to process if the 'DoseReferenceDescription' (300a,0016) tag contains a value longer than 64 characters. We now allow these plans with the description truncated to 64 characters.

- We've fixed an issue that could cause DICOM RT Plans to fail to process if the 'Radiation Type' (300A,00C6) tag has no value.

ProKnow DS v1.23.0 (8f63b534)

August 28, 2020 — Download ProKnow DS v1.23.0 User Guide

What's New

- We've implemented a mechanism to let you know about planned maintenance and release windows. Starting in the next release, you will receive a notification in the web application if you are using the application shortly before a maintenance or release window is about to begin. The notification will disappear once the maintenance has been completed.

- We've added the ability to export one or more patient scorecards as a PDF report. The exported PDF will include basic patient demographics and plan information. It also supports exports involving comparison doses.

- We've relaxed the processing of Brachytherapy plans to allow non-standard Application Setup Types (300A,0232).

Bug Fixes

- We've fixed the wording of the message that appears when viewing a scorecard with no numeric metrics.

- We've fixed an issue that could cause long metric values to overflow the scorecard table cells.

- We've fixed a bug in the dose composition algorithm that was causing results generated from certain GammaPlan RT Doses to be computed incorrectly.

ProKnow DS v1.22.0 (9274bcde)

July 10, 2020 — Download ProKnow DS v1.22.0 User Guide

What's New

- We've introduced basic support for interacting with SROs in the user interface once they have been uploaded to a patient. The new patient Fusion tab provides a list of the SROs for a patient. With an SRO selected, you may edit its name, download it, or delete it.

- We've improved the order in which images are downloaded, prioritizing the slices that are closest to the current slice position.

- We've added new capabilities for managing organizations in a multi-tenant environment.

Bug Fixes

- We've fixed an issue with the font size of the dose composition tool.

- The API route for adding computed metrics to patients within a collection now requires read collection access instead of write collection access. This addressed an issue were a scorecard could fail to display metrics in certain rare situations.

- We've fixed an issue where an error message was missing a space.

- We've fixed an issue renaming a scorecard template while filtering could cause unexpected results.

- We've fixed a rendering issue for uniform image sets with a slice spacing larger than 5mm.

- We've addressed a minor styling issue observed during the multi-factor authentication (MFA) workflow.

- We've fixed an issue that could prevent SROs from appearing in the Download list in certain unique situations.

ProKnow DS v1.21.0 (72ae5d6d)

May 29, 2020 — Download ProKnow DS v1.21.0 User Guide

What's New

- ProKnow DS has a fresh new "Elekta" look and feel. We hope you like it as much as we do!

- We've introduced basic comparison tools for patient scorecards and DVHs. The **Compare** tab is available as a right sidebar tab in the Patient Scorecards and Patient DVH modules. With a dose object activated, up to four additional objects may be activated as secondary entities for the purpose of comparison.

Bug Fixes

- We've fixed an issue that could cause an organization collection to fail to load under certain conditions.

- We've fixed an issue that could cause you to be redirected to the login page unnecessarily.

- We've fixed an issue that could cause workflows to display the wrong set of patient checklists in rare cases.

- We've fixed an issue that could result in an invalid state of controls on the Collection DVH page if the Edit button is clicked while the collection analysis is being computed.

- We've fixed an issue that would remove scorecard template category information after uploading scorecard to a scorecard template or editing and saving the scorecard template's metrics.

- We've fixed an issue that could cause incorrect visual artifacts to be rendered on contour reconstructions in situations where the structure was bifurcated on its most superior slice.

- We've fixed an issue where the checklist checkpoints and tasks were not wrapping properly in situations where the names were long.

- We've fixed several sidebars whose content were not scrolling properly.

ProKnow DS v1.20.0 (658edb75)

May 2, 2020 — Download ProKnow DS v1.20.0 User Guide

What's New

- Scorecard template managers may now put scorecard templates into categories. Categorized scorecard templates will be grouped under their scorecard category in the user interface.

Bug Fixes

- We've fixed an issue affecting patient notes. Previously, the content could disappear in edit mode when the operation was implicitly canceled after attempting to edit or delete a different note.

- We've fixed an issue that was causing successful patient copy operations to be reported as failures.

- We've fixed an issue preventing structure sets without ROIs from being imported successfully.

- We've fixed an issue that could, in rare cases, cause ROIs with missing slices to be rendered without appropriate gaps on sagittal and coronal reconstructions on image sets with non-uniform slice spacing.

- We've replaced a vendor library with an updated version. The old version was causing widespread issues across the system including the inability to load a patient and stalled background jobs. We continue to closely monitor the system to ensure the issues have been completely resolved.

ProKnow DS v1.19.2 (aad9c447)

April 17, 2020 — Download ProKnow DS v1.19.2 User Guide

What's New

- We've added a maintenance page that will be displayed when you visit ProKnow during a maintenance window. The maintenance page will automatically redirect you to the site once the maintenance is complete and the site is available again.

Bug Fixes

- We've fixed an issue could cause uploads to get stuck in the processing stage if the length of the DICOM Study ID `(0020,0010)` did not comply with DICOM specifications. We've relaxed this constraint and will display a truncated value in ProKnow.

ProKnow DS v1.19.1 (b4bc9fb5)

April 15, 2020 — Download ProKnow DS v1.19.1 User Guide

Bug Fixes

- We've fixed an issue that could, in some very rare cases, cause summary information related to uploads (but no uploaded data) from one user to be included in query results sent to another user.

- We've fixed an issue that was causing errors when many users were downloading data concurrently.

ProKnow DS v1.19.0 (bb50e611)

April 5, 2020 — Download ProKnow DS v1.19.0 User Guide

What's New

- We replaced Amazon Web Services with Microsoft Azure as our Infrastructure as a Service (IaaS) provider.

ProKnow DS v1.18.0 (cd83ae2)

March 23, 2020 — Download ProKnow DS v1.18.0 User Guide

What's New

- When exporting a list of users to a CSV, you'll notice a new column denoting the user's role.
- We've added the ability to import and update users from a CSV. You can access this functionality from the Users management page (located within Identity and Access Management) by clicking on the Actions dropdown and pressing "Import Users from CSV."

Bug Fixes

- We've fixed an issue that could cause updating custom metric data for patients to fail.
- We've fixed an issue preventing SROs with empty tags to process.

ProKnow DS v1.17.0 (60112e7)

March 7, 2020 — Download ProKnow DS v1.17.0 User Guide

What's New

- We've improved the label for the link to reset your password on the login form.
- We've introduced the ability to customize the permissions for a user. Permissions may be configured directly for the user without affecting any formal roles that have been defined for the organization. In this manner, formal roles may be used as permission templates for further customization at the user level. We have also rearranged the buttons in the header for role and user to facilitate a consistent experience between the two concepts. See Managing Users — Organization Personnel for more information.
- We've improved the collection DVH experience by allow users to define the list of structures they wish to be included in the collection DVH.

Bug Fixes

- We've fixed an issue that was causing the collections DVHs in collections in with a large number of structures to fail to calculate.

- We've fixed issues that were preventing patient DVHs to fail to calculate if the dose files had certain unique characteristics.

ProKnow DS v1.16.0 (3a8ddcf)

January 29, 2020 — Download ProKnow DS v1.16.0 User Guide

What's New

- We've introduced basic support for positron emission tomography (PET) image sets, allowing PET image sets to be uploaded, archived, and viewed.

- When navigating from a collection to a patient, the representative entity of the patient (i.e., the one added to the collection) will now be automatically activated once the patient is loaded.

Bug Fixes

- Fixed an issue where patient links in the histograms and scatterplots views within organization collections were being improperly constructed.

- Fixed a rendering issue affecting pixel data whose pixel representation is 1 (signed) and rescale slope is not 1. This impacted a very small number of image sets, all of which have been reprocessed as part of this release.

ProKnow DS v1.15.0 (38b02dc)

December 17, 2019 — Download ProKnow DS v1.15.0 User Guide

What's New

- Output file sizes have been improved (i.e., reduced) for DICOM files generated as a result of dose composition operations.

- We've switched where dose composition operations store the input equation in the resulting DICOM file from the 'Comments on Radiation Dose' (0040,0310) tag to the more standard 'Image Comments' (0020,4000) tag. This allows the resulting DICOM RT Dose file to exclusively utilize tags present in the RT Dose IOD, since the 'Image Comments' tag is part of the 'General Image' (C.7.6.1) module. Previously, the 'Comments on Radiation Dose' tag, which is part of the 'Radiation Dose' (C.4.16) module, caused the resulting RT Dose to be an extended IOD.

- Improved accuracy of 32-bit dose files when performing dose compositions.

Bug Fixes

- Fixed an issue where synonym renaming rules with no criteria would fail with a critical error.

- Fixed an issue where DICOM UIDs longer than 64 characters could cause uploads to fail to process, resulting in uploads being "stuck" in the processing state. DICOM files with invalid UIDs will now fail properly during upload with an appropriate error message.

- Improved plane slice position determination for oblique image sets. The previous method was not properly taking into account the rotated geometry. In situations where large rotations were present, this could result in the slice planes failing to encompass the entire extents of the image set.

ProKnow DS v1.14.0 (a694ef4)

November 26, 2019 — Download ProKnow DS v1.14.0 User Guide

What's New

- We're happy to announce our newest feature: dose composition. This feature allows you to compose multiple doses using common operations (addition, multiplication, and division) with the ability to set scale factors for each term. This module enforces a consistent frame of reference between operands, but it will allow you to choose from a list of available SROs to transform an operand from its current frame of reference to the target frame of reference. Please refer to the Patient — Browse support article for additional details.

- When viewing correlation finder results on the collection scatterplots page, the row corresponding to the current scatterplot configuration will be highlighted.

- We have added special logic to handle metric values for structures outside the dose grid or structures that have received zero dose.

- The collections list now displays a column for the creation date and time.

- Added CE mark to the About ProKnow DS dialog.

Bug Fixes

- Fixed an issue that could cause users authenticating with SSO to be unable to login.

- Fixed an issue preventing federated user account from being deleted under certain circumstances.

- Fixed an issue where uploads were not sorted into the correct patient in the case where a user changed a patient's ID while uploads were being uploaded directly to that patient. We also now present a warning when editing a patient's ID that uploads currently being processed may end up being sorted into a different patient.

- Fixed an issue where synonym renaming rules were not being executed in a case insensitive manner.

- Fixed a bug where datetimes in the structure set versions sidebar were not displayed according to the current locale.

ProKnow DS v1.13.2 (65072ff)

October 3, 2019

Bug Fixes

- Fixed an issue that could cause structure set editing to be disabled due to mismatched frames of reference, despite a valid spatial registration object being active.

- Fixed an issue that could cause an error to incorrectly be reported when creating a workspace after visiting the users page.

ProKnow DS v1.13.1 (342f685)

September 20, 2019

What's New

- We've updated the ProKnow DS About dialog and Instructions for Use support article to reflect our new manufacturer and regulatory information.

Bug Fixes

- Fixed an issue related to objective bin scoring that could cause assigned values to be incorrect in certain situations.

- Fixed an issue that would cause unexpected results when selecting multiple scatterplot items when hiding groups.

- Fixed an issue related to patient CSV export columns.

- Fixed minor styling issue related to filter inputs in dropdown selectors.

ProKnow DS v1.13.0 (5f75530)

September 6, 2019

What's New

- We've implemented a notification in the user interface that will be displayed if ProKnow DS detects that you are using an unsupported browser. This notification also provides a link to the relevant support article so you can easily access the complete list of supported browsers.

- We've added support for RT Dose files that are missing the required DICOM ReferencedRTPlanSequence tag. Dose files that are missing this tag will not be automatically associated with a parent entity in ProKnow DS (but they may be associated manually).

Bug Fixes

- ProKnow DS is now able to properly compute DVH data (and computed plan metrics) when plan files generated by the Varian Halcyon™ system are associated with a corresponding dose. Our previous release allowed these files to be uploaded and visualized, but in some situations the unique characteristics of the plan files would cause the DVH calculations to fail when processing the computed plan metrics.

- Fixed an issue related to broken patient links being displayed in the Browse tab within Organization Collections.

ProKnow DS v1.12.1 (33a62da)

August 30, 2019

Bug Fixes

- ProKnow DS is now able to properly import DICOM plan and dose files generated for the Varian Halcyon™ system.

ProKnow DS v1.12.0 (245beb5)

August 20, 2019

What's New

- We're excited to announce that we've added support for oblique image sets (i.e., image sets that are not orthogonal to the axial, sagittal, and coronal views) as well as basic support for spatial registration objects (SROs). With this release, oblique image sets may now be uploaded and viewed (resampled in the axial, sagittal, and coronal views) directly from within ProKnow DS. In addition, any rigid spatial registration objects that you upload will be processed and utilized when viewing secondary image sets.

- The ProKnow DS favicon has been improved to look better in Firefox and Chrome incognito mode (i.e., browser tabs with a dark background).

Bug Fixes

- Upgraded several modules and systems to improve overall performance, security, and stability.

ProKnow DS v1.11.0 (8a749d2)

July 30, 2019

What's New

- We've added the ability to export a list of users from the **Identity and Access Management > Users** page, which should make it a lot easier to audit the list of users within an organization. This tool is accessible from the new **Actions** dropdown menu at the top of the screen.

- It is now possible to delete multiple custom metrics at the same time from the **Organization Settings > Custom Metrics** page. This should make it easier to remove unwanted custom metrics created via the API.

- You are now able to select and add multiple custom metrics at once to a scorecard (previously, you had to add custom metrics one at a time). This should reduce the time that it takes to populate a scorecard with a lot of custom metrics.

- We've changed the domain used during the login process to auth.proknow.com. This change shouldn't have any effect on the login process other than making it slightly more secure. Please note that it is still not recommended to bookmark the login page. You should instead bookmark *your-domain*.proknow.com (where *your-domain* is the specific domain that you use to access your ProKnow DS account).

- Improved several support articles related to scorecards and objectives.

Bug Fixes

- We've significantly improved ProKnow DS's error reporting and the ability to recover from intermittent errors during task execution (e.g., during DVH calculation). Although these situations are already very rare, this should reduce the frequency of uploads and calculations getting "stuck" within the system.

- Added proper error handling for errors that occur during structure set export when invalid UIDs are present in the associated image set.

- Fixed issue that could cause uploads to fail if newline characters were present in specific DICOM fields.

- Fixed several minor bugs and styling issues related to scorecards.

ProKnow DS v1.10.0 (a5cb751)

July 12, 2019

What's New

- We've introduced a new *Collaborator* permission that allows you to selectively grant access to particular patients in a workspace (for example, in the case of peer review) as well as allows multiple users to upload into a single workspace while only seeing patients they have uploaded (for example, in the case of distributed data collection). Once a user is designated as a collaborator (via their assigned role), their respective permissions no longer apply to all related patients; instead, they only apply to patients to which the user has been given explicit access. A collaborator may obtain explicit access to patients in two ways: (1) the user is automatically granted access to any patient that they create (either by manually creating the patient or by uploading files that result in the patient being created, assuming they also have the *View PHI* and *Write Patients* permissions) or (2) the user may be granted access from the new

Manage Patient Access dialog by another user with *Manage Users, Roles, and Workspaces* permission. Please refer to the Managing Access to Patients support article for additional information about how the collaborator permission may be used to manage access within an organization.

- We've split the *Read* permission into two separate permissions: *Read Patients* and *Read Collections*, in order to provide more granular control over user permissions. This change also allows us to support the "Collaborator" permission since collaborators are not allowed access to collections.

- Users are now only able to view files that they personally uploaded on the Uploads page; previously, users were able to view all files uploaded by any user in the current workspace. This change was made to address usability and privacy concerns (especially with the new "Collaborator" permission) related to one user accessing the uploads from another user. Please note that if you are using a dedicated user account to upload files using DICOM DS, you will now need to login with that user (not your normal user) in order to see details related to failed uploads and uploads that need attention.

Bug Fixes

- Fixed a bug that would cause grouping histograms by custom metric to fail when collection contained patients with no representative entity.

- Fixed a few minor styling inconsistencies and issues.

ProKnow DS v1.9.1 (c5edfc8)

June 28, 2019

Bug Fixes

- Fixed a bug that could cause the collection correlation finder to display incorrect correlation coefficient values if the collection contained patients with no representative entity.

ProKnow DS v1.9.0 (6d81a56)

June 27, 2019

What's New

- We've significantly improved the user interfaces related to viewing and modifying scorecards. Notably, we've removed the Up/Down arrows that were previously used to reorder the scorecard items in favor of a more intuitive drag-and-drop interface. It is also now possible to calculate a computed metric from the Patient Scorecard page when editing the scorecard (i.e., you are no longer required to save the entire scorecard to view the result of a particular metric). These changes, and several other minor usability and performance improvements, affect the Scorecard Templates page, the Patient — Scorecards page, and the Collection — Scorecards page.

- It is now possible to create a new clone or uniform margin structure directly from an existing structure by clicking on the associated buttons from the edit tools below the name of the current structure in the Structures list. This will open the Create Structure dialog automatically populated with appropriate default options. Please refer to the Editing Structures support article for more information.

Bug Fixes

- Fixed an issue that could cause scorecard objective templates to fail to save under certain situations.

- Several API routes were not properly validating numeric fields, this has been fixed.

- Scorecard API routes should now properly enforce uniqueness on computed and custom metrics.

- Fixed a bug that would cause collections to fail to load if the collection contained a large number of patients.

- Fixed a bug that could cause scatterplots to fail to display custom metric data correctly if the collection contained patients with no representative entity.

- Fixed a bug that could cause the Patients list to display outdated results after bulk operations.

- Improved styling of "Reverse Order" and "Add" buttons on **Edit Objectives** dialog to make them look less disabled.

- Several other minor styling improvements.

ProKnow DS v1.8.0 (5dec1df)

May 16, 2019

What's New

- It is now possible to create a new structure based on a uniform margin of an existing structure. Please refer to the Editing Structures support article for more information on adding structures.

- We've improved the patient list and patient checklist view so that they may support a large number of patients.

- We've added the ability for the user interface to remember the selected patient scorecard from the patient page (until you switch to another patient).

- We've updated the Clear All Slices button to provide support for different clear operations. These include "Clear all," "Clear every other slice," and "Clear specific slices." Please refer to the Editing Structures support article for more information on clearing slices.

- We've also improved patient lists within the collections module to support selecting multiple patients from a list and performing batch actions.

- Checkpoints at the beginning of a checklist will now trigger a workflow change to their transition state when one or more tasks within the checklists have been marked as Started, Done, or Exception.

Previously, checkpoints at the beginning of a checklist would be triggered immediately regardless of the states of any following tasks.

- You can now visit our support center by clicking on the ProKnow icon and then the Help & Support Center link or by holding Control (Windows) or Command (Mac) and clicking the Support button from the main navigation toolbar on the left.

Bug Fixes

- Fixed an issue that could cause the interface to lock up when the support widget was activated.

- Fixed an issue where Loading DVH Data indicator was shown even when a dose was not associated with a structure set.

ProKnow DS v1.7.0 (29c48ff)

April 26, 2019

What's New

- It is now possible to simultaneously view image sets that were not exported in the same DICOM frame of reference by unlocking them from the Patient Images tab. It is now also possible to permanently force a consistent frame of reference between the active entities from the Patient Browse tab. Please refer to the Multiple Image Set Display (Images Tab) and Patient — Browse support articles for a complete description of the available options.

- We've improved the table component used to display lists of patients (and collections) to allow sorting by column (by clicking on the table column headers) as well as to allow right clicking on a patient's ID in order to easily open the patient in a new tab.

- We've completely overhauled our online self-help knowledge base (available at https://support.proknow.com) to be easier to navigate and more user friendly. In addition, we've replaced the support widget within ProKnow DS. This new support widget should be both more helpful (relevant articles should now be suggested based on your current location within the application) and less error prone (the support widget should now work properly within all browsers).

Bug Fixes

- Fixed an issue that could cause structure sets that contained point ROIs to fail while committing updates.

- Addressed several issues that could cause uploads or DVHs to fail to process in certain rare circumstances.

- Fixed an issue that could cause image sets to be improperly activated when dragging a structure set from one active image set to another when multiple image sets are active.

- Fixed an annoying bug that could cause dialogs to close unexpectedly when clicking on a dialog and then dragging outside of the form.

- Fixed several minor issues related to patients that contained no entities being counted improperly when added to a collection.

ProKnow DS v1.6.0 (2dafe68)

March 25, 2019

What's New

- Implemented the ability to move and copy patients between workspaces.

- Relaxed the consistency checks when processing new image sets in order to allow uploading image grids that are very nearly orthogonal (as opposed to exactly orthogonal).

Bug Fixes

- Fixed several minor user interface bugs.

ProKnow DS v1.5.1 (f18d48d)

February 25, 2019

Bug Fixes

- Fixed two rare situations that could cause failures during DVH calculation.

ProKnow DS v1.5.0 (f6c3947)

February 23, 2019

What's New

- We've introduced a new top-level navigation item: "Workflows," which allows you to quickly browse and interact with patient checklists within their respective workflows. This new view summarizes relevant information about each patient checklist (such as how many tasks are contained in a checklist and who the tasks are assigned to) as well as allows filtering by common criteria. This is just the first version of this tool, so stay tuned for additional enhancements in the near future (for instance, the ability to perform more complex filtering such as "show me all patient checklists assigned to me").

- Patient name comparisons are now more intelligent when uploading files, conflicts should no longer be reported when the patient names are semantically equivalent (e.g., "Smith^John" and "Smith^John^^").

- Improve the default labels for patient objects in the Patient Browse tab.

- We've selected a more appropriate mouse cursor for the "Zoom to Selection" tool in the Patient Visualizer.

Bug Fixes

- Fixed an issue that could cause DVH analysis to fail in some rare situations.

- Fixed a bug that would cause MR image set counts to be reported incorrectly in the patients table.

ProKnow DS v1.4.0 (bebc484)

January 17, 2019

What's New

- It is now possible to customize the patient orientation used when viewing patient images and other objects. A commonly requested feature, this allows you to indicate whether you want to view the patient from the planning orientation (if a plan is present), as well as whether you wish to always view images from the feet (i.e., always head first). This setting is accessible from the "Your Profile" dialog. Please refer to the Managing Personal Preferences section of the Configuring Your Profile support article for a complete description of the available options.

- Implemented "Zoom to Selection" and "Zoom to Fit" visualizer tools. Please refer to the Patient Viewer Toolset support article for complete details.

- Improved the contouring interpolation tool in situations where multiple contours are present on adjacent slices. Please refer to the Editing Structures support article for complete details.

- Implemented API routes for directly downloading CT, plan, and dose DICOM files. This allows users of the API or Python SDK to directly access the DICOM files without having to utilize the batch download process.

- Improved patient name anonymization.

- It is now possible to select multiple scatterplot items at once by clicking and dragging a selection window around the points of interest.

- Added number of patients to labels in scatterplot legend.

- Improved accessibility of scatterplots by implementing varied symbols and improving default color palette.

- Improved default colors assigned to new structures created in ProKnow DS.

- Simplified adding patients to collections (from within the patient) by removing extraneous confirmation dialogs.

- It is now possible to add an organization collection to one or more workspaces when the collection is being created.

Bug Fixes

- Fixed several issues related to contouring lock renewal timeouts and associated issues that could arise if you continued contouring once the "Are you still contouring?" dialog had appeared. This should resolve the "Provided tag does not match current tag for ROI" message that would occasionally appear when committing a structure set.

- Fixed issue that could cause some RT Ion Plans to fail to process during upload due to unsupported Primary Dosimeter Unit value.

- Added support for CyberKnife dose files that do not contain a Referenced RT Plan Sequence.

- Fixed transparency of image set styling at the edge of the window/level range.

- Users with email addresses containing capital letters should now be able to be updated or deleted.

- Fixed several minor usability and styling issues.

ProKnow DS v1.3.0 (e1c73c1)

December 19, 2018

What's New

- Implemented the ability to create patient checklists, which are sets of tasks and checkpoints that can assist in managing effort within the patient workflow via the new Patient Checklists sidebar. Patient checklists can be used for keeping track of any arbitrary tasks associated with the patient, regardless of whether they will be performed within ProKnow DS. In addition, it is possible to define patient checklist templates and custom checklist workflows within your organization in order to drive towards consistency and simply the process of creating patient checklists.

- Improved default entity visibility when new entities are being uploaded. New entities that are children of the current primary entity will now activate automatically.

- Improved the name of downloaded patient archive files.

- Added the date each patient was created and the number of objects contained within the patient to the patients list.

Bug Fixes

- Line probe no longer displays ancillary image set data when plotting (i.e., it only displays values for the primary image set).

- Patient download modal no longer lists empty studies.

- Fixed several issues related to tooltips.

- Improved usability of patient information sidebar while patient entities are loading.

- Fixed issues related to deleting a workspace and creating a new workspace with the same Unique URL.

- Fixed several miscellaneous usability and styling issues.

ProKnow DS v1.2.0 (324d56d)

November 10, 2018

What's New

- Implemented the ability to simultaneously view multiple image sets located in the same coordinate system (i.e., when they have been resampled in the same coordinate system prior to uploading to ProKnow DS). Use the new Patient Images sidebar to activate multiple image sets.

- Implemented the ability to attach arbitrary files (e.g., PDFs, images, and videos) to patients via the Patient Documents sidebar. This can be used to keep track of non-DICOM documents (e.g., pathology reports) associated with the patient.

- Implemented the ability to both temporarily remove protected health information (e.g., patient names and medical record numbers) and explicitly prevent certain users from viewing this information via the new "View PHI" role permission. Use the "Anonymized Mode" toggle from the main ProKnow dropdown menu to temporarily anonymize patient information (useful when showing a colleague a patient without exposing medical information).

- Implemented ability to create a new structure as an intersection of two other structures.

- Implemented the ability to independently control whether users can download DICOM files via the new "Download DICOM" role permission.

- It is now possible to add a commit label and message when committing a new version of a structure set (it is also possible to edit labels and messages once committed).

- We now record and display the name of the user user that performed relevant updates to structure set version (created, last updated, committed).

- It is now possible to delete old structure set versions (please note you may not delete the currently active version).

- Added appropriate "Add item" buttons to the top of list-based user interface pages (so you no longer need to scroll to the bottom of the list to add a new item).

- Added a patient filter on the Browse tab within a Collection.

- It is now possible to display gridlines on DVH graphs.

- Improved consistency of patient and study information in DICOM structure set files generated by ProKnow DS to facilitate transfer to and from external systems.

Bug Fixes

- Fixed an issue that could cause DVH calculation and metric extraction to fail in some rare cases.

- Fixed a few minor functionality and styling issues.

ProKnow DS v1.1.0 (df730d3)

October 19, 2018

What's New

- Implemented ability to view and edit patient, study, and entity DICOM information and metadata from the Patient Information sidebar.

- Implemented the ability to attach notes to patients via the Patient Notes sidebar. This can be used to communicate intent or other useful information to colleagues or simply to keep track of relevant free-text information for the current patient.

- Implemented support for federated identity providers. Please contact ProKnow Customer Support at support@proknow.com if you would like to learn more about using your enterprise credentials to login to ProKnow DS.

- When downloading DICOM files from a patient, the modal will now default to having the currently active entities selected.

- For organizations with many workspaces and collections, the corresponding dropdowns will now display as many items as will fit on the screen (as opposed to a limited number).

- Improved isoband rendering (layers that are turned off will now fill with the color of the next layer, instead of appearing as a transparent gap in the dose).

- Added relevant tooltips to the Edit Objectives modal.

Bug Fixes

- Fixed several minor Firefox-specific bugs.

ProKnow DS v1.0.0 (b66c174)

October 8, 2018

Bug Fixes

- Fixed an issue that could cause interpolation to fail while contouring bifurcated structures.

- Fixed an issue that was causing Collection population DVH to incorrectly remember selected patient when closing the DVH tab.

- Fixed several issues that were caused by clicking on the modal backdrop when closing various modal dialogs.

- Fixed several other minor functionality and styling issues.

ProKnow DS v0.8.3 (adf05fd)

September 23, 2018

What's New

- Improved the way Population DVHs are calculated for collections, especially in low and high-dose structures.

Bug Fixes

- Fixed an issue that could cause DVH calculations to fail when slice positions were not aligned properly in the uploaded DICOM file.

- Fixed a minor issue where the selected histogram bin would lose its selected state when histogram was resized.

ProKnow DS v0.8.2 (7375f18)

September 21, 2018

What's New

- It is now possible to select whether you'd like to skip or overwrite duplicate metrics when uploading metrics to a scorecard from a downloaded JSON file.

- Implemented full support for deactivating users via the user interface.

Bug Fixes

- Statistics lines in histogram charts now properly display statistics from subpopulations when grouped.

- Addressed several minor usability and accuracy issues related to dose and DVH displays.

- Fixed an issue with the patient scorecard where the current value marker would not be displayed in the proper location when only two objectives levels were present.

- Fixed issue that could cause collection scorecard whisker plots to not be displayed for a metric when the metric had not been assigned objectives.

ProKnow DS v0.8.1 (465037b)

September 13, 2018

What's New

- We've adjusted how the visualizer reports information about the current mouse position. The mouse position and current dose value (if there is an active dose) will now only be displayed when using the navigation or probe tools, however, it will now be displayed in all three views. In addition, when the probe tool is active the current image pixel value will also be displayed for the current cursor position (in addition to dose).

- Implemented an optional automatic session timeout that can be configured on a per-organization bases (i.e., applies to all users within an organization). Contact ProKnow DS support for more information on how to enable this security feature for your organization.

- Added units of measure to appropriate exported data (i.e., CSV files).

- Wrapped up the remaining Online Help articles, including several articles under the Collection Analysis and Patient Viewer categories.

Bug Fixes

- Addressed a few reporting issues with differential DVH curves.

- Fixed an issue that could cause DVH calculations to fail in some rare cases.

- Fixed an issue that prevented the "clear filter" button on the Collection > Browse tab from working properly in some cases.

- It is now no longer possible to to create two dose levels with the same value.

- Fixed several issues with editing and creating new dose levels on the Patient > Dose tab.

ProKnow DS v0.8.0 (cb6e743)

September 7, 2018

What's New

- Added an "About ProKnow DS" option under the main ProKnow menu in order to see the current release version of the application.

- Added tooltips to a few locations in the user interface where they were missing.

- Added some detail to the "Configuring your Profile" support article indicating the importance of securely storing API keys.

Bug Fixes

- Fixed an issue where adding a new structure (while editing a structure set) would fail if the structure you selected hadn't finished loading yet.

- Point probe now properly updates its value when switching slices.

Whitelisting ProKnow DS Traffic

If you are a new user attempting to access ProKnow DS from within your organization's network, you may encounter issues while attempting to log in to ProKnow DS or access patient data—especially if you are one of the first people in your organization to use ProKnow DS. This is because your organization's IT department may have firewall policies in place that restrict access to unfamiliar websites or web traffic that it is unable to scan. If you are experiencing any of these symptoms, a firewall configuration may be responsible:

- When you attempt to access your organizations page at **https://*custom-domain*.proknow.com** (where custom-domain is your organization's specific domain), the page is blank and/or does not bring you to a page to enter your login credentials.

- After entering your credentials into the login form, the page "hangs" on the login form or goes blank.

- Some patient data, such as image slices or dose displays, do not load properly in the browser.

When you run into any of these issues, contact us at support@proknow.com so that we may set up a meeting with you where we'll determine if it's related to a firewall setting within your network. If we determine that it's related to a firewall setting, you will need to contact your IT department to request that they add a firewall rule to whitelist ProKnow DS traffic. We can help you draft an email or memo with respect to your specific network setup. Here is a sample template we might use:

> *To Whom It May Concern:*
>
> *I am attempting to access ProKnow DS (https://proknow.com), which is a cloud-based tool used to visualize and analyze radiation therapy data, and the browser-based application is [describe problem].*
>
> *After contacting the developer of the application, they were able to help me inspect the network responses to my browser, and [describe outcome of investigation].*
>
> *The developer would be happy to answer any questions you might have related to the content or functionality of the application. They indicated that emailing support@proknow.com would be the fastest way to answer IT and security related questions that you might have.*
>
> *Please let me know if you need any additional information in order to resolve this issue, and thanks in advance for your assistance.*

How ProKnow Calculates DVH Values

ProKnow as Independent "Gold Standard"

Every TPS has its own technology (i.e. software algorithm) to take radiotherapy objects such as dose and structures and, from them, estimate dose volume histogram (DVH) and other important stats. Some DVH algorithms are more accurate than others, and unfortunately they are highly variable [refs. 1, 2].

We have designed the ProKnow DVH engine to be an industry standard in terms of accuracy and quality. We have tested it using a rigorous testing strategy and benchmark datasets which has been recently published [ref. 2]. For a nice background, please see this presentation: DVH-revisited.pdf.

Our DVH and metric calculation engine is used for all patient datasets, regardless of the TPS in which the dose was calculated. This is good, because it drives out variability and ensures the highest accuracy. However, you may notice some differences compared to your TPS results (differences which are usually minor, but can sometimes be significant). This is normal, and is due to how DVH calculations are implemented by different systems.

Methods Summary

Three of the most important aspects of DVH calculation (described in the document link, above), are (1) how is dose super-sampling implemented for small or complex volumes, and/or coarse dose grids, (2) how does the system handle volume 'end-capping' at superior and inferior borders, and (3) what dose bin resolution (Gy) is used to discretize the each voxel's dose?

Regarding dose bin resolution, the dose bin width will be calculated dynamically, per structure, to ensure that there are at least 1000 (and up to 10,000) bins along the dose axis for each structure, i.e. from zero dose to the structure's max dose. All of these parameters help ensure a smooth, high-resolution, and accurate DVH curve and extracted points.

In terms of super-sampling to get fine dose voxels per structure, ProKnow will do enough super-sampling to ensure at least 10,000 volume elements ("voxels") per structure, no matter how small. Sometimes this means super-sampling a dose resolution < 0.1 mm! Also, super-sampling will be used for any structure with a volume < 200 cc and/or for dose grid resolution < 3 mm.

To ensure min and max dose are captured accurately per structure, all contoured points (i.e., surface points) will have a point dose interpolated at their exact 3D coordinate. If that point dose is lower than the lowest sampled dose voxel inside the structure, or higher than the highest, the min or max dose for that structure will be updated accordingly.

Finally, **on the topic of end-capping**, ProKnow will ensure that the structure's inferior and superior border(s) will be extended halfway to the next dose grid slice, but not to exceed 1.0 mm. One particular

TPS (Eclipse, from Varian) tends to underestimate structure volumes in these directions, leading to smaller volumes and less capture of steep dose gradients [2].

The dose bin resolution, super-sampling, min and max dose refinement, and end-capping rules specified above are improvements on the proven method published in literature. For more detail, please refer to the published article by Nelms et al., "Methods, software and datasets to verify DVH calculations against analytical values: Twenty Years Late(r)." [2]

References

[1] Ebert MV, et al. "Comparison of DVH data from multiple radiotherapy treatment planning systems," Phys Med Biol. 2010 May; 55(11).

[2] Nelms BE, Stambaugh C, Hunt D, Tonner B, Zhang G, and Feygelman V. "Methods, software and datasets to verify DVH calculations against analytical values: Twenty Years Late(r)," Med Phys. 2015 Aug; 42(8).

[3] " DVH Revisited: Everything you (probably) already know and maybe some things you don't (but should)," presented by Ben Nelms as part of 2017 AAMD webinar series for National Dosimetrist's Week.

[4] https://blog.proknowsystems.com/news/dvh-calculation-accuracy/

DVH-revisited.pdf
   (1 MB)

Computed Metric Library

IN THIS ARTICLE

This article enumerates the custom metrics available in ProKnow and covers some frequently asked questions about these metrics.

- Metric Library

- Frequently Asked Questions

    - Q: Why does my treatment planning system report different metric values from ProKnow?

    - Q: What is the "Conformation Number" metric?

Metric Library

The following metrics are available in ProKnow as computed metrics. You can also define custom metrics to track other factors that are important to you.

- Dose (Gy) covering specified volume (%) of ROI

- Dose (Gy) covering specified volume (cc) of ROI

- Dose (Gy) covering whole ROI minus specified volume (cc)

- Volume (%) of ROI covered by specified dose (Gy)

- Volume (cc) of ROI covered by specified dose (Gy)

- Volume (%) of ROI covered by a specified dose range (Gy)

- Volume (cc) of ROI covered by a specified dose range (Gy)

- Total ROI volume (cc)

- Min ROI dose (Gy)

- Mean ROI dose (Gy)

- Max ROI dose (Gy)

- Integral ROI dose (Gy · cc)

- Global max dose (Gy)
  Max dose value over the whole dose grid

- Conformation Number
  (Specified ROI volume-at-dose)^2/(vol ROI · total irradiated volume-at-dose)

- Conformality Index
  (Volume receiving specified dose)/(volume of specified ROI)

- Dose Spillage
  Total volume (cc) covered by specified dose (Gy) / Volume (cc) of the specified structure covered by specified dose (Gy)

- Gradient Index
  Total volume (cc) covered by lower specified dose (Gy) / Total volume (cc) covered by higher specified dose (Gy)

- Modified Gradient Index
  Total volume (cc) covered by lower specified dose (Gy) / Volume (cc) of the specified structure covered by higher specified dose (Gy)

- Homogeneity Index
  (Specified ROI D01% – D99%)/(prescription dose)

- Inhomogeneity Index
  (Max ROI dose – min ROI dose)/(mean ROI dose)

- Volume of Regret
  Volume (cc) receiving specified dose but outside specified ROI

- Irradiated Volume
  Total volume (cc) receiving specified dose over whole grid

- Cumulative meterset
  (MU or min) over all treatment beams

- Dose (%) relative to specified prescription covering specified volume (%) of the specified structure

- Dose (%) relative to specified prescription covering specified volume (cc) of the specified structure

- Dose (%) relative to specified prescription covering the total volume (cc) minus specified volume (cc) of the specified structure

- Volume (cc) of the specified structure covered by specified percent (%) dose relative to specified prescription

- Volume (%) of the specified structure covered by specified percent (%) dose relative to specified prescription

- Volume (%) of ROI covered by a specified dose range (%) dose relative to specified prescription

- Volume (cc) of ROI covered by a specified dose range (%) dose relative to specified prescription

- Minimum dose (%) relative to specified prescription to the specified structure

- Maximum dose (%) relative to specified prescription to the specified structure

- Mean dose (%) relative to specified prescription to the specified structure

- Global max dose (%) relative to specified prescription
  Max dose value over the whole dose grid relative to the specified prescription

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- Volume of Regret (Relative)
  Volume (cc) receiving specified percent of specified prescription dose but outside of the specified ROI

- Irradiated Volume (Relative)
  Total volume (cc) receiving specified percent of specified prescription dose over whole grid

- Conformation Number (Relative)
  (Specified ROI volume-at-prescription-dose)^2/(vol ROI · total irradiated volume-at-prescription-dose)

- Conformality Index (Relative)
  (Volume receiving specified prescription dose)/(volume of specified ROI)

- Dose Spillage (Relative)
  Total volume (cc) covered by specified percent (%) dose relative to specified prescription / Volume (cc) of the specified structure covered by specified percent (%) dose relative to specified prescription

- Gradient Index (Relative)
  Total volume (cc) covered by lower specified percent (%) dose relative to specified prescription / Total volume (cc) covered by higher specified percent (%) dose relative to specified prescription

- Modified Gradient Index (Relative)
  Total volume (cc) covered by lower specified percent (%) dose relative to specified prescription / Volume (cc) of the specified structure covered by higher specified percent (%) dose relative to specified prescription

- Homogeneity Index (Relative)
  (Specified ROI D01% – D99%)/(prescription dose)

Frequently Asked Questions

Q: Why does my treatment planning system report different metric values from ProKnow?

Some treatment planning systems calculate DVHs differently from ProKnow. Read more about these differences in How ProKnow Calculates DVH Values.

Q: What is the "Conformation Number" metric?

There are many conformity indices in our field, some more useful than others.

We often use the "Conformation Number" (CN) metric which was originally described by Van't Riet et al. The CN does a great job in capturing both the coverage of the target by the reference dose and the shaping of the reference dose outside the target.

The CN is summarized by the equation:

CN = (TVRI * TVRI)/(TV * VRI)

TVRI = Target volume covered by the reference dose (cc), TV = Total target volume (cc), VRI = Volume of the reference dose (cc)

References

Feuvret et al. "Conformity Index: A Review," Int. J. Radiation Oncology Biol. Phys 2006; 64(2).

DICOM Conformance Statement

Updated January 21, 2022, for ProKnow DS v1.30.0

1. Conformance Statement Overview

ProKnow DS is a cloud-based RT-PACS (Radiation Therapy Picture/Patient Archiving and Communication System). It enables radiotherapy professionals to archive, inspect, analyze, and interact with radiation therapy patient data for retrospective studies, prospective analysis, and clinical decision support. Although most patient data will be generated and imported from external systems, ProKnow DS also allows users to interact with patient data by performing common tasks such as structure renaming, Boolean operations, and contouring.

ProKnow DS does not support any of the DICOM networking services (transfer, query/retrieve, workflow management, print management). Instead, a user interface is provided to upload and download DICOM files. In addition, ProKnow DS contains a private REST API to receive uploaded files from a client-side application and ProKnow DICOM DS local data services. Table 1-1 identifies the standard SOP classes supported by ProKnow DS.

Table 1-1. Supported Standard SOP Classes

SOP Class Name	SOP Class UID	PS 3.3 Reference
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	A.3
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	A.4
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	A.21
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	A.18
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	A.19
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	A.20
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	A.49
Spatial Registration	1.2.840.10008.5.1.4.1.1.66.1	C.20

2. Table of Contents

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C.8.8.5-Export	Structure Set Module (C.8.8.5) Export
C.8.8.6-Export	ROI Contour Module (C.8.8.6) Export

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C.8.8.8-Export	RT ROI Observations Module Export (C.8.8.8)
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C.7.6.1-Export-Dose	General Image Module (C.7.6.1) Export for RT Dose
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C.12.2-Import	Common Instance Reference Module (C.12.2) Import

3. Introduction

3.1. Revision History

Table 3-1. Revision History

Document Revision	Date of Issue	Description of Change
A	September 28, 2018	Initial release
B	August 16, 2019	Addition of Spatial Registration support
C	November 26, 2019	Addition of Dose Compositing support
D	June 30, 2020	Fixed omission of Structure Set Name (3006,0004) from statement
E	August 6, 2020	Addition of non-standard Application Setup Types
F	August 7, 2020	Addition of RT Prescription support
G	December 21, 2021	Updates to "Networking" and "Media Interchange" sections as well as improvements to the Notes column in several "Usage of Attributes from Received IODs" tables
H	January 21, 2022	Minor changes to wording throughout to improve clarity; changed "Referenced CT image set" to "Referenced image set" as appropriate; fixed

"Type" and "Notes" columns in the "Common Instance Reference Module (C.12.2) Import" table

3.2. Audience

This document is written for the people that need to understand how ProKnow DS will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.3. Remarks

The scope of this DICOM conformance statement is to facilitate integration between ProKnow DS and other DICOM products. The conformance statement should be read and understood in conjunction with the DICOM standard. DICOM by itself does not guarantee interoperability. The conformance statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality. This conformance statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different conformance statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.

- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.4. Terms and Definitions

Informal definitions are provided for the following terms used in this conformance statement. The DICOM standard is the authoritative source for formal definitions of these terms.

Table 3-2. Terms and Definitions

Term	Definition
Attribute	A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).

Information Entity (IE)	That portion of information defined by a Composite IOD which is related to one specific class of Real-World Object. There is a one-to-one correspondence between Information Entities and entities in the DICOM Application Model.
Information Object Definition (IOD)	The specified set of Attributes that comprise a type of data object, does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex
Service/Object Pair (SOP) Class	The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
Service/Object Pair (SOP) Instance	An information object; a specific occurrence of information exchanged in a SOP Class. Example: a specific x-ray image.
Tag	A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.
Unique Identifier (UID)	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5. Basics of DICOM Communication

This section describes terminology used in this conformance statement for the non-specialist. The key terms used in the conformance statement are highlighted in italics below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Since ProKnow DS does not support any DICOM networking services, these services need to be provided by other applications. ProKnow DS does provide a user interface and private REST API to upload and download files created and used by these other applications.

DICOM specifies a variety of methods for encoding data and denoting transfer syntaxes. The transfer syntax specifies endianness and whether the value representation for each attribute is explicitly provided or whether it must be determined based on the tag using a DICOM dictionary. Each unit of data is formatted in accordance with the appropriate information object definition, using the transfer syntax.

3.6. Abbreviations

Table 3-3. Abbreviations

C	Conditional (Module Usage)
DICOM	Digital Imaging and Communications in Medicine
IE	Information Entity
IOD	Information Object Definition
ISO	International Organization for Standards
M	Mandatory (Module Usage)
NEMA	National Electrical Manufacturers Association
OSI	Open Systems Interconnection
PS 3.2	DICOM Standard Part 2: Conformance
PS 3.3	DICOM Standard Part 3: Information Object Definitions
PS 3.15	DICOM Standard Part 15: Security and System Management Profiles
QA	Quality Assurance
RT	Radiotherapy
SOP	Service-Object Pair

SRO	Spatial Registration Object
U	User Option (Module Usage)
UID	Unique Identifier
VR	Value Representation

3.7. References

Table 3-4. References

NEMA PS3	Digital Imaging and Communications in Medicine (DICOM) Standard, available free at https://www.dicomstandard.org

4. Networking

ProKnow DS does not satisfy the 7.1 DICOM Networking Conformance Requirements defined in PS3.2. Network transfer of data from on-premise clinical systems to the cloud-based ProKnow DS is achieved by utilizing the ProKnow DICOM Agent — a locally installed Windows application. Refer to the ProKnow DICOM Agent support articles for more information.

5. Media Interchange

While ProKnow DS does not fully satisfy the 7.2 DICOM Media Interchange Conformance Requirements defined in PS3.2, it does provide a user interface for uploading and downloading DICOM files. Refer to the Uploads Module and Downloading Patient Objects support articles for more information.

6. Transformation of DICOM to CDA

ProKnow DS does not support any Structured Reporting (SR) objects.

7. Support of Character Sets

ProKnow DS does not support extended character sets.

8. Security

ProKnow DS does not claim conformance to any of the Security and System Management Profiles defined in the DICOM Standard. That being said, data security is one of the most important aspects of the

ProKnow DS design. All data transmission both to and from the Internet (including calls to the REST API to upload DICOM files) is encrypted using secure HTTP access (HTTPS) and all communication between servers is encrypted using HTTPS or SSL.

8.1. Security Profiles

No Security Profiles are supported.

8.2. Association Level Security

ProKnow DS does not support Association Level Security.

8.3. Application Level Security

Any users logging into ProKnow DS must identify themselves with, at a minimum, an email and password. It is also possible to utilize multi-factor authentication (enabled at a per-user or organization-wide level) to further enhance security.

9. Annexes

9.1. IOD Contents

9.1.1. Created SOP Instances

The following tables use a number of abbreviations. The abbreviations used in the "Presence of Value" column are:

VNAP – Value Not Always Present (attribute saved with zero length if no value is present)
ANAP – Attribute Not Always Present
ALWAYS – Always Present
EMPTY – Attribute is sent without a value
N/A – Attribute does not have a value, e.g., a sequence (SQ)

The abbreviations used in the "Source" column are:

USER – the attribute value source is from User input
AUTO – the attribute value is generated automatically

9.1.1.1. RT Structure Set IOD (A.19) Export

ProKnow DS creates RT Structure Set SOP instances as either new or edited instances. The attribute values saved are the same as the values in the referenced image instances, except where noted to facilitate interoperability with external systems.

RT Structure Set IOD (A.19) Export

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Export
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Export
Series	RT Series	C.8.8.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Export
Equipment	General Equipment	C.7.5.1	See General Equipment Module (C.7.5.1) Export
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Export
Structure Set	Structure Set	C.8.8.5	See Structure Set Module (C.8.8.5) Export
	ROI Contour	C.8.8.6	See ROI Contour Module (C.8.8.6) Export
	RT ROI Observations	C.8.8.8	See RT ROI Observations Module (C.8.8.8) Export
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Export

Structure Set Module (C.8.8.5) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Structure Set Label	(3006,0002)	SH	Copied	ALWAYS	Input SOP instance(s) or USER
Structure Set Name	(3006,0004)	LO	Copied	ALWAYS	Input SOP instance(s) or USER
Structure Set Date	(3006,0008)	DA		EMPTY	
Structure Set Time	(3006,0009)	TM		EMPTY	

Referenced Frame of Reference Sequence	(3006,0010)	SQ		N/A	
>Frame of Reference UID	(0020,0052)	UI	Copied	ALWAYS	Referenced image set
>RT Referenced Study Sequence	(3006,0012)	SQ		N/A	
>>Referenced SOP Class UID	(0008,1150)	UI	Copied	ALWAYS	Referenced image set
>>Referenced SOP Instance UID	(0008,1155)	UI	Copied	ALWAYS	Referenced image set
>>RT Referenced Series Sequence	(3006,0014)	SQ		N/A	
>>>Series Instance UID	(0020,000E)	UI	Copied	ALWAYS	Referenced image set
>>>Contour Image Sequence	(3006,0016)	SQ		N/A	
>>>>Referenced SOP Class UID	(0008,1150)	UI	Copied	ALWAYS	Referenced image set
>>>>Referenced SOP Instance UID	(0008,1155)	UI	Copied	ALWAYS	Referenced image set
Structure Set ROI Sequence	(3006,0020)	SQ		N/A	
>ROI Number	(3006,0022)	IS	Copied or uniquely generated	ALWAYS	Input SOP instance
>Referenced Frame of Reference UID	(3006,0024)	UI	Copied	ALWAYS	Referenced image set
>ROI Name	(3006,0026)	LO	Copied	ALWAYS	Input SOP instance or USER
>ROI Generation Algorithm	(3006,0036)	CS	"MANUAL"	ALWAYS	

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ROI Contour Module (C.8.8.6) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
ROI Contour Sequence	(3006,0039)	SQ			
>Referenced ROI Number	(3006,0084)	IS	Copied or the number of the new ROI	ALWAYS	Input SOP instance or AUTO
>ROI Display Color	(3006,002A)	IS	Copied or the assigned color	ALWAYS	Input SOP instance or USER
>Contour Sequence	(3006,0040)	SQ			
>>Contour Image Sequence	(3006,0016)	SQ	NOTE: Not present for existing POINT ROIs		
>>>Referenced SOP Class UID	(0008,1150)	UI	Copied or SOP class UID of image on which contour was drawn	ALWAYS	Referenced image set
>>>Referenced SOP Instance UID	(0008,1155)	UI	Copied or SOP instance UID of image on which contour was drawn	ALWAYS	Referenced image set
>>Contour Geometric Type	(3006,0042)	CS	Copied or "CLOSED_PLANAR" for new contours	ALWAYS	Input SOP instance or AUTO
>>Number of Contour Points	(3006,0046)	IS	Copied or the number of contour points drawn	ALWAYS	Input SOP instance or AUTO
>>Contour Data	(3006,0050)	DS	Copied or the contour points drawn	ALWAYS	Input SOP instance or AUTO

RT ROI Observations Module Export (C.8.8.8)

Attribute Name	Tag	VR	Value	Presence of Value	Source
RT ROI Observations Sequence	(3006,0080)	SQ			
>Observation Number	(3006,0082)	IS	Copied or the number of the new observation	ALWAYS	Input SOP instance or AUTO
>Referenced ROI Number	(3006,0084)	IS	Copied or the number of the new ROI	ALWAYS	Input SOP instance or AUTO
>RT ROI Interpreted Type	(3006,00A4)	CS	Copied or the user assigned value	VNAP	Input SOP instance or USER
>ROI Interpreter	(3006,00A6)	PN		EMPTY	

9.1.1.2. RT Dose IOD (A.18) Export

ProKnow DS creates RT Dose SOP instances as combinations of other RT Dose SOP instances, possibly transformed by Spatial Registration SOP instances and scaled or offset by constants. The attribute values saved are either copied from one of the input SOP instances or are user assigned values, except where noted to facilitate interoperability with external systems.

RT Dose IOD (A.18) Export

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Export
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Export
Series	RT Series	C.8.8.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Export
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Export

Equipment	General Equipment	C.7.5.1	See General Equipment Module (C.7.5.1) Export
Dose	General Image	C.7.6.1	See General Image Module (C.7.6.1) Export for RT Dose
	Image Plane	C.7.6.2	See Image Plane Module (C.7.6.2) Export
	Image Pixel	C.7.6.3	See Image Pixel Module (C.7.6.3) Export
	Multi-frame	C.7.6.6	See Multi-frame Module (C.7.6.6) Export
	RT Dose	C.8.8.3	See RT Dose Module (C.8.8.3) Export
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Export

General Image Module (C.7.6.1) Export for RT Dose

Attribute Name	Tag	VR	Value	Presence of Value	Source
Instance Number	(0020,0013)	IS	"1"	ALWAYS	AUTO
Image Comments	(0020,4000)	LT	Derived	ALWAYS	String formatted equation describing how the input dose entities (including scales and offsets) were composed. Please note that the indices of referenced dose entities (e.g., D0, D1, D2) refer to the indices within the Referenced Instance Sequence (0008,114A).

RT Dose Module (C.8.8.3) Export

Refer to General Image Module (C.7.6.1) Export for RT Dose for duplicate attribute Instance Number. Refer to Image Plane Module (C.7.6.2) Export for duplicate attributes Samples per Pixel, Photometric Interpretation, Bits Allocated, Bits Stored, High Bit, and Pixel Representation.

Attribute Name	Tag	VR	Value	Presence of Value	Source
Content Date	(0008,0023)	DA	creation date	ALWAYS	AUTO

Content Time	(0008,0033)	TM	creation time	ALWAYS	AUTO
Dose Units	(3004,0002)	CS	"GY"	ALWAYS	AUTO
Dose Type	(3004,0004)	CS	"PHYSICAL" or "EFFECTIVE"	ALWAYS	Input SOP instance(s) or USER
Dose Comment	(3004,0006)	LO	Derived or the user assigned value	ALWAYS	Input SOP instance(s) and composition equation or USER
Dose Summation Type	(3004,000A)	CS	"PLAN" or "MULTI_PLAN"	ALWAYS	Input SOP instance(s)
Referenced RT Plan Sequence	(300C,0002)	SQ		N/A	
>Referenced SOP Class UID	(0008,1150)	UI	Derived	ALWAYS	Input SOP instance(s)
>Referenced SOP Instance UID	(0008,1155)	UI	Derived	ALWAYS	Input SOP instance(s)
Grid Frame Offset Vector	(3004,000C)	DS	Derived	ALWAYS	Input SOP instance(s) or AUTO
Dose Grid Scaling	(3004,000E)	DS	Derived	ALWAYS	Dose composition results
Tissue Heterogeneity Correction	(3004,0014)	CS	Derived	ALWAYS	Input SOP instance(s)
Referenced Instance Sequence	(0008,114A)	SQ		N/A	References the set of RT Dose SOP Instances used to derive

					this RT Dose SOP Instance. One or more items will be present.
>Referenced SOP Class UID	(0008,1150)	UI	"1.2.840.10008.5.1.4.1.1.481.2"	ALWAYS	AUTO
>Referenced SOP Instance UID	(0008,1155)	UI	Derived	ALWAYS	Input SOP instance(s)
>Purpose of Reference Code Sequence	(0040,A170)	SQ		N/A	Code describing the purpose of the reference to the Instance(s). Only one item will be present.
>>Code Value	(0008,0100)	SH	"121372"	ALWAYS	AUTO
>>Coding Scheme Designator	(0008,0102)	SH	"DCM"	ALWAYS	AUTO
>>Coding Scheme Version	(0008,0103)	SH	"20140106"	ALWAYS	AUTO
>>Code Meaning	(0008,0104)	LO	"Source dose for composing current dose"	ALWAYS	AUTO

9.1.1.3. Spatial Registration IOD (A.39) Export

ProKnow DS creates Spatial Registration SOP instances. The attribute values saved are the same as the values in the referenced image instances, except where noted to facilitate interoperability with external systems.

Spatial Registration IOD (A.39) Export

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Export

Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Export
Series	General Series	C.7.3.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Export
	Spatial Registration Series	C.20.1	See Spatial Registration Series Module (C.20.1) Export
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Export
Equipment	General Equipment	C.7.5.1	See General Equipment Module (C.7.5.1) Export
Spatial Registration	Spatial Registration	C.20.2	See Spatial Registration Module (C.20.2) Export
	Common Instance Reference	C.12.2	See Common Instance Reference Module (C.12.2) Export
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Export

Spatial Registration Series Module (C.20.1) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	"REG"	ALWAYS	AUTO

Spatial Registration Module (C.20.2) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Content Date	(0008,0023)	DA	Date SRO was last updated	ALWAYS	AUTO
Content Time	(0008,0033)	TM	Time SRO was last updated	ALWAYS	AUTO
Instance Number	(0020,0013)	IS	0	ALWAYS	AUTO
Content Label	(0070,0080)	CS	"REGISTRATION"	ALWAYS	AUTO
Content Description	(0070,0081)	LO	SRO Name	ALWAYS	USER

Content Creator's Name	(0070,0084)	PN		EMPTY	
Registration Sequence	(0070,0308)	SQ			
>Frame of Reference UID	(0020,0052)	UI	Frame of reference of source or target coordinate system	ALWAYS	AUTO
>Referenced Image Sequence	(0008,1140)	SQ			
>>Referenced SOP Class UID Sequence	(0008,1150)	UI	Class UID of referenced image set	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance UID of referenced image set	ALWAYS	AUTO
>Matrix Registration Sequence	(0070,0309)	SQ			
>>Registration Type Code Sequence	(0070,030D)	SQ			
>>>Code Value	(0008,0100)	SH	"125025"	ALWAYS	AUTO
>>>Coding Scheme Designator	(0008,0102)	SH	"DCM"	ALWAYS	AUTO
>>>Coding Scheme Version	(0008,0103)	SH	"20040115"	ALWAYS	AUTO
>>>Code Meaning	(0008,0104)	LO	"Visual Alignment"	ALWAYS	AUTO
>>Matrix Sequence	(0070,030A)	SQ			
>>>Frame Of Reference Transformation Matrix	(0070,030A)	DS	SRO 4x4 affine transformation matrix	ALWAYS	USER
>>>Frame Of Reference Transformation Matrix Type	(0070,030C)	CS	"RIGID"	ALWAYS	AUTO

9.1.1.4. Common Modules Export

Patient Module (C.7.1.1) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Patient's Name	(0010,0010)	PN	Copied	VNAP	Input SOP instance(s)
Patient's ID	(0010,0020)	LO	Copied	VNAP	Input SOP instance(s)
Patient's Birth Date	(0010,0030)	DA	Copied	VNAP	Input SOP instance(s)
Patient's Birth Time	(0010,0032)	TM	Copied	ANAP	Input SOP instance(s)
Patient's Sex	(0010,0040)	CS	Copied	VNAP	Input SOP instance(s)

General Study Module (C.7.2.1) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Study Instance UID	(0020,000D)	UI	Copied	ALWAYS	Input SOP instance(s)
Study Date	(0008,0020)	DA	Copied	VNAP	Input SOP instance(s)
Study Time	(0008,0030)	TM	Copied	VNAP	Input SOP instance(s)
Referring Physician's Name	(0008,0090)	PN		EMPTY	
Study ID	(0020,0010)	SH	Copied	VNAP	Input SOP instance(s)
Accession Number	(0008,0050)	SH		EMPTY	
Study Description	(0008,1030)	LO	Copied	ANAP	Input SOP instance(s)

General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source

Attribute Name	Tag	VR	Value	Presence of Value	Source
Modality	(0008,0060)	CS	"RTSTRUCT", "RTDOSE", or "SEG", as appropriate	ALWAYS	
Series Instance UID	(0020,000E)	UI	Copied	ALWAYS	Input SOP instance(s)
Series Number	(0020,0011)	IS	Copied	VNAP	Input SOP instance(s)
Series Date	(0008,0021)	DA	Copied	ANAP	Input SOP instance(s)
Series Time	(0008,0031)	TM	Copied	ANAP	Input SOP instance(s)
Series Description	(0008,103E)	LO	Copied	ANAP	Input SOP instance(s)
Operators' Name	(0008,1070)	PN		EMPTY	

Frame of Reference Module (C.7.4.1) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Frame of Reference UID	(0020,0052)	UI	Frame of reference from referenced instances	ALWAYS	AUTO
Position Reference Indicator	(0020,1040)	LO		EMPTY	

General Equipment Module (C.7.5.1) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer	(0008,0070)	LO	"ProKnow"	ALWAYS	AUTO

Attribute Name	Tag	VR	Value	Presence of Value	Source
Manufacturer's Model Name	(0008,1090)	LO	"ProKnow DS"	ALWAYS	AUTO

Image Plane Module (C.7.6.2) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Pixel Spacing	(0028,0030)	DS	Derived or specified	ALWAYS	Input SOP instance(s) or USER
Image Orientation (Patient)	(0020,0037)	DS	(+/-1, 0, 0, 0, +/-1, 0)	ALWAYS	Input SOP instance(s) or AUTO
Image Position (Patient)	(0020,0032)	DS	Derived	ALWAYS	Input SOP instance(s) or AUTO
Slice Thickness	(0018,0050)	DS		EMPTY	

Image Pixel Module (C.7.6.3) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Samples per pixel	(0028,0002)	US	1	ALWAYS	AUTO
Photometric Interpretation	(0028,0004)	CS	"MONOCHROME2"	ALWAYS	AUTO
Rows	(0028,0010)	US	Derived	ALWAYS	Input SOP instance(s) or AUTO
Columns	(0028,0011)	US	Derived	ALWAYS	Input SOP instance(s) or AUTO
Bits Allocated	(0028,0100)	US	16	ALWAYS	AUTO
Bits Stored	(0028,0101)	US	16	ALWAYS	AUTO
High Bit	(0028,0102)	US	15	ALWAYS	AUTO

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Pixel Representation	(0028,0103)	US	0	ALWAYS	AUTO
Pixel Data	(7FE0,0010)	OW	Derived	ALWAYS	Input SOP instance(s) and USER

Multi-frame Module (C.7.6.6) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Number of Frames	(0028,0008)	IS	Derived	ALWAYS	Input SOP instance(s) or AUTO
Frame Increment Pointer	(0028,0009)	AT	Value of attribute (3004,000C)	ALWAYS	AUTO

SOP Common Module (C.12.1) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
SOP Class UID	(0008,0016)	UI	Specific class UID for instance	ALWAYS	AUTO
SOP Instance UID	(0008,0018)	UI	SOP Instance UID	ALWAYS	AUTO

Common Instance Reference Module (C.12.2) Export

Attribute Name	Tag	VR	Value	Presence of Value	Source
Referenced Series Sequence	(0008,1115)	SQ		ANAP	
>Series Instance UID	(0020,000E)	UI	Referenced Series Instance UID	ALWAYS	AUTO
>Referenced Instance Sequence	(0008,114A)	SQ		ALWAYS	
>>Referenced SOP Class UID	(0008,1150)	UI	SOP Class UID of Referenced Instance	ALWAYS	AUTO
>>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance UID of	ALWAYS	AUTO

			Referenced Instance		
Studies Containing Other Referenced Instances Sequence	(0008,1200)	SQ		ANAP	
>Study Instance UID	(0020,000E)	UI	Referenced Study Instance UID	ALWAYS	AUTO
>Referenced Series Sequence	(0008,1115)	SQ		ANAP	
>>Series Instance UID	(0020,000E)	UI	Referenced Series Instance UID	ALWAYS	AUTO
>>Referenced Instance Sequence	(0008,114A)	SQ		ALWAYS	
>>>Referenced SOP Class UID	(0008,1150)	UI	SOP Class UID of Referenced Instance	ALWAYS	AUTO
>>>Referenced SOP Instance UID	(0008,1155)	UI	SOP Instance UID of Referenced Instance	ALWAYS	AUTO

9.1.2. Usage of Attributes from Received IODs

The following sections list the attributes used in the ProKnow DS implementation of each information object, along with any additional attribute requirements not already specified in the DICOM Standard.

9.1.2.1. CT Image IOD (A.3) Import

CT Image IOD (A.3) Import

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Import
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Import
Series	General Series	C.7.3.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Import

Image	Image Plane	C.7.6.2	See Image Plane Module (C.7.6.2) Import
	Image Pixel	C.7.6.3	See Image Pixel Module (C.7.6.3) Import
	CT Image	C.8.2.1	See CT Image Module (C.8.2.1) Import
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Import

CT Image Module (C.8.2.1) Import

Attribute Name	Tag	Type	Notes
Rescale Intercept	(0028,1052)	1	Rescale Intercept
Rescale Slope	(0028,1053)	1	Rescale Slope

9.1.2.2. MR Image IOD (A.4) Import

MR Image IOD (A.4) Import

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Import
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Import
Series	General Series	C.7.3.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Import
	Image Plane	C.7.6.2	See Image Plane Module (C.7.6.2) Import
Image	Image Pixel	C.7.6.3	See Image Pixel Module (C.7.6.3) Import
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Import

9.1.2.3. PET Image IOD (A.21) Import

PET Image IOD (A.21) Import

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Import
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Import
Series	General Series	C.7.3.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
	PET Series	C.8.9.1	See PET Series Module (C.8.9.1) Import
	PET Isotope	C.8.9.2	See PET Isotope Module (C.8.9.2) Import
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Import
Image	Image Plane	C.7.6.2	See Image Plane Module (C.7.6.2) Import
	Image Pixel	C.7.6.3	See Image Pixel Module (C.7.6.3) Import
	PET Image	C.8.9.4	See PET Image Module (C.8.9.4) Import
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Import

PET Series Module (C.8.9.1) Import

Attribute Name	Tag	Type	Notes
Units	(0054,1001)	1	SUV calculation requires BQML or CNTS
Counts Source	(0054,1002)	1	SUV calculation requires EMISSION
Corrected Image	(0028,0051)	2	SUV calculation requires both DECY and ATTN
Decay Correction	(0054,1102)	1	SUV calculation requires START or ADMIN

PET Isotope Module (C.8.9.2) Import

Attribute Name	Tag	Type	Notes
Radiopharmaceutical	(0054,0016)	2	

Information Sequence

>Radiopharmaceutical Start Time	(0018,1072)	3	Used in SUV calculation if Radiopharmaceutical Start DateTime (0018,1078) is not present
>Radiopharmaceutical Start DateTime	(0018,1078)	3	Used in SUV calculation in preference to Radiopharmaceutical Start Time (0018,1072), when both are present
>Radionuclide Total Dose	(0018,1074)	3	Defaults to 0 if not present
>Radionuclide Half Life	(0018,1075)	3	Defaults to 0 if not present

PET Image Module (C.8.9.4) Import

Attribute Name	Tag	Type	Notes
Image Type	(0008,0008)	1	
Acquisition Date	(0008,0022)	2	Earliest value in the image series is used as start of acquisition date for SUV calculation
Acquisition Time	(0008,0032)	2	Earliest value in the image series is used as start of acquisition time for SUV calculation
Private Creator (GE)	(0009,0010)	3	If present, indicates the presence of GE (0009,1xxx) private tags for SUV calculation. Must be "GEMS_PETD_01"
PET scan_datetime	(0009,100D)	3	If present, used for the start of acquisition in preference to Acquisition Date (0008,0022) and Acquisition Time (0008,0032) if Series Date (0008,0021) and Series Time (0008,0031) are later, i.e., image series was post-processed
Private Creator (Philips)	(7053,0010)	3	If present, indicates the presence of Philips (7053,1xxx) private tags for SUV calculation. Must be "Philips PET Private Group"
SUV Scale Factor	(7053,1000)	3	If present, enables the "Philips SUV" calculation mode which applies this scale factor to convert counts to SUV
Activity	(7053,1009)	3	If present, enables recalculation of CNTS into BQML using this

| Concentration Scale Factor | | | scale factor |

9.1.2.4. RT Structure Set IOD (A.19) Import

RT Structure Set IOD (A.19) Import

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Import
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Import
Series	RT Series	C.8.8.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
Structure Set	Structure Set	C.8.8.5	See Structure Set Module (C.8.8.5) Import
	ROI Contour	C.8.8.6	See ROI Contour Module (C.8.8.6) Import
	RT ROI Observations	C.8.8.8	See RT ROI Observations Module (C.8.8.8) Import
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Import

Structure Set Module (C.8.8.5) Import

Attribute Name	Tag	Type	Notes
Structure Set Label	(3006,0002)	1	Used as the object label, if Structure Set Name (3006,0004) is not present or is empty
Structure Set Name	(3006,0004)	3	Used as the object label
Structure Set Date	(3006,0008)	2	
Structure Set Time	(3006,0009)	2	
Referenced Frame of Reference Sequence	(3006,0010)	3	Required

>Frame of Reference UID	(0020,0052)	1	
>RT Referenced Study Sequence	(3006,0012)	3	
>>Referenced SOP Class UID	(0008,1150)	1	
>>Referenced SOP Instance UID	(0008,1155)	1	
>>RT Referenced Series Sequence	(3006,0014)	1	
>>>Series Instance UID	(0020,000E)	1	
Structure Set ROI Sequence	(3006,0020)	1	
>ROI Number	(3006,0022)	1	
>Referenced Frame of Reference UID	(3006,0024)	1	
>ROI Name	(3006,0026)	2	If not present, defaults to "Unnamed", "Unnamed (1)", etc.
>ROI Generation Algorithm	(3006,0036)	2	Displayed as "Method" for ROI in Structures tab

ROI Contour Module (C.8.8.6) Import

Attribute Name	Tag	Type	Notes
ROI Contour Sequence	(3006,0039)	1	
>Referenced ROI Number	(3006,0084)	1	
>ROI Display Color	(3006,002A)	3	If not present, defaults to red (255, 0, 0)
>Contour Sequence	(3006,0040)	3	
>>Contour Geometric Type	(3006,0042)	1	

>>Contour Data	(3006,0050)	1

RT ROI Observations Module (C.8.8.8) Import

Attribute Name	Tag	Type	Notes
RT ROI Observations Sequence	(3006,0080)	1	
>Referenced ROI Number	(3006,0084)	1	
>RT ROI Interpreted Type	(3006,00A4)	2	If not provided, default to "UNSPECIFIED"

9.1.2.5. RT Plan IOD (A.20) / RT Ion Plan IOD (A.49) Import

RT Plan IOD (A.20) / RT Ion Plan IOD (A.49) Import

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Import
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Import
Series	RT Series	C.8.8.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Import
Equipment	General Equipment	C.7.5.1	See General Equipment Module (C.7.5.1) Import
Plan	RT General Plan	C.8.8.9	See RT General Plan Module (C.8.8.9) Import
	RT Prescription	C.8.8.10	See RT Prescription Module (C.8.8.10) Import
	RT Patient Setup	C.8.8.12	See RT Patient Setup Module (C.8.8.12) Import
	RT Fraction Scheme	C.8.8.13	See RT Fraction Scheme Module (C.8.8.13) Import

RT Beams, RT Ion Beams	C.8.8.14, C8.8.25		See RT Beams Module (C.8.8.14) / RT Ion Beams Module (C.8.8.25) Import
RT Brachy Application Setups	C.8.8.15		See RT Brachy Application Setups Module (C.8.8.15) Import
SOP Common	C.12.1		See SOP Common Module (C.12.1) Import

RT General Plan Module (C.8.8.9) Import

Attribute Name	Tag	Type	Notes
RT Plan Label	(300A,0002)	1	Used as the object label if RT Plan Name (3000A,0003) is not present or is empty
RT Plan Name	(300A,0003)	3	Used as the object label
RT Plan Description	(300A,0004)	3	
Instance Number	(0020,0013)	3	
RT Plan Date	(300A,0006)	2	
RT Plan Time	(300A,0007)	2	
Plan Intent	(300A,000A)	3	
RT Plan Geometry	(300A,000C)	1	
Referenced Structure Set Sequence	(300C,0060)	1C	
>Referenced SOP Class UID	(0008,1150)	1	
>Referenced SOP Instance UID	(0008,1155)	1	
Referenced Dose Sequence	(300C,0080)	3	

>Referenced SOP Class UID	(0008,1150)	1
>Referenced SOP Instance UID	(0008,1155)	1
Referenced RT Plan Sequence	(300C,0002)	3
>Referenced SOP Class UID	(0008,1150)	1
>Referenced SOP Instance UID	(0008,1155)	1

RT Prescription Module (C.8.8.10) Import

Attribute Name	Tag	Type	Notes
Prescription Description	(300A,000E)	3	
Dose Reference Sequence	(300A,0010)	3	
>Dose Reference Number	(300A,0012)	1	If not provided or a duplicate is encountered, dose reference will be ignored (omitted from prescription).
>Dose Reference UID	(300A,0013)	3	
>Dose Reference Structure Type	(300A,0014)	1	If not provided, dose reference will be ignored (omitted from prescription).
>Dose Reference Description	(300A,0016)	3	

>Dose Reference Point Coordinates	(300A,0018)	3	If not provided and Dose Reference Structure Type is "COORDINATES", dose reference will be ignored (omitted from prescription).
>Dose Reference Type	(300A,0020)	1	If not provided, dose reference will be ignored (omitted from prescription). If "TARGET", the prescribed dose will be extracted from the first provided tag in the following list of tags: Target Prescription Dose (300A,0026), Target Maximum Dose (300A,0027), Target Minimum Dose (300A,0025), Delivery Maximum Dose (300A,0023), Delivery Warning Dose (300A,0022). If "ORGAN_AT_RISK", the prescribed dose will be extracted from the first provided tag in the following list of tags: Organ at Risk Full-volume Dose (300A,002A), Organ at Risk Limit Dose (300A,002B), Organ at Risk Maximum Dose (300A,002C), Delivery Maximum Dose (300A,0023), Delivery Warning Dose (300A,0022).
>Delivery Warning Dose	(300A,0022)	3	See comment for Dose Reference Type (300A,0020)
>Delivery Maximum Dose	(300A,0023)	3	See comment for Dose Reference Type (300A,0020)
>Target Minimum Dose	(300A,0025)	3	See comment for Dose Reference Type (300A,0020)
>Target Prescription Dose	(300A,0026)	3	See comment for Dose Reference Type (300A,0020)
>Target Maximum Dose	(300A,0027)	3	See comment for Dose Reference Type (300A,0020)
>Organ at Risk Full-volume Dose	(300A,002A)	3	See comment for Dose Reference Type (300A,0020)
>Organ at	(300A,002B)	3	See comment for Dose Reference Type (300A,0020)

Risk Limit Dose			
>Organ at Risk Maximum Dose	(300A,002C)	3	See comment for Dose Reference Type (300A,0020)

RT Patient Setup Module (C.8.8.12) Import

Attribute Name	Tag	Type	Notes
Patient Setup Sequence	(300A,0180)	1	
>Patient Setup Number	(300A,0182)	1	
>Patient Setup Label	(300A,0183)	3	
>Patient Position	(0018,5100)	1C	Required

RT Fraction Scheme Module (C.8.8.13) Import

Attribute Name	Tag	Type	Notes
Fraction Group Sequence	(300A,0070)	1	
>Fraction Group Number	(300A,0071)	1	
>Fraction Group Description	(300A,0072)	3	
>Number of Fractions Planned	(300A,0078)	2	
>Referenced Beam Sequence	(300C,0004)	1C	
>>Referenced Beam Number	(300C,0006)	1	
>>Beam Dose Specification Point	(300A,0082)	3	
>>Beam Dose	(300A,0084)	3	
>>Beam Meterset	(300A,0086)	3	

Attribute Name	Tag	Type	Notes
>Referenced Brachy Application Setup Sequence	(300C,000A)	1C	
>>Referenced Brachy Application Setup Number	(300C,000C)	1	
>>Brachy Application Setup Dose Specification Point	(300A,00A2)	3	
>>Brachy Application Setup Dose	(300A,00A4)	3	

RT Beams Module (C.8.8.14) / RT Ion Beams Module (C.8.8.25) Import

Attribute Name	Tag	Type	Notes
Beam Sequence, Ion Beam Sequence	(300A,00B0), (300A,03A2)	1	RT Plan, RT Ion Plan
>Beam Number	(300A,00C0)	1	
>Beam Name	(300A,00C2)	3	
>Beam Description	(300A,00C3)	3	
>Beam Type	(300A,00C4)	1	
>Radiation Type	(300A,00C6)	2	If present, used to compute delivery Modality for Beams on Plan tab
>Primary Fluence Mode Sequence	(3002,0050)	3	RT Beams only
>>Fluence Mode	(3002,0051)	1	RT Beams only
>>Fluence Mode ID	(3002,0052)	1C	RT Beams only; if present, included in Energy for Beams on Plan tab
>High-Dose Technique Type	(300A,00C7)	1C	RT Beams only
>Scan Mode	(300A,0308)	1	RT Ion Beams only
>Treatment Machine Name	(300A,00B2)	2	
>Manufacturer	(0008,0070)	3	
>Institution Name	(0008,0080)	3	

>Institution Address	(0008,0081)	3	
>Institutional Department Name	(0008,1040)	3	
>Manufacturer's Model Name	(0008,1090)	3	
>Device Serial Number	(0018,1000)	3	
>Primary Dosimeter Unit	(300A,00B3)	1	
>Virtual Source Axis Distance	(300A,030A)	1	RT Ion Beams only
>Beam Limiting Device Sequence, Ion Beam Limiting Device Sequence	(300A,00B6), (300A,03A4)	1, 3	RT Beams, RT Ion Beams
>>RT Beam Limiting Device Type	(300A,00B8)	1	
>>Source to Beam Limiting Device Distance	(300A,00BA)	3	RT Beams only
>>Isocenter to Beam Limiting Device Distance	(300A,00BB)	2	RT Ion Beams only
>>Number of Leaf/Jaw Pairs	(300A,00BC)	1	
>>Leaf Position Boundaries	(300A,00BE)	2C	
>Referenced Patient Setup Number	(300C,006A)	3	
>Treatment Delivery Type	(300A,00CE)	3	If present, displayed as the Type for Beams on the Plan tab
>Wedge Sequence, Ion Wedge Sequence	(300A,00D1), (300A,03AA)	1C	RT Beams, RT Ion Beams
>>Wedge Number	(300A,00D2)	1	
>>Wedge Type	(300A,00D3)	2	
>Compensator Sequence, Ion Range Compensator Sequence	(300A,00E3), (300A,02EA)	1C	RT Beams, RT Ion Beams
>>Compensator Number	(300A,00E4)	1	

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>>Material ID	(300A,00E1)	2	
>>Compensator ID	(300A,00E5)	3	
>Referenced Bolus Sequence	(300C,00B0)	1C	
>>Referenced ROI Number	(3006,0084)	1	
>Block Sequence, Ion Block Sequence	(300A,00F4), (300A,03A6)	1C	RT Beams, RT Ion Beams
>>Block Type	(300A,00F8)	1	
>>Block Divergence	(300A,00FA)	1	
>>Block Mounting Position	(300A,00FB)	1	
>>Block Number	(300A,00FE)	1	
>>Material ID	(300A,00E1)	2	
>>Block Thickness	(300A,0100)	1	
>Snout Sequence	(300A,030C)	3	RT Ion Beams only
>>Snout ID	(300A,030F)	1	RT Ion Beams only
>Applicator Sequence	(300A,0107)	3	
>>Applicator ID	(300A,0108)	1	
>>Applicator Type	(300A,0109)	1	
>General Accessory Sequence	(300A,0420)	3	
>>General Accessory Number	(300A,0424)	1	
>>General Accessory ID	(300A,0421)	1	
>>General Accessory Type	(300A,0423)	3	
>Lateral Spreading Device Sequence	(300A,0332)	1C	RT Ion Beams only
>>Lateral Spreading Device Number	(300A,0334)	1	RT Ion Beams only

>>Lateral Spreading Device ID	(300A,0336)	1	RT Ion Beams only
>>Lateral Spreading Device Type	(300A,0338)	1	RT Ion Beams only
>Range Shifter Sequence	(300A,0314)	1C	RT Ion Beams only
>>Range Shifter Number	(300A,0316)	1	RT Ion Beams only
>>Range Shifter ID	(300A,0318)	1	RT Ion Beams only
>>Range Shifter Type	(300A,0320)	1	RT Ion Beams only
>Range Modulator Sequence	(300A,0342)	1C	RT Ion Beams only
>>Range Modulator Number	(300A,0344)	1	RT Ion Beams only
>>Range Modulator ID	(300A,0346)	1	RT Ion Beams only
>>Range Modulator Type	(300A,0348)	1	RT Ion Beams only
>Final Cumulative Meterset Weight	(300A,010E)	1C	
>Control Point Sequence, Ion Control Point Sequence	(300A,0111), (300A,03A8)	1	RT Beams, RT Ion Beams
>>Cumulative Meterset Weight	(300A,0134)	2	
>>Nominal Beam Energy	(300A,0114)	3, 1C	RT Beams, RT Ion Beams
>>Dose Rate Set	(300A,0115)	3	RT Beams only
>>Meterset Rate	(300A,035A)	3	RT Ion Beams only
>>Beam Limiting Device Position Sequence	(300A,011A)	1C	
>>>RT Beam Limiting Device Type	(300A,00B8)	1	
>>>Leaf/Jaw Positions	(300A,011C)	1	
>>Gantry Angle	(300A,011E)	1C	
>>Gantry Rotation Direction	(300A,011F)	1C	

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>>Gantry Pitch Angle	(300A,014A)	3
>>Gantry Pitch Rotation Direction	(300A,014C)	3
>>Beam Limiting Device Angle	(300A,0120)	1C
>>Beam Limiting Device Rotation Direction	(300A,0121)	1C
>>Patient Support Angle	(300A,0122)	1C
>>Patient Support Rotation Direction	(300A,0123)	1C
>>Table Top Pitch Angle	(300A,0140)	1C
>>Table Top Pitch Rotation Direction	(300A,0142)	1C
>>Table Top Roll Angle	(300A,0144)	1C
>>Table Top Roll Rotation Direction	(300A,0146)	1C
>>Isocenter Position	(300A,012C)	2C

RT Brachy Application Setups Module (C.8.8.15) Import

Attribute Name	Tag	Type	Notes
Brachy Treatment Technique	(300A,0200)	1	
Brachy Treatment Type	(300A,0202)	1	
Treatment Machine Sequence	(300A,0206)	1	
>Treatment Machine Name	(300A,00B2)	2	
>Manufacturer	(0008,0070)	3	

>Institution Name	(0008,0080)	3
>Institution Address	(0008,0081)	3
>Institutional Department Name	(0008,1040)	3
>Manufacturer's Model Name	(0008,1090)	3
>Device Serial Number	(0018,1000)	3
Source Sequence	(300A,0210)	1
>Source Number	(300A,0212)	1
>Source Type	(300A,0214)	1
>Source Manufacturer	(300A,0216)	3
>Active Source Diameter	(300A,0218)	3
>Active Source Length	(300A,021A)	3
>Source Isotope Name	(300A,0226)	1
>Source Isotope Half Life	(300A,0228)	1
>Source Strength Units	(300A,0229)	1C
>Reference Air Kerma Rate	(300A,022A)	1

>Source Strength	(300A,022B)	1C	
>Source Strength Reference Date	(300A,022C)	1	
>Source Strength Reference Time	(300A,022E)	1	
Application Setup Sequence	(300A,0230)	1	
>Application Setup Type	(300A,0232)	1	The following non-standard Application Setup Types are permitted: MAMMOSITE, VAGINAL, CERVICAL, UTERINE, BREAST, MULTICATHETER_BREAST_APPLICATOR, HEAD_AND_NECK, SKIN_AND_SURFACE, PANCREAS_AND_BILE_DUCT, GYNECOLOGY, UROLOGY, EXTREMITIES, STOMACH, INTESTINES, ORBITA, SINGLE_CATHETER, MULTI_CATHETER, UNDEFINED
>Application Setup Number	(300A,0234)	1	
>Application Setup Name	(300A,0236)	3	
>Application Setup Manufacturer	(300A,0238)	3	
>Total Reference Air Kerma	(300A,0250)	1	
>Channel Sequence	(300A,0280)	1	
>>Channel Number	(300A,0282)	1	
>>Channel Length	(300A,0284)	2	

>>Channel Total Time	(300A,0286)	1
>>Source Movement Type	(300A,0288)	1
>>Source Applicator Number	(300A,0290)	3
>>Source Applicator ID	(300A,0291)	2C
>>Source Applicator Type	(300A,0292)	1C
>>Source Applicator Name	(300A,0294)	3
>>Source Applicator Length	(300A,0296)	1C
>>Source Applicator Step Size	(300A,02A0)	1C
>>Referenced ROI Number	(3006,0084)	2C
>>Transfer Tube Number	(300A,02A2)	2
>>Reference Source Number	(300C,000E)	1
>>Final Cumulative Time Weight	(300A,02C8)	1C
>>Brachy Control Point Sequence	(300A,02D0)	1

>>>Cumulative Time Weight	(300A,02D6)	2
>>>Control Point Relative Position	(300A,02D2)	1
>>>Control Point 3D Position	(300A,02D4)	3

9.1.2.6. RT Dose IOD (A.18) Import

RT Dose IOD (A.18) Import

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Import
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Import
Series	General Series	C.7.3.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Import
	Image Plane	C.7.6.2	See Image Plane Module (C.7.6.2) Import
	Image Pixel	C.7.6.3	See Image Pixel Module (C.7.6.3) Import
	RT Dose	C.8.8.3	See RT Dose Module (C.8.8.3) Import
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Import

RT Dose Module (C.8.8.3) Import

Attribute Name	Tag	Type	Notes
Dose Type	(3004,0004)	1	

Dose Summation Type	(3004,000A)	1	
Referenced RT Plan Sequence	(300C,0002)	1C	
>Referenced SOP Class UID	(0008,1150)	1	
>Referenced SOP Instance UID	(0008,1155)	1	
>Referenced Fraction Group Sequence	(300C,0020)	1C	
>>Referenced Fraction Group Number	(300C,0022)	1	
>>Referenced Beam Sequence	(300C,0004)	1C	
>>>Referenced Beam Number	(300C,0006)	1	
Grid Frame Offset Vector	(3004,000C)	1C	Dose planes must be uniformly spaced.
Dose Grid Scaling	(3004,000E)	1C	

9.1.2.7. Spatial Registration IOD (A.39) Import

Spatial Registration IOD (A.39) Import

IE	Module	PS 3.3 Reference	Notes
Patient	Patient	C.7.1.1	See Patient Module (C.7.1.1) Import
Study	General Study	C.7.2.1	See General Study Module (C.7.2.1) Import
Series	General Series	C.8.8.1	See General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
	Spatial Registration Series	C.20.1	See Spatial Registration Series Module (C.20.1) Import
Frame of Reference	Frame of Reference	C.7.4.1	See Frame of Reference Module (C.7.4.1) Import

Equipment	General Equipment	C.7.5.1	See General Equipment Module (C.7.5.1) Import
	Spatial Registration	C.20.2	See Spatial Registration Module (C.20.2) Import
Spatial Registration	Common Instance Reference	C.12.2	See Common Instance Reference Module (C.12.2) Import
	SOP Common	C.12.1	See SOP Common Module (C.12.1) Import

Spatial Registration Series Module (C.20.1) Import

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	Must be "REG"

Spatial Registration Module (C.20.2) Import

Attribute Name	Tag	Type	Notes
Content Date	(0008,0023)	1	Used to name SRO if Content Description is not present
Content Time	(0008,0033)	1	Used to name SRO if Content Description is not present
Content Description	(0070,0081)	2	If present, used to name SRO; otherwise, the Content Date and Time are used
Registration Sequence	(0070,0308)	1	Exactly one or two items shall be included in this Sequence
>Frame of Reference UID	(0020,0052)	1C	Required
>Referenced Image Sequence	(0008,1140)	1C	Required
>>Referenced SOP Class UID Sequence	(0008,1150)	1	
>>Referenced SOP Instance UID	(0008,1155)	1	
>Matrix Registration Sequence	(0070,0309)	1	Only a single item shall be included in this Sequence

>>Matrix Sequence	(0070,030A)	1	Only a single item shall be included in this Sequence
>>>Frame Of Reference Transformation Matrix	(0070,030A)	1	
>>>Frame Of Reference Transformation Matrix Type	(0070,030C)	1	Must be "RIGID"

9.1.2.8. Common Module Implementations

Patient Module (C.7.1.1) Import

Attribute Name	Tag	Type	Notes
Patient's Name	(0010,0010)	2	Must be non-empty and not have leading or trailing whitespace
Patient ID	(0010,0020)	2	Must be non-empty and not have leading or trailing whitespace
Patient's Birth Date	(0010,0030)	2	Must be non-empty
Patient's Birth Time	(0010,0032)	3	
Patient's Sex	(0010,0040)	2	Must be non-empty
Patient's Size	(0010,0020)	3	Used in SUV calculations, if present
Patient's Weight	(0010,0030)	2	Used in SUV calculations, if present

General Study Module (C.7.2.1) Import

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	
Study Date	(0008,0020)	2	If present, is third choice for study label on Browse tab
Study Time	(0008,0030)	2	

Study ID	(0020,0010)	2	If present, is first choice for study label on Browse tab
Study Description	(0008,1030)	3	If present, is second choice for study label on Browse tab

General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	
Series Instance UID	(0020,000E)	1	
Series Number	(0020,0011)	2	
Series Date	(0008,0021)	3	
Series Time	(0008,0031)	3	
Series Description	(0008,103E)	3	Used as the object label for image sets and RT Doses

Frame of Reference Module (C.7.4.1) Import

Attribute Name	Tag	Type	Notes
Frame of Reference UID	(0020,0052)	1	

General Equipment Module (C.7.5.1) Import

Attribute Name	Tag	Type	Notes
Manufacturer	(0008,0070)	2	
Institution Name	(0008,0080)	3	
Institution Address	(0008,0081)	3	
Station Name	(0008,1010)	3	
Institutional Department Name	(0008,1040)	3	

Manufacturer's Model Name	(0008,1090)	3	
Device Serial Number	(0018,1000)	3	
Software Versions	(0018,1020)	3	

Image Plane Module (C.7.6.2) Import

Attribute Name	Tag	Type	Notes
Pixel Spacing	(0028,0030	1	Must contain two values
Image Orientation (Patient)	(0020,0037)	1	RT Dose SOP Instances must specify direction cosines as (+/-1, 0, 0, 0, +/-1, 0) or (0, +/-1, 0, +/-1, 0, 0) with an angle tolerance of 0.01 radians, i.e., the dose grid must be orthogonal to the patient coordinate system. CT Image and MR Image SOP Instances may specify any arbitrary (i.e., oblique) direction cosines.
Image Position (Patient)	(0020,0032)	1	

Image Pixel Module (C.7.6.3) Import

Attribute Name	Tag	Type	Notes
Samples per Pixel	(0028,0002)	1	
Photometric Interpretation	(0028,0004)	1	RT Dose only
Rows	(0028,0010)	1	
Columns	(0028,0011)	1	
Bits Allocated	(0028,0100)	1	Must be 16 or 32
Bits Stored	(0028,0101)	1	Must be between 8 and the value of Bits Allocated (0028,0100), inclusive

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High Bit	(0028,0102)	1
Pixel Representation	(0028,0103)	1
Pixel Data	(7FE0,0010)	1C

SOP Common Module (C.12.1) Import

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	Must be correct value for SOP Instance
SOP Instance UID	(0008,0018)	1	

Common Instance Reference Module (C.12.2) Import

Attribute Name	Tag	Type	Notes
Referenced Series Sequence	(0008,1115)	1C	
>Series Instance UID	(0020,000E)	1	
>Referenced Instance Sequence	(0008,114A)	1	
>>Referenced SOP Class UID	(0008,1150)	1	SOP Class UID of Referenced Instance
>>Referenced SOP Instance UID	(0008,1155)	1	
Studies Containing Other Referenced Instances Sequence	(0008,1200)	1C	
>Study Instance UID	(0020,000E)	1	
>Referenced Series Sequence	(0008,1115)	1	
>>Series Instance UID	(0020,000E)	1	
>>Referenced Instance Sequence	(0008,114A)	1	
>>>Referenced SOP Class UID	(0008,1150)	1	

>>>Referenced SOP Instance UID   (0008,1155)   1

9.1.3. Attribute Mapping

ProKnow DS does not perform any attribute mapping.

9.1.4. Coerced/Modified Fields

ProKnow DS does not coerce nor modify any of the input fields.

9.2. Data Dictionary of Private Attributes

ProKnow DS preserves imported private attributes but does not create new private attributes.

9.3. Coded Terminology Templates

ProKnow DS does not use codes or controlled terminology mechanisms (templates).

9.4. Greyscale Image Consistency

ProKnow DS does not provide support for the DICOM Grayscale Standard Display Function.

9.5. Standard Extended/Specialized/Private SOP Classes

ProKnow DS supports extensions of the standard SOP classes specified in section 1, ignoring any private attributes except where indicated. It does not support any specialized or private SOP classes.

9.6. Private Transfer Syntaxes

ProKnow DS does not support any private transfer syntaxes.

Using the ProKnow DS API

What is the API?

The main component of the ProKnow DS server-side architecture is the ProKnow DS REST API which may be accessed over HTTPS. The API serves as an interface between the client (e.g., a web browser or script) and ProKnow DS databases and blob storage. If you're using the ProKnow DS user interface, you're already using the API! The user interface uses the API to create, read, update, and delete data from a web browser. DICOM DS also uses the API directly to upload DICOM files.

Full documentation of the API is still under development, however, many of the API endpoints have been implemented as part of the ProKnow Python SDK.

Projects Using the API

> ### Warning
>
> The following projects use the ProKnow DS API and may be helpful to you in your own automation, scripting, and process integration efforts. However, **these projects are NOT validated as part of the ProKnow DS medical device** and, as such, use of these projects is done **AT YOUR OWN RISK**.

ProKnow

These projects are created, owned, and managed by ProKnow staff, but may accept contributions from members of the ProKnow community.

- **Python SDK** — The ProKnow DS - Python SDK library provides convenient access to the ProKnow API from applications written in the Python language. It includes a pre-defined set of classes for API resources that initialize themselves dynamically from API responses.
  Documentation — Project Page

- **ProKnow Uploader** — Application for creating unique applications for uploading to ProKnow DS.
  Project Page

Community

These projects are created, owned, and managed by members of the ProKnow community.

No projects have been added to this section yet.

Contributing

If you would like to see your project listed here, please let us know by emailing support@proknow.com. At minimum we ask that you provide your project's name, description, and links to project page and/or documentation. In addition, we ask that you adhere to the following guidelines.

- The project must be open source.

- The project must be documented in English, or an English translation must be provided (in order for us to evaluate it).

- The project must be documented such that other potential users of the API can understand it (with the understanding that they are familiar with basic programming algorithms, data structures, and programming language you are using). This includes demonstrating the problem you're trying to solve (e.g., how to integrate ProKnow into a clinical workflow) or the task you're trying to accomplish (e.g., importing patient custom metrics for analysis).

We reserve the right not to list your project, but we'll always tell you why.

Defining Structure Set Templates

IN THIS ARTICLE

Define structure set templates to standardize the names, types, and colors of structures across your organization.

- Accessing Structure Set Templates

- Creating Structure Set Templates

- Editing Structure Set Templates

- Downloading Structure Set Templates

- Uploading Structure Set Templates

- Editing Structure Set Template Structures

- Deleting Structure Set Templates

Accessing Structure Set Templates

To view your organization's structure set templates, click on the ProKnow icon in the top left corner of the page, select Structure Set Templates under Organization Settings, and make sure Organization is selected from the dropdown at the top of the page. To view structure set templates for a workspace, select the workspace from the dropdown. Just to the right of the main navigation are vertical tabs for each of the organization level settings which you can read more about in the related articles. The structure set templates sidebar is to the right of the tabs. The sidebar holds a list of structure set templates that belong to the organization with a button to create a template at the top. Templates are displayed in alphabetical order, grouped by category (categories can be assigned to templates after they have been created). Use the Filter Templates search area at the top of the sidebar to filter the Structure Set Templates.

Click on one of the templates to select it. The main content area will update to display the details for the selected structure set template.

Creating Structure Set Templates

Note: You must have the *Create Structure Set Templates* permission on the organization to define structure set templates for the organization. You must have the *Create Structure Set Templates* permission on a workspace to define structure set templates for the workspace.

1   Press the **Create** button located at the top of the sidebar.

2   Choose a **Name** for your structure set template. You can use any characters you'd like, but the name must not contain more than 64 characters.

3   Choose a **Category**for your structure set template. You can use any characters you'd like, but the name must not contain more than 45 characters.

4   Press the **Create** button to create the structure set template. Your new scorecard should be selected.

Copying a Structure Set Template

Another way to create a structure set template is to copy an existing structure set template. Just select a template, and press the **Copy Structure Set Template** button in the small ribbon of tools below the selected template in the sidebar.

Editing Structure Set Templates

Note: You must have the *Update Structure Set Templates* permission on the organization to edit structure set templates for the organization. You must have the *Update Structure Set Templates* permission on a workspace to edit structure set templates for the workspace.

1   Choose the structure set template you wish to edit from the sidebar on the left.

2   Press the **Edit Structure Set Template** button in the small ribbon of tools below the selected template in the sidebar.

3   Edit the **Name** and **Category** in fields provided, and press **Save** to save your changes.

Downloading Structure Set Templates

1   Choose the structure set template you wish you download from the sidebar on the left.

2   Press the **Download Structure Set Template** button in the small ribbon of tools below the selected template in the sidebar.

3   Find the downloaded CSV file in your browser's configured download folder.

Uploading Structure Set Templates

Note: You must have the *Update Structure Set Templates* permission on the organization to upload structure set templates for the organization. You must have the *Update Structure Set Templates*

permission on a workspace to upload structure set templates for the workspace.

1   Choose the structure set template to which you wish you upload structures from the sidebar on the left.

2   Press the **Upload Structure Set Template** button in the small ribbon of tools below the selected template in the sidebar.

3   Press the **Select File** button and select a structure set template CSV file (containing at minimum the columns **Name**, **Type**, **R**, **G**, and **B**)

4   Select how duplicates should be handled: either **Leave existing structure color and type unchanged** or **Overwrite existing structure color and type**.

5   Press the **Upload** button to upload the structure set template file.

Editing Structure Set Template Structures

Note: You must have the *Update Structure Set Templates* permission on the organization to edit structure set templates for the organization. You must have the *Update Structure Set Templates* permission on a workspace to edit structure set templates for the workspace.

1   Choose the scorecard you wish you edit from the sidebar on the left.

2   Press the **Edit** button.

3   Press the **Add new structure...** button.

4   Enter a **Name**, and choose a **Type** and **Color**.

5   Delete metrics from your scorecard template by pressing the trash icon.

6   Press the **Save** button to save your changes.

Deleting Structure Set Templates

Note: You must have the *Delete Structure Set Templates* permission on the organization to delete structure set templates for the organization. You must have the *Delete Structure Set Templates* permission on a workspace to delete structure set templates for the workspace.

1   Choose the structure set template you wish you delete from the sidebar on the left.

2   Press the **Delete Structure Set Template** button in the small ribbon of tools below the selected template in the sidebar.

3   Press the **Delete** button to delete the structure set template.

Defining Custom Metrics

IN THIS ARTICLE

Custom metrics add an important new dimension to your ProKnow data in that they allow you to record and analyze the important metrics you care about, metrics that generally can't be extracted or calculated from the original DICOM data.

- Accessing Custom Metrics

- Creating Custom Metrics

- Editing Custom Metrics

- Deleting Custom Metrics

Accessing Custom Metrics

To access your organization's custom metrics, click on the ProKnow icon in the top left corner of the page, and select Custom Metrics under Organization Settings. Just to the right of the main navigation are vertical tabs for the other Organization Settings. The remainder of the view is devoted to the area where the custom metrics may be defined. If you do not yet have custom metrics, this space will contain a box titled, "No Custom Metrics." Otherwise, your custom metrics will be displayed in the table.

Creating Custom Metrics

Note: You must have the *Create Custom Metrics* permission to define custom metrics for your organization.

1   Click the **Add custom metric...** link.

2   Choose a **Name**, the **Type**, and the **Context** for your custom metric.

When choosing a name, use words that will be clear to the people using your system. A good custom metric name is clear while being as concise as possible.

Choose a type that suits the data you wish to record and analyze. Numbers are best if you want to analyze your data in a histogram or scatterplot across a population of patients. Text and Choices can both be used for grouping data across collections. Choices, however, is best when the possible set of values is fixed to a limited set of values, while text is best if you would like to allow free-form text entry.

The context specifies the level at which the custom metric data will be defined. For example, for a metric that specifies whether the contours of a structure set were generated by an auto-segmentation algorithm, you would likely wish to specify the context of **Structure Set**. Another way to determine the appropriate context of a custom metric is to think about the "highest" point in the hierarchy where the custom metric will have a unique value. For instance, a custom metric titled "Dose Algorithm" that indicates the type of dose algorithm used (e.g., Pencil Beam, Collapsed Cone, or Monte Carlo) would be inappropriate to store at the **Plan** context since multiple doses, generated by different algorithms, may exist under a single plan (i.e., the value is not unique to a plan).

3   Press the **Create** button to create the custom metric.

Editing Custom Metrics

Note: You must have the *Update Custom Metrics* permission to update custom metrics for your organization.

CAUTION: Editing a custom metric *context* is an irreversible action, so use caution. Any custom metrics data associated with the previous context will be removed.

1   Double-click the custom metric you wish to edit or select the row and press the **Edit** button located in the toolbar.

2   Modify the field values as needed.

3   If you have elected to change the type of the custom metric and upgrading the existing values is a non-trivial operation, you may be asked to specify how existing values should be handled. *Please note that the option to upgrade existing values is not possible if you are also making changes to the context of the custom metric. This is because altering the context of a custom metric will result in the removal of any existing custom metric data (so there will be no data to upgrade).*

From	To	Trivial Upgrade
Text	Number	No
Text	Choices	No
Number	Text	Yes
Number	Choices	No
Choices	Text	Yes
Choices	Number	No

4   If you have elected to change the context of the custom metric you will be asked to confirm your change. Once you've read and understood the confirmation message, check the confirmation checkbox.

5   Press the **Save** button to save your changes.

Deleting Custom Metrics

Note: You must have the *Delete Custom Metrics* permission to delete custom metrics for your organization.

CAUTION: Deleting a custom metric is an irreversible action, so use caution.

1   Select the custom metrics you wish to delete using the checkbox for each custom metric row.

2   Press the Delete button located in the toolbar.

3   Once you've read and understood the confirmation message, check the confirmation checkbox, and press the **Delete** button.

Defining Scorecard Templates

IN THIS ARTICLE

Define scorecard templates to standardize methods and implement robust measures to document plan quality across your organization.

- Accessing Scorecard Templates

- Creating Scorecard Templates

- Renaming Scorecard Templates

- Editing Scorecard Templates

- Deleting Scorecard Templates

Accessing Scorecard Templates

To view your organization's scorecard templates, click on the ProKnow icon in the top left corner of the page, and select Scorecard Templates under Organization Settings. Just to the right of the main navigation are vertical tabs for each of the organization level settings which you can read more about in the related articles. The scorecard templates sidebar is to the right of the tabs. The sidebar holds a list of scorecard templates that belong to the organization with a button to create a template at the top. Templates are displayed in alphabetical order, grouped by category (categories can be assigned to templates after they have been created). Click on one of the templates to select it.

The main content area will update to display the details for the selected scorecard template. Links in the toolbar will allow you to jump to the computed or custom metrics defined in the scorecard (if applicable). A button to edit the scorecard is available on the far right side of the toolbar.

Creating Scorecard Templates

> **Note**: You must have the *Create Scorecard Templates* permission on the organization to define scorecard templates for the organization. You must have the *Create Scorecard Templates* permission on a workspace to define scorecard templates for the workspace.

1. Press the **Create** button located at the top of the sidebar.

2. Choose a **Name** for your scorecard. You can use any characters you'd like, but the name must not contain more than 64 characters.

3. Choose a **Category** for your scorecard. You can use any characters you'd like, but the name must not contain more than 45 characters.

4. Press the **Create** button to create the scorecard. Your new scorecard should be selected.

Copying a Scorecard Template

Another way to create a scorecard template is to copy an existing scorecard template. Just select a template, and press the **Copy Template** button in the small ribbon of tools below the selected template in the sidebar.

Editing Scorecard Templates

Note: You must have the *Update Scorecard Templates* permission on the organization to edit scorecard templates for the organization. You must have the *Update Scorecard Templates* permission on a workspace to edit scorecard templates for the workspace.

1   Choose the scorecard you wish to edit from the sidebar on the left.

2   Press the **Edit Template** button in the small ribbon of tools below the selected template in the sidebar.

3   Edit the **Name** and **Category** in fields provided, and press **Save** to save your changes.

Editing Scorecard Template Metrics

Note: You must have the *Update Scorecard Templates* permission on the organization to edit scorecard templates for the organization. You must have the *Update Scorecard Templates* permission on a workspace to edit scorecard templates for the workspace.

1   Choose the scorecard you wish you edit from the sidebar on the left.

2   Press the **Edit** button.

3   Press the **Add computed metric...** button, and select one or more metrics from the categorized lists of available absolute dose metrics, relative dose metrics, relative dose metrics, plan metrics, and structure set metrics.

> For more information about computed metrics, visit our Computed Metric Library.

4   Fill in the computed metric parameters parameters.

5   Press the **Add custom metric...** button, and select one or more metrics from the list of custom metrics defined in your ProKnow organization by a custom metric manager.

> To learn about how to create custom metrics, please visit the Defining Custom Metrics page.

6   Press the swap icon to exchange an absolute or relative metric for its variant. Note that this button will be disabled if the metric does not have a variant.

7   Press the copy icon to copy a metric to the row below.

8   Press the pencil icon to chose a different metric from the metric selection dialog.

9   Press the **Add...** or **Edit...** button in the Objectives column to add, edit, or remove objectives for a particular metric. Objectives are useful for defining performance bins for your data. In the following example, for instance, you might set up objectives for the volume PAROTID_LT where you define ranges as follows:

- ⊘ VERY SMALL: less than 8 cc

- ⊘ SMALL: 8 cc to 15 cc

- ⊘ NORMAL: 15 cc to 29 cc

- ⊘ LARGE: 29 cc to 36 cc

- ⊘ VERY LARGE: greater than 36 cc

These ranges can be assigned a color and displayed end-to-end as follows:

Objectives are completely customizable, allowing you to configure ranges for organs-at-risk metrics and target metrics, too.

Sometimes, a computed metric value or custom metric value may equal the threshold value for an objective level. You can customize which objective level should be assigned in those cases by clicking the bracket indicators to toggle the level. A bracket that opens upward indicates that the objective level above will be used. A bracket that opens downward indicates that the objective level below will be used. In addition to the direction of the bracket, the background color behind the bracket indicates the level to which the threshold value belongs.

In the following example, you'll notice that the two objective sets vary only in the direction of the brackets (see orange outlined region). For the objectives on the left, a value of 0 would produce a result of IDEAL, a value of 10 would produce the result GOOD, a value of 20 would produce the result ACCEPTABLE, and a value of 30 would produce the result MARGINAL. Compare that with the objectives on the right, where a value of 0 would now produce the result GOOD (not IDEAL), a value of 10 would now produce the result ACCEPTABLE (not GOOD), a value of 20 would now produce the result MARGINAL (not ACCEPTABLE), and a value of 30 would now produce the result UNACCEPTABLE (not MARGINAL).

Saving Custom Objective Templates

The labels, colors, and bracket direction may be customized and saved as a custom objective template. To accomplish this, first make your edits to the objective levels. The dropdown field should appear with the value *Custom*. Press the edit button next to the dropdown field, enter a name for your template, and then press the **Save** button.

This template may be recalled and used when defining objectives for other metrics. To delete a custom objective template, select it from the dropdown, and press the delete button.

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> **Note**: You must have the *Create Objective Templates* permission to create objective templates. You must have the *Delete Objective Templates* permission to delete objective templates.

10   You may reorder metrics within a scorecard template by dragging and dropping rows to the desired location. Each row has an icon on the left containing three small horizontal lines. Using this icon as a handle, identify the item you wish to reorder, and drag and drop it into its new position:

11   Delete metrics from your scorecard template by pressing the trash icon.

12   Press the **Save** button to save your changes.

Deleting Scorecard Templates

> **Note**: You must have the *Delete Scorecard Templates* permission on the organization to delete scorecard templates for the organization. You must have the *Delete Scorecard Templates* permission on a workspace to delete scorecard templates for the workspace.

1   Choose the scorecard template you wish you delete from the sidebar on the left.

2   Press the **Delete Template** button in the small ribbon of tools below the selected template in the sidebar.

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3   Press the **Delete** button to delete the scorecard.

Defining Renaming Rules

IN THIS ARTICLE

Renaming rules can be critical to your organization when analyzing large cohorts of patients in which ROI names do not follow a consistent naming convention. Use renaming rules to automatically rename structures matching your criteria for future imports or execute a renaming operation on data that has already been imported.

- Accessing Renaming Rules

- Editing Renaming Rules

- Searching and Executing Rules

Accessing Renaming Rules

To access your organization's renaming rules, click on the ProKnow icon in the top left corner of the page, and select Renaming Rules under Organization Settings. Just to the right of the main navigation are vertical tabs for the other Organization Settings. The remainder of the view is devoted to the area where the renaming rules may be defined. If you do not yet have any renaming rules, this space will contain a box titled, "No Renaming Rules." Otherwise, your renaming rules will be displayed in the table.

Editing Renaming Rules

Note: You must have the *Update Renaming Rules* permission to update the set of renaming rules for your organization.

1   Press the **Edit** button in the renaming rules toolbar.

2   Edit the renaming rules as needed.

       To add a new rule, press the **Add rule...** button, choose the rename rule type, and fill in the required fields. The *criteria* field will be used to test against candidate structure names. If a match is found, the structure will be replaced with the renaming rule's *value*. For *is one of...* renaming rules, you can define up to 100 synonyms for the rule's criteria.

3   To delete a renaming rule from the set, press the trash icon in the **Actions** column.

4   Press the **Save** button to save the renaming rules configuration.

Searching and Executing Rules

Editing Renaming Rules

Note: You must have the *Search Renaming Rules* permission to search for structure sets matching a renaming rule. You must have the *Execute Renaming Rules* permission to execute a renaming rule on the structure sets across the organization.

1   You can search for structures that match a rule and then execute the rule on those structures. To begin, click **Search** in the **Actions** column for the rule you wish to search.

2   Review the list of structures in the table on the next page. If no matching structures were found, a box titled "No Matching Occurrences" will be displayed instead.

3   To execute the rule, press the **Execute** button.

4   Confirm that you wish to execute the rule by pressing **Execute** in the confirmation window. Renaming will take place in the background. You can press **Dismiss** to close the window at any time. When you press the Dismiss button, you will be directed back to the list of renaming rules. To view the status of a renaming operation that is in progress, click **Status** in the **Actions** column. To view the results of a completed renaming operation, click **Results**.

Was your renaming rule skipped for one or more structures?

If a match is found for a renaming rule that is processing, one of two things will happen. Either the structure will be renamed with the rule's value as expected or the rule will skip that structure. A structure will be skipped if the rule's value conflicts with a structure that is already defined in the structure set. We suggest handling these cases on a case-by-case basis.

Defining Workflows and Checklist Templates

IN THIS ARTICLE

Workflows and checklist templates help you keep patient-related tasks organized and on schedule. Use this document to learn how to define workflows and checklist templates.

- Accessing Workflows and Checklist Templates

- Creating Workflows

- Editing Workflows

- Deleting Workflows

- Creating Checklist Templates

- Copying Checklist Templates

- Editing Checklist Templates

- Editing Checklist Template Items

- Deleting Checklist Templates

Accessing Workflows and Checklist Templates

To access your organization's workflows and checklist templates, click on the ProKnow icon in the top left corner of the page, and select Checklist Templates under Organization Settings. Just to the right of the main navigation are vertical tabs for the other Organization Settings. The checklist templates sidebar is to the right of the tabs. The sidebar holds a list of both workflows and checklist templates with a button to create workflows and templates at the top. Checklist templates are grouped under the workflow to which they are assigned. If they are not assigned to any workflow, then they will appear at the top of the list. Click on one of the workflows or templates to select it.

The main content area will update to display the details for the selected template. A button to edit the selected item is available on the far right side of the toolbar.

Creating Workflows

> **Note**: You must have the *Create Workflows* permission on the organization to create workflows.

1   Press the **Create** button dropdown and choose **Create Workflow**.

2   Enter the **Name** for the new workflow.

    Define the list of states for the workflow. There are three state statuses—Unstarted, Started, and Done—and there must be at least one state defined for each of these statuses. Press the **Add Workflow State** button to the right of the status to add a new state with that status. Use the toolbar of icons to reorder states, delete states, and edit state names.

3   Press the **Create** button to create the workflow.

Editing Workflows

> **Note**: You must have the *Update Workflows* permission on the organization to edit workflows.

1   Press the **Edit Workflow** button for the workflow you wish to edit.

2   Update the **Name** for the workflow.

Edit the the list of states for the workflow. There are three state statuses—Unstarted, Started, and Done—and there must be at least one state defined for each of these statuses. Press the **Add Workflow State** button to the right of the status to add a new state with that status. Use the toolbar of icons to reorder states, delete states, and edit state names. When deleting an existing state, you will be asked to choose a transition state. Patient checklists belonging to state marked for deletion will be transitioned to the new state automatically.

3   Press the **Save** button to save the workflow.

Deleting Workflows

Note: You must have the *Delete Workflows* permission on the organization to delete workflows.

1   Press the **Delete Workflow** button for the workflow you wish to delete.

2   Once you've read and understood the confirmation message, check the confirmation checkbox, and type the name of the workflow into the provided input.

3   Press the **Delete** button to delete the workflow.

Creating Checklist Templates

Note: You must have the *Create Checklist Templates* permission on the organization to create checklist templates.

1   Press the **Create** button dropdown and choose **Create Checklist Template**.

2   Enter the **Name** and **Description** for the new checklist template. Optionally, choose a workflow from the list of defined workflows (or *None* to leave unset).

3   Press the **Create** button to create the checklist template.

Copying Checklist Templates

Note: You must have the *Create Checklist Templates* permission on the organization to copy checklist templates.

1   Click on the checklist template row for the template you wish to copy.

2   Press the **Copy Template** button located in the toolbar below the activated checklist template row.

3   Enter the **Name** and **Description** for the new checklist template.

4   Press the **Copy** button to copy the checklist template.

Editing Checklist Templates

Note: You must have the *Update Checklist Templates* permission on the organization to edit checklist templates.

1   Click on the checklist template row for the template you wish to edit.

2   Press the **Edit Template** button located in the toolbar below the activated checklist template row.

3   Modify the **Name** and **Description** for the checklist template and set a **Workflow** from the list of defined workflows (or *None* to unset).

4   Press the **Save** button to save the checklist template.

Editing Checklist Template Items

Note: You must have the *Update Checklist Templates* permission on the organization to edit checklist templates.

1   Click on the checklist template row for the template you wish to edit.

2   Press the **Edit** button aligned to the right of the toolbar in the main content area.

3   To add a checklist template item, press the **Add checklist item...** button from the toolbar and use the popup to create a task or checkpoint. To define a task, set the **Type** to Task and define a **Name** and **Description**. To define a checkpoint, set the **Type** to Checkpoint and define the **Name**. If the checklist template is assigned to a workflow, you can also specify an automatic transition state for checkpoints using the **When Complete, Automatically Transition To** field.

Actions for reordering, editing, and deleting checklist template items are available in the Actions column for each row.

Tasks and Checkpoints

A *task* is an assignable "to do" item. In the context of a patient checklist, each checklist task is has one of four statuses: Unstarted, Started, Done, and Exception.

A *checkpoint* marks a break in a checklist. A checkpoint is useful for indicating a group of tasks that can be done in parallel and tasks which should be complete before moving on to another group of tasks. When used with workflows, checkpoints can also allow patient checklists to be automatically transitioned to a specific workflow state. If a checkpoint appears at the beginning of the checklist, the checklist will transition to the defined transition state once any task in the checklist has been marked as Started, Done, or Exception. If a checkpoint appears anywhere else in checklist, the checklist will transition to the defined transition state when all preceding tasks have been completed (marked as either Done or Exception).

4   Press the **Save** button when you are finished editing to save the checklist template items.

Deleting Checklist Templates

Note: You must have the *Delete Checklist Templates* permission on the organization to delete checklist templates.

1   Click on the checklist template row for the template you wish to delete.

2   Press the **Delete Template** button located in the toolbar below the activated checklist template row.

3   Once you've read and understood the confirmation message, press the **Delete** button to delete the checklist template.

Browsing Audit Logs

IN THIS ARTICLE

This article describes auditing within ProKnow.

- Understanding Auditing

- Viewing Audit Logs

- Searching Audit Logs

- Downloading Audit Logs

Note: You must have the *Manage Audit Logs* permission on the organization to view or download audit logs.

Understanding Auditing

Also known as an audit trail, audit logs provide a record of patient- and security-related events that have occurred within ProKnow for your organization. Generally speaking, each audit record provides information about what happened, when it happened, who initiated it and what resources were involved. If an event is related to a particular patient, the patient will also be included in the record.

Audit records are created whenever a user creates, updates, deletes, or retrieves objects within ProKnow. Additionally, security events such as login attempts, password recoveries, account lockouts and permission denials are recorded.

Records will contain a resource ID when applicable that uniquely identifies the object that was involved in the event. This is a useful key to search with when tracking all events that have occurred for a given object, such as a patient plan or structure set.

Due to the nature of the information recorded, patient protected health information (PHI) and personally identifiable information (PII) can be found in audit records. The Manage Audit Logs permission grants users access to the audit logs and hence access to patient PHI and PII. Note that granting Manage Audit Logs permission does not also grant access to PHI outside of the audit logs.

Viewing Audit Logs

To view the audit logs for your organization, click on the ProKnow icon in the top left corner of the page and select Monitoring.

Each record in the table contains:

- Type – the type of event

- Description – a brief synopsis of the event

- Date – the time that the event occurred (in your local time zone)

- Workspace – the name of the workspace that contains the object involved in the event, if applicable

- Patient – the name and medical record number of the patient involved in the event, if applicable

- Resource ID – the unique identifier of the object, if applicable

- User – the name of the user that initiated the event

The indicator in the first column of the table depicts whether the event occurred successfully (a green indicator), failed (a yellow indicator) or a possible breach was attempted (a red indicator). Additional details about the event can be found by double-clicking the record in the table.

Only records from the last 90 days can be viewed and searched. Records older than 90 days are moved to archival storage but may still be downloaded as needed.

Searching Audit Logs

To search audit records for your organization, three search tools are available in the filters toolbar. The Search tool allows for searching all text or precision searches against specific record fields, as explained in detail below. The Select Event tool allows for filtering events by their event type and the Date Range tool allows for filtering events by date.

Search Query Syntax

You can submit queries using a subset of the Lucene query syntax. The query string is parsed into a series of terms:

- A term can be a single word such as `john` or `doe`

- A term can be multiple words such as `john doe`, which will match on all records containing at least one of these words

- A term can be a phrase surrounded by double quotes (`"john doe"`), which will match on all records containing this exact phrase

- A term prefixed with a field name (`patient_name:"john doe"`) will only match against the selected field

- A term with a field name followed by a list of values (`type:[user_created, roles_queried]`) will match all values against the selected field

All search fields are case insensitive.

Field	Description	Aliases	Accepts Lists
`type`	The coded event type*	`types`	Yes
`user_id`	The identifier of the user		No
`user_name`	The name of the user		No
`patient_id`	The identifier of the patient		No
`patient_mrn`	The MRN of the patient		No
`patient_name`	The name of the patient		No
`resource_id`	The identifier of the resource or object related to the event		No
`resource_name`	The name of the resource or object		No
`workspace_id`	The identifier of the workspace		No
`workspace_name`	The name of the workspace		No
`collection_id`	The identifier of the collection	`collection`	No
`classification`	The origin of the event. "HTTP" for events originating in the ProKnow API and "AUTH" for events originating in Auth0	`class`	No
`method`	The HTTP method of the API call. Accepts lists of values	`methods`	Yes
`uri`	The unique resource identifier (URI)		No
`status_code`	The resultant HTTP status code of the API call	`status_code`, `status`, `code`	Yes

* Event types displayed in the table and Select Event dropdown can be searched on by adding an underscore between words. For example, "Patient Created" events can be searched using the query term

```
type:patient_created .
```

Event Selection

The Select Event dropdown allows you to see all possible event types and select one to filter by.

Date Range

Records can be filtered down by date by entering begin and end dates into the Date Range filter. Begin dates may not be older than 90 days.

Downloading Audit Logs

The following steps outline the process of downloading audit records to file, including records older than 90 days.

1　Press the **Download Logs** button.

2　Enter a **Start Date** for when to begin searching.

3　Enter an **End Date** for when to stop searching.

4　(Optional) To further filter records to download, enter values into the filter fields.

5　Select a **File Format** to indicate the format of the logs.

6　Press **Download**.

A ZIP file will be produced containing a file for each day within the specified date range. Note that the maximum file size for downloads is 100MB. If the 100MB download limit is reached, a NOTICE.txt file will be included in the ZIP file to indicate that download results have been truncated and the date to use in subsequent download requests to retrieve the remaining results.

Understanding Identity and Access Management

IN THIS ARTICLE

ProKnow's Identity and Access Management (IAM) facilitates the management of user access to groups of resources. It comprises Workspaces, Roles, and Users. This article explains the purpose of these entities in ProKnow and offers a general method for setting up your organization.

- Users, Resources, Groups, and Roles

- Key Tenants

- Setting Up Your Organization

    - Step 1: Define Groups and Add Members

    - Step 2: Add Resource Assignments

    - Step 3: Define Custom Roles (Optional)

- Conclusion and Next Steps

Users, Resources, Groups, and Roles

A **user** is an entity (usually a person) who uses the system.

A **resource** is an entity in the system to which a user may be assigned a set of permissions. Resources include your Organization, Groups, Workspaces, Patients, and Collections. Resources are defined in a resource hierarchy.

A **group** is a collection of 0 or more users called members. Groups are organized into a group hierarchy. A user is an *explicit member* of a group if they belong to the group. A user is an *implicit member* of a group if they belong to a subgroup of the group.

A **role** is a set of permissions. Organizations may use built-in system roles or define their own custom roles.

Users, groups, and your organization may be assigned a role on a resource, giving that entity the permissions defined in the role on the given resource and all of its subresources.

Key Tenants

1. Strive to keep the number of resource assignments to a minimum.

2. Limit role assignments to only those which are necessary for each user to fulfill their duties.

3. Favor using built-in roles over defining your own custom roles.

Setting Up Your Organization

Step 1: Define Groups and Add Members

A well-defined group hierarchy will allow you to keep the number of resource assignments to a minimum. Here are a few things to keep in mind as you set up your groups:

1. A user is an *explicit member* of a group if they belong to the group.

2. A user is an *implicit member* of a group if they belong to a subgroup of the group.

3. At the top level of the group hierarchy is the organization. All users are explicit members of the organization.

4. Groups have a maximum nesting depth of 5.

To illustrate these principals, consider the following example:

```
ABC Cancer Network
– Hospital A
    – Physicians
    – Physicists
    – Dosimetrists
    – Administrators
– Hospital B
    – Physicians
    – Physicists
    – Dosimetrists
    – Administrators
– Hospital C
    – Physicians
    – Physicists
    – Dosimetrists
    – Administrators
– Network Administrators
```

Some observations on this group setup are presented below:

- We have defined a total of 16 groups under the Organization at a maximum depth of 3. Since all users belong to the ABC Cancer Network organization, we can use the organization to assign permissions that all users should have.

- We have defined a Network Administrators group. We could add hospital network IT staff as members of this organization and limit their permissions to managing the directory of groups and users across the organization while preventing them from accessing any patients.

- We have defined a group and several subgroups for each hospital within the network. We can add members to the subgroups Physicians, Physicists, Dosimetrists, and Administrators. These users will be explicit members of the parent Hospital group.

  - We can give the Administrators group permissions to manage access within their Hospital group and all its subgroups but restrict access to patient data. This might be an appropriate group for hospital IT staff.

  - We can assign physicians, physicists, and dosimetrists to their appropriate group.

  - The Administrators group can use the Hospital group to grant permissions for all members (explicit and implicit) of the hospital group.

Step 2: Add Resource Assignments

Remember that resources in the system include your Organization, Groups, Workspaces, Patients, and Collections. Note that some permissions only apply to certain resource types. For example, the Create API Keys permission must be applied on the Organization resource in order to have an effect. As another example, the Create Patients permission could be applied to the Organization resource (implying that the user(s) have access to create patients within all resources) or to a Workspace resource (implying that the user(s) as access to create patients within that workspace). Please note that when a resource is created, the user who created the resource will automatically be added as an Owner of the resource.

More information on managing resource assignments can be found in the Managing Access article.

Step 3: Define Custom Roles (Optional)

While its recommended that you use the built-in system roles, you can define your own custom roles for your organization if needed. For more information on defining custom roles, please see Managing Roles - Permission Sets.

Note that roles are designed to be composable. That is, more than one role may be assigned to a given user, organization, or group on a given resource. For example, if you want to grant a group the ability to manage structure set templates and scorecard templates at the organization level, you could simply assign the "Structure Set Template Manager" role and the "Scorecard Template Manager" role to the group.

Conclusion and Next Steps

Identity and Access Management is an important part of your ProKnow organization. Determining the needs of your organization is the first step toward ensuring that your account remains secure and your team stays efficient. Once you've thought about these needs, you're ready dive into these step-by-step guides:

- Managing Groups and Users — Organization Directory

- Managing Roles — Permission Sets

- Managing Workspaces — Data Access and Partitioning

Managing Groups and Users — Organization Directory

IN THIS ARTICLE

An Organization's directory deals with Groups and Users. Users are entities (usually people) who use the system. Each group may have zero or more members. These members will assume the permissions assigned to the group on resources via roles. This article explains how to manage groups and users.

- Viewing the Directory

- Creating Groups

- Renaming Groups

- Deleting Groups

- Viewing Group Members

- Adding Group Members

- Removing Group Members

- Exporting Group Members

- Importing Group Members

- Viewing User Details

- Creating Users

- Editing Users

- Deleting Users

Viewing the Directory

1   Click on the ProKnow icon in the top left corner of the page.

2   Select **Directory** under **Identity and Access Management**.

The directory sidebar holds a hierarchy of groups that belong to the organization with a button to create groups and users at the top. Click on one of the groups to select it.

The main content area presents the details for the selected group, including the group name, the group type, and the group's list of members. In addition, there are options for editing the group, managing access to the group, and deleting the group.

Creating Groups

> **Note**: You must have the *Create Groups* permission on the parent group to create a subgroup under that group.

1   With the parent group selected from the directory sidebar, open the **Create** dropdown located in the sidebar header, and then press the **Create Group** button.

2   Enter the **Name** for the group. The group name must be unique across all sibling groups.

3   Select the **Parent Group**.

4   Press the **Create** button to create the group.

Renaming Groups

> **Note**: You must have the *Update Groups* permission on a group to rename the group.

1   With a group selected from the directory sidebar, press the **Edit** button.

2   Enter the **Name** for the group. The group name must be unique across all sibling groups.

3   Press the **Save** button to save your changes to the group name.

Deleting Groups

> **Note**: You must have the *Delete Groups* permission on a group to delete the group.

1   With a group selected from the directory sidebar, press the **Delete** button.

2   Read and acknowledge the notice by checking the box next to "I have read and understand the above notice."

3   Press the **Delete** button to delete the selected group and all of its subgroups.

Viewing Group Members

1   With a group selected from the directory sidebar, activate the **Members** tab in the main content area.

2   Optional: Filter the list of group members using the **Filter Users** text input.

3   Optional: Include or exclude inactivate users using the **Show Inactive** toggle.

4   Optional: Include or exclude members from subgroups using the **Show Members from Subgroups** toggle.

5   View the list of matching group members in the table.

Adding Group Members

> **Note**: You must have the *Add Group Members* permission on a group to add members to the group.

1   With a group selected from the directory sidebar, activate the **Members** tab in the main content area.

2   Press the **Add Member** button.

3   Select the **User** to add as a member.

4   Press the **Add** button to add the user as a member of the group.

Removing Group Members

> **Note**: You must have the *Remove Group Members* permission on a group to remove members from the group.

1   With a group selected from the directory sidebar, activate the **Members** tab in the main content area.

2   Select one or more users from the table to remove from the group.

3   Open the Actions dropdown and press the **Remove Selected Users from Group...** button.

4   Press **Remove** to confirm that you wish to remove the users from the group. Once the operation is complete, you will see a message reporting how many users were removed. To view a detailed results report, click on the *"Click here to download a results report"* link which will download a CSV file containing detailed information on all removed members and any members that the system failed to remove.

Exporting Group Members

1   With a group selected from the directory sidebar, activate the **Members** tab in the main content area.

2   Open the Actions dropdown and press the **Export Users to CSV** button.

Importing Group Members

> **Note**: You must have the *Add Group Members* permission on a group to add members to the group. You must have the *Create Users* permission on the organization to create users.

1   With a group selected from the directory sidebar, activate the **Members** tab in the main content area.

2   Open the Actions dropdown and press the **Import Users from CSV...** button.

3   Begin by selecting the CSV file containing the users data. Press the **Select File** button to choose a file from your file system. Then press **Next** to continue to the next step.

4   Associate each column in the spreadsheet with the appropriate user field. Columns that exactly match user fields will be automatically associated. Otherwise, to associate a column with a user field, choose the user field from the select box. To ignore the column, choose **(Ignore)** from the select box. Press **Next** when finished to continue to the next step.

5   After clicking the **Next** button, you will be asked to acknowledge that you understand the consequences of the action you are about to perform. The acknowledgement will list how many rows were found in the spreadsheet and how many potential user records may be updated. Once you have acknowledged the potential impact by clicking on the consent checkbox, you may press the **Import** button to begin importing the users.

6   Once importing is complete, you will see a message reporting how many rows were imported. To view a detailed results report, click on the *"Click here to download a results report"* link which will download a CSV file containing detailed information on all imported users and any that may have failed to import. Press **Finish** to exit the wizard.

Viewing User Details

1   With a group selected from the directory sidebar, activate the **Members** tab in the main content area.

2   Select a single user row.

3   Inspect user details in the **User Information** sidebar.

Creating Users

> **Note**: You must have the *Create Users* permission on the organization to create users.

1. Open the **Create** dropdown located in the directory sidebar header, and then press the **Create User** button.

2. Enter the user's **Name** and **Email**.

3. Optional: Select one or more groups to which the user should be added as a member.

4. Press the **Create** button to create the user.

5. If groups were selected in step 3, you will see a message reporting the number of groups to which the user was successfully added a member. To view a detailed results report, click on the *"Click here to download a results report"* link which will download a CSV file containing detailed information on each group. Press **Finish** to exit.

Editing Users

Note: You must have the *Update Users* permission on the organization to edit users.

1. While viewing user details for a selected group member, press the **Edit** button located in the **User Information** sidebar.

2. Modify the **Name**, **Email**, and **Active** fields as needed.

3. Press the **Save** button to save the change to the user.

Deleting Users

Note: You must have the *Delete Users* permission on the organization to delete users.

1. With a group selected from the directory sidebar, activate the **Members** tab in the main content area.

2. Select one or more users from the table to delete.

3. Open the Actions dropdown and press the **Delete Selected Users...** button.

4. Press **Delete** to confirm that you wish to delete the selected users from the system. Once deleting is complete, you will see a message reporting how many users were deleted. To view a detailed results report, click on the *"Click here to download a results report"* link which will download a CSV file containing detailed information on all deleted users and any users that the system failed to delete.

Managing Workspaces — Data Access and Partitioning

IN THIS ARTICLE

ProKnow workspaces are abstract containers where patient and collection data is stored. One workspace can hold many patients and can have a representation in many collections. Each patient belongs to exactly one workspace. This article explains how to manage workspaces.

- Viewing Workspaces

- Creating Workspaces

- Editing Workspaces

- Deleting Workspaces

- Configuring Algorithms

    - Auto-Segmentation Algorithms

Viewing Workspaces

Note: You must have the *Read Workspaces* permission on a workspace to view the workspace.

To view your organization's workspaces, click on the ProKnow icon in the top left corner of the page, and select **Workspaces** under **Identity and Access Management**. Just to the right of the main navigation are vertical tabs for each of the Identity and Access Management components. Use these tabs to switch quickly between the pages for workspaces, roles, and users. The workspaces sidebar is to the right of the tabs. The sidebar holds a list of workspaces that belong to the organization with a button to create workspaces at the top. Click on one of the workspaces to select it.

The main content area will update to display the details for the selected workspace. You will notice a large grey bar at the top of this space. On the left is the name of the workspace and the workspace slug. The workspace slug is used in the URL bar when you are viewing workspace resources. On the right, you will find buttons for editing and deleting the selected workspace. You may also see a lock icon, which indicates that the workspace is protected against accidental deletion. You can edit the workspace to disable this feature.

Clinical
clinical

Edit   Delete

Algorithm Configuration   Configure
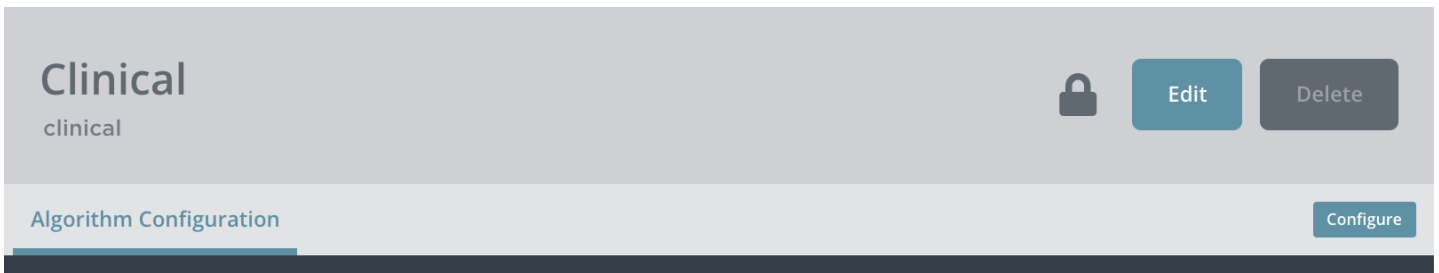
Creating Workspaces

> **Note**: You must have the *Create Workspaces* permission on the organization to create a workspace.

1   Press the **Create** button at the top of the workspaces sidebar.

2   Enter a **Unique URL ID** and the **Name** for your workspace. The ID must be unique across all workspaces in your organization. In addition, it may only contain lowercase alphanumeric characters or single hyphens and cannot begin or end with a hyphen. The URL ID will be used in the URL throughout the application. For example, you will access patients for your new workspace at **https://*custom-domain*.proknow.com/*unique-id*/patients**.

3   If you wish to lock the workspace to protect it from being deleted by accident, leave the **Protected** field set to Yes (recommended). Otherwise, set the value to No.

4   Press the **Create** button to create the workspace.

Editing Workspaces

> **Note**: You must have the *Update Workspaces* permission on a workspace to edit the workspace.

> **CAUTION**: Use caution when changing the values for the Unique URL ID. Since these values are used in the URL, changes to the URL will break any bookmarked links to a workspace resource.

1   With a workspace selected from the sidebar, press the **Edit** button.

2   Modify the field values as needed.

The **Unique URL ID** must be unique across all workspaces in your organization. In addition, it may only contain lowercase alphanumeric characters or single hyphens and cannot begin or end with a hyphen. The URL ID will be used in the URL throughout the application. For example, you will access patients for your new workspace at **https://*custom-domain*.proknow.com/*unique-id*/patients**.

If you wish to lock the workspace to protect it from being deleted by accident, leave the **Protected** field set to Yes (recommended). Otherwise, set the value to No.

3   Press the **Save** button to save your changes to the workspace.

Deleting Workspaces

Note: You must have the *Delete Workspaces* permission on a workspace to delete the workspace.

CAUTION: Deleting workspaces is an irreversible action, so use caution. Deleting a workspace will delete any patients contained in that workspace (including the corresponding patient data). It will also delete any workspace collections that have been defined for that workspace, and any saved URLs that point to resources for that workspace will be redirected.

1   With a workspace selected from the sidebar, press the **Delete** button. If you see a lock icon, and the **Delete** button is disabled, you'll need to edit the workspace to set the **Protected** status to No before you can delete the workspace.

2   Once you've read and understood the confirmation message, check the confirmation checkbox, and press the **Delete** button.

Configuring Algorithms

Note: You must have the *Update Workspace Algorithms* permission on a workspace to update workspace algorithms for that workspace. In addition, you must be granted a license for an algorithm type in order to configuration algorithms for that algorithm type.

1   With a workspace selected from the sidebar, switch to the **Algorithm Configuration** tab.

2   Press the **Configure** button.

3   To *add a new configuration*, press the **Add new configuration...** button in the section for the appropriate algorithm type.

4   To *edit a configuration*, press the **Edit** button in the Action column for the row you wish to modify.

5   To *delete a configuration*, press the **Delete** button in the Action column for the row you wish to remove.

6   To import configurations from another workspace:

1   Press the **Import** button.

2   Select the **Workspace** from which you wish to import algorithm configurations.

3   Select the types of algorithms that you wish to import.

4   Press **Import**.

7   Press **Save** to save your changes.

Auto-Segmentation Algorithms

These instructions provide details on configuring auto-segmentation algorithms. To open the *Configure Auto-Segmentation Algorithm* dialog, press the **Add new configuration...** button under the Auto-Segmentation section, or press the **Edit** button for row you wish to modify. See the Configuring Algorithms section for details.

1   Enter an algorithm **Name**.

2   Select an **Engine** from the list of available engines. Engines will only appear in this list if they have been licensed to your organization and provide one or more licensed auto-segmentation algorithms.

3   Select an **Algorithm** from the list of available algorithms. Algorithms will only appear in this list once the engine has been selected. In addition, some algorithms must be licensed in order to show up in this list.

4   Select a **Version** from the list of available versions. Versions will only show up in this list once the algorithm has been selected.

5   Activate the **Documents** tab.

   1   Here you will find a list of documents related to the selected version.

   2   Use the **Filter** field to filter documents by title.

   3   Use the **Language** menu to view documents for another available language.

   4   Click on the document link to download the document.

6   Activate the **Structure Set** tab:

   1   Enter the structure set **Name**. This will serve as the default structure set name when users run this algorithm. Users may override this default name when invoking the algorithm.

   2   Optional: Select a structure set **Template**. When processing the auto-segmentation result, the system will apply a structure set template by comparing the structures in the result to the list of structures defined in the template. The system will initialize an empty structure for each structure defined in the template that does not exist in the auto-segmentation result, using the type and color specified in the template.

7   Activate the **Structures** tab:

    1   Place a check mark next to the algorithm-defined structures that should be included in the result structure set.

    2   Remove a check mark next to the algorithm-defined structures that should not be included in the result structure set.

    3   Enter the **Desired Structure Name** for each structure. Use the undo button to revert the name back to the name defined by the algorithm.

    4   Choose the **Color** for each structure. Use the undo button to revert the color back to the color defined by the algorithm.

8   Press the **Create** or **Save** button to finish and close the dialog.

Managing Roles — Permission Sets

IN THIS ARTICLE

Roles are collections of permissions. Roles may be assigned applied to groups on a given resource. This article explains how to manage roles.

- Viewing Roles

- Creating Roles

- Updating Roles

- Updating Role Permissions

- Copying Roles

- Deleting Roles

Viewing Roles

1   Click on the ProKnow icon in the top left corner of the page.

2   Select **Roles** under **Identity and Access Management**.

The roles sidebar holds a list of roles that belong to the organization with a button to create roles at the top. Some roles are system roles and cannot be edited or deleted. Click on one of the roles to select it.

The main content area presents the details for the selected role, including the role name, the role type, and the permissions enabled for the role. In addition, there are options for editing the role properties, editing the role permissions, and deleting the role.

Creating Roles

Note: You must have the *Create Roles* permission on the organization to create custom roles.

1   Press the **Create** button located in the roles sidebar header.

2   Enter the **Name** and optional **Description** for the role.

3   Press the **Create** button to create the role.

Updating Roles

Note: You must have the *Update Roles* permission on the organization to update custom roles. System roles cannot be updated.

1   With a custom role selected, press the **Edit** button.

2   Update the **Name** and optional **Description** for the role as needed.

3   Press the **Save** button to save the role.

Updating Role Permissions

Note: You must have the *Update Roles* permission on the organization to update the permissions for custom roles. The permissions for system roles cannot be updated.

1   With a custom role selected, press the **Edit Permissions** button.

2   Mark the checkboxes next to the permissions to enable for the role.

3   Press the **Save** button to save the role permissions.

Copying Roles

Note: You must have the *Create Roles* permission on the organization to copy roles.

1   With a role selected, press the **Copy** button.

2   Enter the **Name** and optional **Description** for the new custom role.

3   Press the **Create** button to copy the role.

Deleting Roles

Note: You must have the *Delete Roles* permission on the organization to delete custom roles. System roles may not be deleted.

1   With a custom role selected, press the **Delete** button.

2   Read and acknowledge the notice by checking the box next to "I have read and understand the above notice."

3   Press the **Delete** button to delete the selected custom role.

Managing Access

IN THIS ARTICLE

With the Manage Access dialog, you can view, add, and remove role assignments for a given resource

- Viewing Role Assignments

- Adding Role Assignments

- Removing Role Assignments

- Downloading Role Assignments

Viewing Role Assignments

Note: You must have the *List Resource Assignments* permission on the resource to view role assignments for that resource.

1   Open the **Manage Access** dialog for the current resource.

2   (Optional) Use the filter to filter the list of role assignments by the name of the user, group, or organization or by the name of the role.

3   (Optional) Use the **Show All Roles** toggle to view assignments for all roles. By default, only the roles that are relevant for the given resource type are displayed.

4   Press the **Close** button to close the dialog.

Adding Role Assignments

Note: You must have the *Add Resource Assignments* permission on the resource to add role assignments for that resource.

1   Open the **Manage Access** dialog for the current resource.

2   Press the **Add** button.

3   Select a role.

4   Select a group.

5   Press the **Add** button.

6   Press the **Close** button to close the dialog.

Removing Role Assignments

Note: You must have the *Remove Resource Assignments* permission on the resource to remove role assignments for that resource.

1   Open the **Manage Access** dialog for the current resource.

2   Select one or more role assignments to remove.

3   Press the **Remove** button.

4   Press the **Close** button to close the dialog.

Downloading Role Assignments

1   Open the **Manage Access** dialog for the current resource.

2   Press the **Download Role Assignments** button

3   Press the **Close** button to close the dialog.

Understanding the Updated Identity and Access Management Controls

Prior to v1.31.0, ProKnow Identity and Access Management (IAM) was implemented via Workspaces, Roles, and Users. In v1.31.0, we introduced an updated set of IAM controls. If you started using ProKnow prior to the v1.31.0 release, this article will help you understand the differences between the two IAM systems and how your IAM entities were migrated to the new system. If you started using ProKnow after this release, the best way to learn about these new controls is by reading the Understanding Identity and Access Management article.

Resources

At the root of the new IAM system is a resource. There are six resource types: Organizations, Groups, Workspaces, Patients, Organization Collections, and Workspace Collections. Resources are organized into a hierarchy depicted in the diagram below.
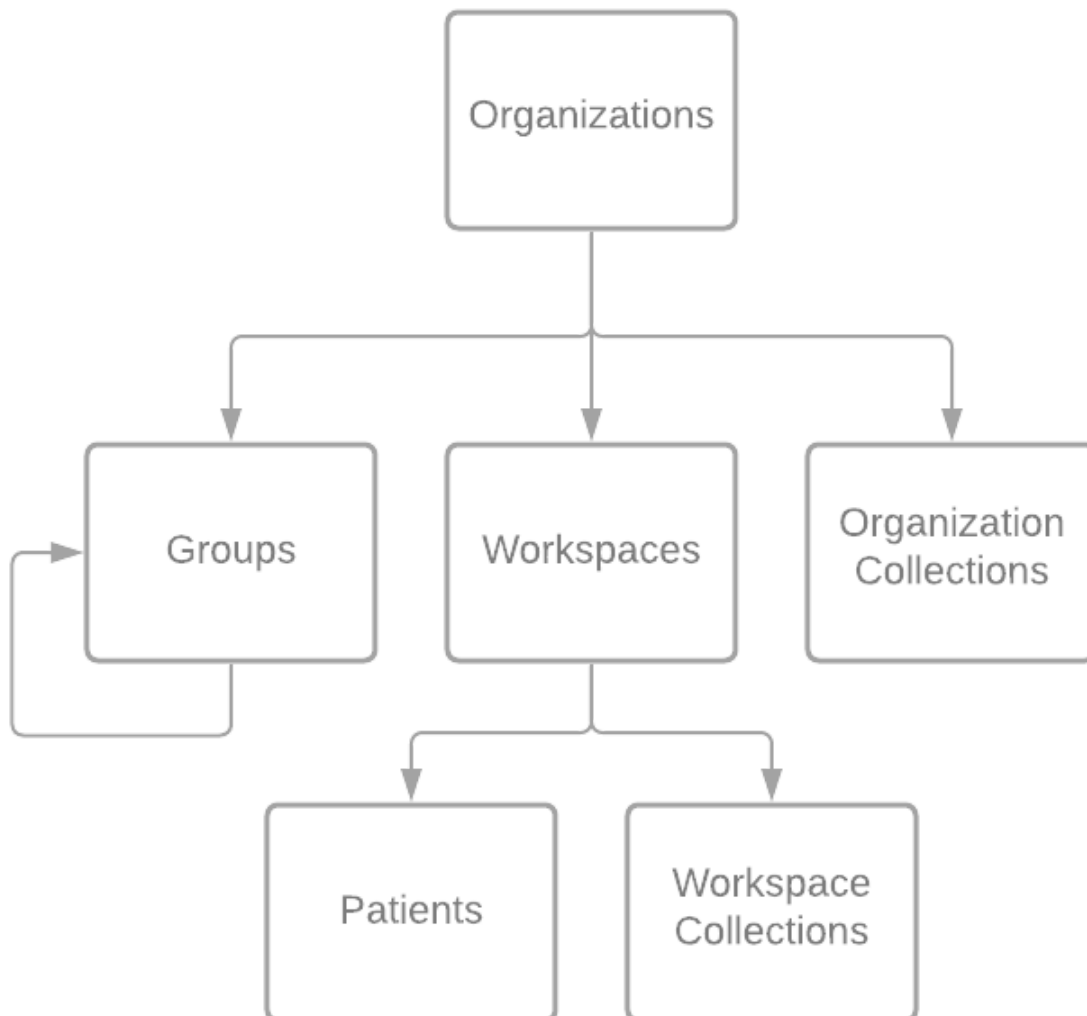
Figure 1: Resource Hierarchy

A *User* will be able to perform an action on a resource if the *User* or a *Group* they belong to is assigned a *Role* that grants the required permission on the given *Resource* or one of its parent resources. Users, Groups, and Roles are discussed in more detail in the sections that follow.

Some resources like patients have subresources (DICOM objects, scorecards, etc.) that are not formally represented in the hierarchy. Access to these subresources is governed by assignments on the closest formal resource in the hierarchy. For example, access on the patient scorecards is governed by permissions on the patient resource, and access to users is governed by permissions on the organization resource.

The inherited nature of permissions allows you to effectively assign permissions for a given resource at multiple levels of the hierarchy, however, assigning the same role at different levels will have a different interpretation. For example, let's examine the various ways you might give access to a patient:

- You can assign the "Contributor" role on a single patient, which will give the user access to edit that single patient (and only that patient).

- You can assign the "Contributor" role on the workspace in which the patient belongs, which would give the user access to that patient, and all other patients in the same workspace.

- You can assign the "Contributor" role on the organization, which would give the user access to that patient, and every other patient in the entire organization (as well as a whole host of other resources and subresources).

The management of resource assignments is performed on the page specific to each resource.

- Link for managing Organization and Group resource assignments

- Link for managing Workspace resource assignments

- Link for managing Patient resource assignments

- Link for managing Collection resource assignments

Roles

In the previous version of the IAM system, Roles defined both the Resource and the Permissions on those Resources. Users would be assigned exactly one Role in the system, granting the permissions on the resources as defined in the Role.

In the new IAM system, the Permissions and the Resources have been decoupled, and Roles now refer to a set of permissions. In addition, Roles are no longer assigned directly to users. Roles are assigned to the Organization, a Group, or a User on a Resource.

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Your organization will be populated with a set of system roles, which cannot be edited or deleted. These roles provide logical groupings of permissions and should be sufficient for most use cases. In general, custom roles for your organization will not be required.

Roles are managed on the Roles tab of the IAM module.

Groups

In the previous version of the IAM system, granting the same set of permissions to a set of users could be accomplished by assigning each of them to the same Role.

In the new IAM system, this can be accomplished by adding users to the same group and then assigning appropriate roles to the group on an appropriate set of resources. Note that users are automatically added to the root-level organization group. Organizations can also take advantage of the fact that membership flows upward to the parent groups. For example, if a user belongs explicitly to the root-level organization group and Group A.1, they are also a member of Group A:

```
Organization Group
|- Group A
    |- Group A.1
    |- Group A.2
|- Group B
    |- Group B.1
    |- Group B.2
```

Groups are managed on the Directory tab of the IAM module.

Users

In the previous version of the IAM system, users were managed on their own tab in the IAM module. Users may only be assigned to a single role, either a system role defined in their organization or a special private role defined just for that user.

In the new system, Users are managed alongside groups on the Directory tab of the IAM module. In addition, it is now possible to assign several roles to a user on a given resource (just like groups).

Examples

Use Case: Research Organization - Everyone Has All Permissions

Consider a small group of researchers with their own ProKnow organization. If each researcher should have full access to the organization, the permission setup is simple (see Figure 2):

- All users should belong to the special organization group at the root of the directory. Since all users are automatically added to this group, no configuration is required.

- Assign the "Owner" role to the "RGB Hospital Network" group on the "Organization" resource.

Figure 2: Entire Organization Has Full Access

Use Case: WorkspaceRead/Write Access

Consider an organization with two workspaces and two sets of users. One set of users should have read access to Workspace A and write access to Workspace B. A second set of users should have read access to Workspace B and write access to Workspace A. To achieve this in the old system, an administrator would have had to configure two custom roles: one for the first set of users with read access to Workspace A and write access to Workspace B and another for the second set of users with read access to Workspace B and write access to Workspace A. To achieve a similar setup with five workspaces and five sets of users, an administrator would have to create five distinct roles and assign the correct role for each user in the system.

In the new system, this setup can be simply achieved by creating a group for each set of users and then assigning the built-in roles "Reader" or "Contributor" to each group on each of the workspace resources as appropriate.

Use Case: Large Distributed Network

Consider a large distributed hospital network that wishes to keep their patient PHI private. Each hospital has their own IT administrators who need the ability to manage permissions for their organization independently. However, the hospitals also wish to share patient contouring responsibilities across the network. The group directory for this kind of ProKnow organization might look like this:

```
RGB Hospital Network
|- Network Administrators
```

```
|- Red Valley Cancer Center
    |- Physicians
    |- Physicists
    |- Dosimetrists
    |- Administrators
|- Green Plains Cancer Center
    |- Physicians
    |- Physicists
    |- Dosimetrists
    |- Administrators
|- Blue Mountain Cancer Center
    |- Clinicians
    |- Administrators
```

Each user in the organization should be added to their appropriate subgroup. Remember that a user can belong to more than one group. A physicist, for example, might also fulfill the role of hospital administrator. In that case, the physicist would belong to both the Physicist and Administrator group for their hospital. Also, notice that Blue Mountain Cancer Center has defined their groups a bit differently than the others, defining a single group for their clinicians rather than separate groups.

Now, let's suppose that the organization also defines a workspace for the clinical patient data for each hospital:

- Red Valley

- Green Plains

- Blue Mountain

With this configuration, the organization could configure their roles as follows.

- The "Network Administrators" group should be given the "Manage Access" role on the "Organization" resource. This will allow the users in that group to create subgroups and change group memberships across all groups within the organization. This is depicted in the screenshot below (see Figure 3).

- The "Administrators" group under each cancer center group should be given the "Manage Access" role on the hospital group resource. This will allow the users within the "Administrators" group to create subgroups under the hospital group and change group membership for the hospital group and all subgroups as needed (see Figure 4).

- Roles on the workspaces should be defined as follows (see Figure 5 for an example using the "Red Valley" workspace):

  - Assign the "Red Valley Cancer Center" group the "Contributor" role on the "Red Valley" workspace.

  - Assign the "Green Plains Cancer Center" group the "Contributor" role on the "Green Plains" workspace.

- Assign the "Blue Mountain Cancer Center" group the "Contributor" role on the "Blue Mountain" workspace.

- Assign the "Green Plains Cancer Center" and "Blue Mountain Cancer Center" groups the "Contourer" role on the "Red Valley" workspace.

- Assign the "Red Valley Cancer Center" and "Blue Mountain Cancer Center" groups the "Contourer" role on the "Green Plains" workspace.

- Assign the "Red Valley Cancer Center" and "Green Plains Cancer Center" groups the "Contourer" role on the "Blue Mountain" workspace.

Figure 3: Access Defined on the Organization

Figure 4: Access Defined on the "Red Valley Cancer Center" Group

Manage Access to Workspace: Red Valley ✕

| Filter Role Assignments 🔍 | Show All Roles ☐ | | | ＋ Add | 🗑 Remove | ⬇ Download Role Assignments | ⟳ Refresh |

☐	Name	Type	Role	Scope
User				
☐	RGB Hospital Network	Organization	User	Inherited
Owner				
☐	Kyle Burnett <kyle.burnett@elekta.com>	User	Owner	This workspace
Access Manager				
☐	Network Administrators	Group	Access Manager	Inherited
Contributor				
☐	Red Valley Cancer Center	Group	Contributor	This workspace
Contourer				
☐	Blue Mountain Cancer Center	Group	Contourer	This workspace
☐	Green Plains Cancer Center	Group	Contourer	This workspace

Close

Figure 5: Access Defined on the "Red Valley" Workspace

Logging In

IN THIS ARTICLE

You may log in to an organization's private domain on ProKnow using your email and password. If you forget or lose your password, you may use the login screen to reset your password.

- Logging In to Your Account

- Resetting Your Password

Logging In to Your Account

1   Find your organization's custom subdomain. If you're not sure what this is, please contact your organization's administrator.

2   In your web browser, navigate to **https://*custom-domain*.proknow.com** (replacing *custom-domain* with the domain you found in step 1).

3   Enter your username and password, and press **LOG IN**.

Resetting Your Password

1   Find your organization's custom subdomain. If you're not sure what this is, please contact your organization's administrator.

2   In your web browser, navigate to **https://*custom-domain*.proknow.com** (replacing ***custom-domain*** with the domain you found in step 1).

3   Click the link: *"Click here to set or reset your password."*

4   Enter your email address, and press **SEND EMAIL**.
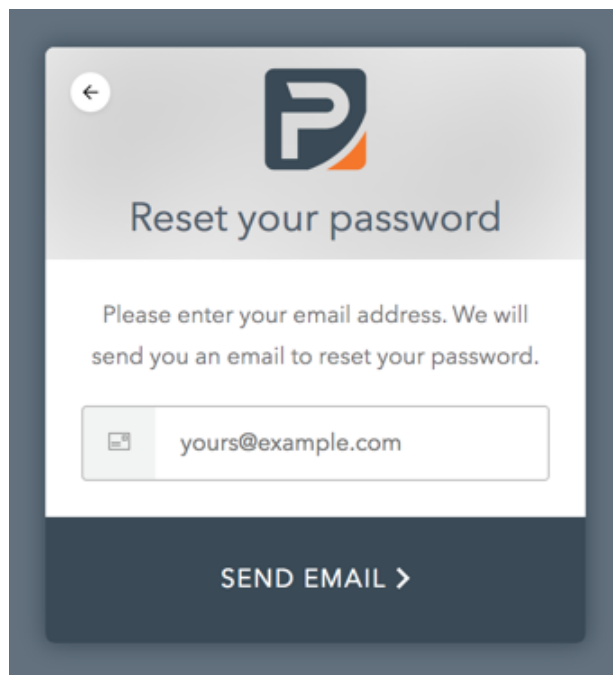
5   Login to the email account for the email you entered in step 4, and wait for an email with the subject "Reset your password." Once you receive the email, click on the provided link to confirm the password change.

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6   Enter and confirm a new password, and press the submit button.

Not receiving a reset password email?

If you do not receive a reset password email in step 5 above, please check the following:

- You may be registered in the organization using a different email address. Contact the organization's administrator to find out which email address they have on record.

- Your email provider may be incorrectly flagging the email as spam. Try adding *no-reply@auth0user.net* to your list of trusted contacts, and repeat the steps for resetting your password above.

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Configuring Your Profile

IN THIS ARTICLE

Your profile refers to the settings attached to your identity in ProKnow. This article describes how you can configure your profile with two-factor authentication and API keys.

- Setting Up Two-Factor Authentication

- Managing API Keys

- Managing Personal Preferences

Setting Up Two-Factor Authentication

Two-factor authentication is simply an extra layer of security for your account. In addition to your password, two-factor authentication works by requiring a second piece of information that only you know or have on your person when signing in to ProKnow. We recommend enabling two-factor authentication to bolster your account's security.

1   Once you are signed in, click on the ProKnow icon in the top left corner of the page, and select **Your Profile**.

2   Select the **Two-Factor Authentication** section.

3   Toggle the status to **Enabled** to enable two-factor authentication, and read the notice.

4   Check the box to indicate you have read and understood the notice, and press the **Save** button. You will be signed out and returned to the sign in screen.

5   Log in to your account again. You will be directed to a page where you can pick your second factor authentication method. Choose a method, and follow the on-screen prompts to complete your device enrollment.

Managing API Keys

API keys are an advanced feature. If you don't know what API keys are, you can probably safely ignore this section. However, if you are using the ProKnow API programmatically in a script or if you are setting up a DICOM server for uploading files to ProKnow, you will probably need to create and manage API keys. Read on to find out how.

CAUTION: It is important to understand that the information contained in the downloaded `credentials.json` file is enough to grant anyone who is in possession of the file

full access to the ProKnow DS user account that created the API key. As such, you should take great care to ensure that your API keys are stored in a safe and secure manner (for instance, you should NEVER store API keys in source code nor should you ever transmit your API keys over unencrypted protocols). When using API keys in stand-alone production services (e.g., ProKnow DICOM DS) it is best practice to create a dedicate user account for each service in ProKnow DS and generate the API keys using that dedicated user account. Using a dedicated user account for each service user has the following advantages:

- Allows you to restrict the permissions of the user to only those that are explicitly required (limiting exposure in the event that the user's credentials are compromised)

- Provides more accurate visibility into the actions performed by the service user (for auditing purposes)

- Allows you to easily disable the service user in the event that you suspect that the service user's credentials have been compromised

Use the following steps to manage your API keys.

1   Once you are signed in, click on the ProKnow icon in the top left corner of the page, and select **Your Profile**.

2   Select the **API Keys** section.

3   *To create an API key*, enter a descriptive name for the key and press the **Create** button. Save the downloaded `credentials.json` file in a safe place.

   To revoke an API key, click the trash icon next to the key you wish to delete, and press the **Revoke** button to confirm.

Note: You must have the *Create API Keys* permission on the organization to create API keys for your account.

Managing Personal Preferences

Use the following steps to manage your personal preferences.

1   Once you are signed in, click on the ProKnow icon in the top left corner of the page, and select **Your Profile**.

2   Select the **Preferences** section.

3   Set the available preferences and press the **Save** button. Descriptions for each the configurable options are enumerated below.

⊘ **Patient Orientation**

⊘ *Planning Orientation (or Image Orientation if not available)*: All patient objects will be rendered according to the orientation specified by the plan. If a plan is not activated, the Image Orientation will be used.

⊘ *Planning Orientation (or Head First Image Orientation if not available)*: All patient objects will be rendered according to the orientation specified by the plan. If a plan is not activated, the Head First Image Orientation will be used.

⊘ *Image Orientation*: All patient objects will be rendered according to the orientation specified by the image set.

⊘ *Head First Image Orientation*: All patient objects will be rendered in the head first orientation related to the specified Image Orientation (e.g., FFS will be displayed as HFS and FFP will be displayed as HFP).

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Anonymized Mode

IN THIS ARTICLE

Anonymized mode can be enabled to obfuscate PHI from the interface even if you have View PHI permissions. It will also, however, prevent you from taking certain actions such as creating new patients in the system or uploading DICOM files.

- Effects of Anonymized Mode

- Toggling Anonymized Mode

Effects of Anonymized Mode

When anonymized mode is enabled, the interface will behave as if you do not have *View PHI* and *Download DICOM* permissions. Wherever a patient is displayed in the user interface, it's ID and name will contain anonymized values and the patient's birth date, birth time, and sex will be hidden from view. In addition certain buttons will no longer be available. For example, the **Create Patient** button from the patients page and the **Download** button from the patient actions menu will be hidden from view with anonymized mode turned on.

If you already do not have *View PHI* and *Download DICOM* permissions, enabling and disabling anonymized mode will have no effect.

Toggling Anonymized Mode

Use the following steps to toggle anonymized mode:

1   Once you are signed in, click on the ProKnow icon in the top left corner of the page, and find the **Anonymized Mode** switch.

2   Toggle **Anonymized Mode** on to enable anonymized mode or off to disable anonymized mode. The setting will take affect immediately.

Multi-Factor Authentication Invalid Code Errors

In rare cases, you may receive invalid code errors when attempting to sign in with MFA enabled because the time on your MFA device has drifted. This has been observed with the Google Authenticator app but may affect other MFA methods. If you are using the Google Authenticator app as your MFA device, you can correct this using the following procedures for iOS and Android phones.

iOS

1. Open the iOS Settings app.

2. Select **General**.

3. Select **Date & Time**.

4. Enable **Set Automatically** if it is not already enabled. Otherwise, disable **Set Automatically**, wait 10 seconds, and then re-enable it.
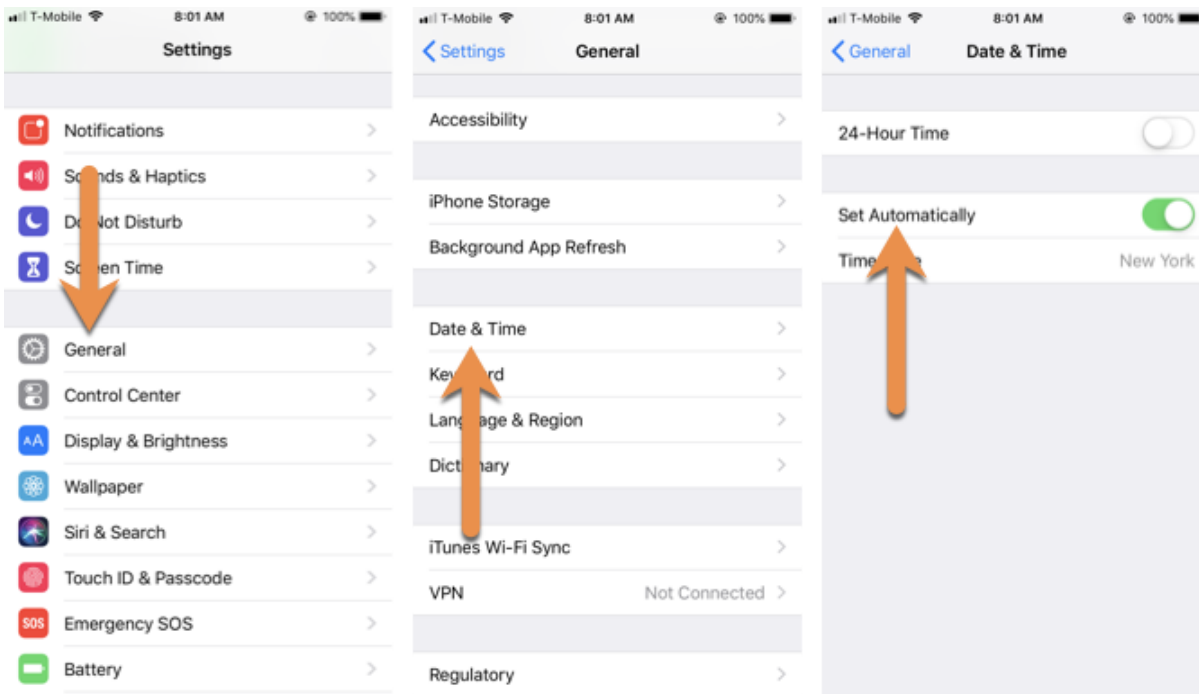
Android

1. Open the Google Authenticator app main menu.

2. Choose **Settings**.

3. Select **Time correction for codes**.

4. Select **Sync now**.
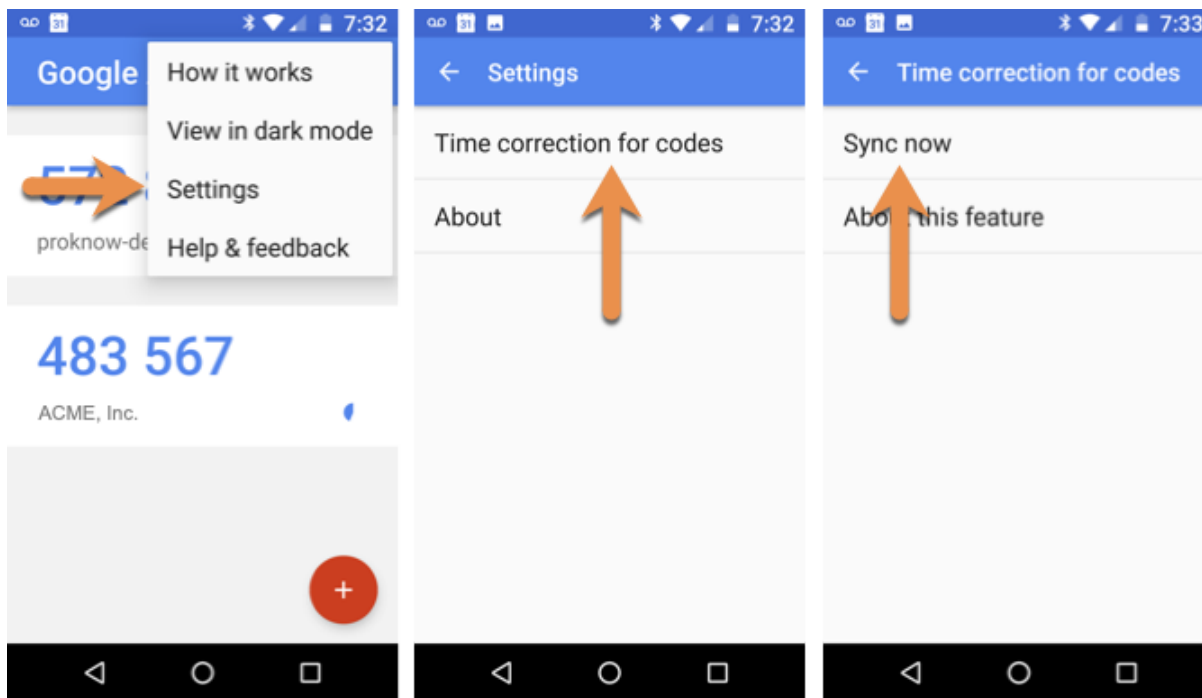
One you have completed the above procedure for your device type, close and reopen the Google Authenticator app, and attempt to enter the next code again.

Can I change the name of my custom metric?

Yes! Simply click the edit button for the metric you wish to edit, type in the new name, and press **Save**. The name change will take effect immediately across the system.

See Editing Custom Metrics for more information.

Can I change how my custom metric is defined?

Yes. See Defining Custom Metrics for information on how to change the custom metric type.

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Uploading Files on the Uploads Page

IN THIS ARTICLE

Use the Uploads page to upload new files or directories of files, and access your recently uploaded files.

- Accessing File Uploads

- Clearing Uploads

- Uploading Files

- Uploading a Directory

Accessing File Uploads

To view the uploads in your organization, select the **Uploads** module from the main navigation on the left. Use the workspace dropdown at the top of the page to switch workspaces. If your organization has many workspaces, search for the one you're looking for by filtering the workspaces by name.

Just to the right of the main navigation is the **Active Uploads** and **Processing** sidebar. The Active Uploads section shows the upload progress for any uploads that have started in your current browsing session. The Processing section provides a count of the uploads that are currently processing. The main content area is devoted to three tabs: the **Completed** tab for uploads that have been uploaded and processed successfully, the **Needs Attention** tab for pending uploads that need attention, and the **Failed** tab for failing uploads.

Under the Completed tab, each row in the list represents a patient, and clicking on the eyeball icon aligned to the right will open that patient for review. Each patient in the list stores a hierarchy of studies, image sets, structure sets, plans, doses, and files. You can expand a node in the hierarchy by clicking on it.

For information about the Needs Attention and Failed tabs, please visit our guides for Resolving Uploads that Need Attention and Addressing Failed Uploads.

Clearing Uploads

Uploads can be cleared for a particular tab or across an entire workspace. To clear uploads across an entire workspace, verify that you have the correct workspace selected, and press the **Clear All** button. To clear uploads for a given tab, select the tab and choose the tab-specific clear button (e.g., **Clear Completed** or **Clear Needs Attention**). Please note that clearing uploads will NOT clear any patient data created by the upload. It is simply clearing the upload record.

Uploading Files

1   With the proper workspace selected, press **Upload Files** to upload files to the workspace.

2   Select one or more DICOM files from your file system.

3   Wait for the files to be uploaded and processed. The tab contents will be updated appropriately as the uploads complete and finish processing.

Note: You must have the *Upload Patient DICOM* permission on a workspace to upload files to the workspace.

Uploading a Directory

1   With the proper workspace selected, press **Upload Directory** to upload a directory of files to the workspace.

2   Select a directory containing DICOM files from your file system.

3   Wait for the files to be uploaded and processed. The tab contents will be updated appropriately as the uploads complete and finish processing.

Note: You must have the *Upload Patient DICOM* permission on a workspace to upload files to the workspace.

Uploading Files Directly to a Patient

IN THIS ARTICLE

ProKnow automatically sets up patients for you when you upload new patient objects based on the patient ID given in the DICOM. There are cases, however, where you may wish to force a number of files to be uploaded to one specific patient. In this article you will learn how to upload files directly to a patient.

- Creating a Patient

- Uploading Files to a Patient

- Uploading a Directory of Files to a Patient

Creating a Patient

1. Select the **Patients** module from the main navigation on the left.

2. With the proper workspace selected, press the **Create Patient** button located in the gray bar at the top.

3. Enter the unique patient **ID** and the patient **Name**. This ID must be unique within each workspace. Optionally, enter the **Birth Date**, **Birth Time**, and **Sex** fields.

4. Press the **Create** button to create the patient.

Already have a patient?

If you already have a patient created, double click on the patient record in any patients table across ProKnow to view the patient's details. With a patient opened, you will see an Actions menu in the top right corner of the page with options to **Upload Files** or **Upload Directory**.

Note: You must have the *Create Patients* permission on a workspace to create a patient in the workspace.

Uploading Files to a Patient

1. With a patient opened, click on the Actions menu in the top right corner of the page and press **Upload Files** to upload files directly to the current patient.

2. Select one or more DICOM files from your file system.

3. Wait for the files to be uploaded and processed. After processing is complete the patient objects will appear in the Browse tab for the patient.

Note: You must have the *Upload Patient DICOM* permission on a patient to upload DICOM files directly to the patient.

Uploading a Directory of Files to a Patient

1. With a patient opened, click on the Actions menu in the top right corner of the page, and press **Upload Directory** to upload a directory of files directly to the current patient.

2. Select a directory containing DICOM files from your file system.

3. Wait for the files to be uploaded and processed. After processing is complete the patient objects will appear in the Browse tab for the patient.

Note: You must have the *Upload Patient DICOM* permission on a patient to upload DICOM files directly to the patient.

Resolving Uploads that Need Attention

IN THIS ARTICLE

Uploads can be marked as "Needs Attention" if duplicate or conflicting entities are detected. Use this article to learn about how to resolve these uploads.

- Underlying Causes of Uploads that Need Attention

- Resolving Pending Uploads

Underlying Causes of Uploads that Need Attention

There are a few reasons why an upload may show up under the Needs Attention tab.

1   A patient with the same ID has already been imported with a different name, causing the strict patient name consistency checks to fail. This can sometimes happen if you use different anonymization schemes when exporting patient objects from your systems.

2   The SOP instance UID (0008,0018) or series instance UID (0020,000E) for files you are trying to upload match the UIDs of patient objects that have already been uploaded and processed in the current workspace. This can sometimes happen if you upload and import the same files more than once.

3   DICOM objects with the same UID have been imported already and contain conflicting values. This is very rare and unlikely to occur in practice.

Resolving Pending Uploads

1   With the proper workspace selected, choose the **Needs Attention** tab.

2   Press the **Resolve** button corresponding to the patient files you wish to resolve.

3   Follow the instructions in the Resolve Uploads Wizard. At the end you will have the opportunity to review your selections before pressing the **Finish** button to commit your changes. The uploads will be removed or reprocessed according to your selections. Depending on what you chose to do, the uploads may end up under Needs Attention again, so it's a good idea to monitor the progress of uploads as they are being reprocessed.

Note: You must have the *Create Patients* permission on a workspace to resolve "Needs Attention" uploads in that workspace.

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Addressing Failed Uploads

IN THIS ARTICLE

Failed uploads can occur if ProKnow detects that a file is not a valid DICOM file or it contains improperly formatted DICOM. Use this document to learn how to address these cases.

- Showing the Failure Details
- Clearing a Failed Upload

Showing the Failure Details

1 With the proper workspace selected, choose the **Failed** tab.

2 In the list of failed uploads find the failed upload you wish to inspect. The failure reason is shown below the file. Press the **Show details** button to view additional details about the failure.

Unexpected Failures

If you believe that a file is failing erroneously, please let us know by contacting ProKnow DS support. Please include the workspace you are trying to upload to and a description of the upload failure in your request. Please do NOT include the original DICOM file if it contains protected health information.

Clearing a Failed Upload

1 With the proper workspace selected, choose the **Failed** tab.

2 In the list of failed uploads find the failed upload you wish to delete. Press the trash icon to clear the upload.

3 Press the **Clear** button to confirm that you wish to remove the upload.

Note: You must have *Delete Patients* permission for a workspace to clear "Failed" uploads in that workspace.

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Importing Custom Metrics from a CSV

IN THIS ARTICLE

Importing custom metrics from a CSV is a convenient and quick way to update the custom metrics for a large cohort of patients. Use this article to learn how to import this custom metric data.

- Constructing the CSV

- Importing the Custom Metrics

Note: You must have the *Update Patients* permission on a patient to upload the patient custom metrics.

Constructing the CSV

The best way to create CSVs is from a spreadsheet. Use familiar tools like Microsoft Excel, Apple's Numbers application, or Google Sheets to create the spreadsheet, and then export or save the sheet as a CSV (comma-separated values) file.

At minimum, your spreadsheet should have a patient ID column. We recommend labeling this column as **Patient ID**. Next, add columns for each of the custom metrics you wish to import. Finally, if there are other columns you wish to include to help keep your spreadsheet organized, feel free to include those as well. You can instruct the import wizard to ignore columns you do not wish to associate with any custom metrics. In the example below, we have a spreadsheet containing four patients. The **Patient ID** column will be used to identify matching patients. Since we are only using the **Name** column to help us keep the spreadsheet organized, we will instruct the import wizard to ignore that column. The columns for **Immobilization Technique** and **Normalcy of Diet at 6 mo.** represent two of the custom metrics we wish to update.

Patient ID	Name	Immobilization Technique	Normalcy of Diet at 6 mo.
HNC-0522c0002	Myers^Josh	Technique A	60
HNC-0522c0003	Kim^Marie	Technique A	80
HNC-0522c0009	Becker^Matthew		90
HNC-0522c0013	Jensen^Myrtle	Technique B	80

Defining Custom Metrics

To learn more about setting up custom metrics for your organization, visit our Defining Custom Metrics article.

Importing the Custom Metrics

1   Select the **Uploads** module from the main navigation on the left.

2   With the proper workspace selected, press the **Import Metrics** button located in the large toolbar at the top. This will open the Import Metrics wizard.

3   Begin by selecting the CSV file containing the custom metric data. Press the **Select File** button to choose a file from your file system. Then press **Next** to continue to the next step.

> **Note**: Currently, the only available option under "Select how empty custom metric cells in the CSV file should be handled:" is "Leave the existing patient custom metric value unchanged." More options will be added in future ProKnow releases.

4   Associate each column in the spreadsheet with the appropriate custom metric. Columns that match metric names exactly will be automatically associated. Otherwise, to associate a column with a custom metric, choose the custom metric from the select box. To ignore the column, choose **(Ignore)** from the select box. Press **Next** when finished to continue to the next step.

5   After clicking the **Next** button, you will be asked to acknowledge that you understand the consequences of the action you are about to perform. The acknowledgement will list how many rows were found in the spreadsheet and how many potential patient records may be updated. Please note that only rows that have a corresponding patient record in the current workspace (as defined by the selected "Patient ID" column) will be updated. Once you have acknowledged the potential impact by clicking on the consent checkbox, you may press the **Import** button to begin importing the metric data.

6   Once importing is complete, you will see a message reporting how many rows were imported. To view a detailed results report, click on the "Click here to download a results report" link which will download a CSV file containing detailed information on all metrics imported (and any that may have failed to import). Press **Finish** to exit the wizard.

ProKnow DICOM Agent: Release Notes

ProKnow DICOM Agent v1.2.0 (2dc0053)

August 4, 2021

What's New

- We've added the ability to use a watched folder as a DICOM source. See Configuring Services for details.

- The Varian Ethos private RT Plan SOP class is now supported.

- Browsing for files or folders is no longer restricted to a single folder. See Installing for more information.

- We've improved the error handling when the provided base URL and credentials are incompatible by not clearing the credentials path.

Bug Fixes

- We've fixed an issue where temporary files were not being cleaned up after DICOM objects were stored.

Downloads

- ProKnow DICOM Agent v1.2.0 Windows Installer

ProKnow DICOM Agent v1.1.0 (61d073a)

May 21, 2021

What's New

- We've introduced the ability to perform automatic anonymization of DICOM datasets prior to storing locally and/or uploading to ProKnow cloud storage based upon user-customizable anonymization rules.

Downloads

- ProKnow DICOM Agent v1.1.0 Windows Installer

ProKnow DICOM Agent v1.0.0 (72c6a85)

March 2, 2021

What's New

- We've completely redesigned the application to run on the Microsoft ASP.NET web platform.

Downloads

- ProKnow DICOM Agent v1.0.0 Windows Installer

ProKnow DICOM DS v2.1.1

Version 2.1.1 of DICOM DS has been deprecated. You can find legacy documentation for this version here (see page 145).

ProKnow DICOM Agent: Installing

Service User Account

It is recommended that ProKnow DICOM Agent be installed using a service user account created specifically for this application. Application data files are stored within the home directory of the user account that was used for the installation. This ensures that access to these files must be authorized by an administrator.

Device Encryption

It is recommended that ProKnow DICOM Agent be installed on hardware that utilizes device encryption to protect data, including protected health information (PHI) and personally identifiable information (PII). Please see the Microsoft support article Device Encryption in Windows 10 for more information.

Replacing DICOM DS

While ProKnow DICOM Agent and its predecessor DICOM DS can certainly co-exist on the same hardware, most users will want to completely replace DICOM DS with ProKnow DICOM Agent. DICOM DS can be uninstalled as follows:

- Retain the DICOM DS configuration by saving or printing a copy of the configuration file that is located, by default, at C:\ProgramData\DICOM DS\configuration.json. This configuration can later be manually entered in ProKnow DICOM Agent.

- Uninstall DICOM DS using the menu options Start > Settings > Apps, clicking on the ProKnow DICOM DS application, clicking on the Uninstall button, and following the instructions.

Downloading the Installer

ProKnow DICOM Agent is designed to run on Windows, as a Windows service. The following link allows you to download the latest Windows installer (recommended).

- ProKnow DICOM Agent v1.2.0 Windows Installer

For previous versions of ProKnow DICOM Agent, please see the Release Notes.

System Requirements

- Windows 10 or Windows Server 2016 or newer

- .NET Framework 3.5 - For a free version, visit https://www.microsoft.com/en-us/download/details.aspx?id=21, select your preferred language, and click on the Download button to install it.

Supported Browsers

Configuration of ProKnow DICOM Agent is performed using a browser-based (i.e., web-based) Management Console application that limits official support to the latest versions of the following browsers:

- Google Chrome

- Mozilla Firefox

These browsers were selected for their support of key web technologies, cross-platform availability, and cost (both are free). While other modern browsers (Microsoft Edge, Apple Safari, etc.) may function properly while using the ProKnow DICOM Agent Management Console, we make no guarantee of performance, stability, or accuracy with an unsupported browser. Furthermore, in order to obtain technical support for ProKnow DICOM Agent, all users must be using one of the officially supported browsers.

Using the Installer

1. Download and run the installer as an administrator. Please note that you may receive message(s) asking you to confirm whether you wish to allow the installer executable to run. In order to use the installer, you will need to make the appropriate selections.

2. Once the installer starts, you will be brought to a welcome page. When you're ready to continue, press the **Next**

3. The End-User License Agreement (EULA) will be displayed. Please read the EULA. To continue with the installation you will need to check the box indicating that you accept the EULA terms and press the **Next**

4. The next page allows you to choose the folder in which to install the application. Press the **Change** button to select a different folder. Press the **Next** button to continue.

5. On the next page, when you're ready to begin the installation, press the **Install** Please note that you may receive message(s) asking you to confirm whether you wish to allow the installation. In order to install the application, you will need to make the appropriate selections.

6. The installation page will show the progress. Once complete, the installation will automatically progress to the next page.

7. The last page will confirm that the install is complete. Click on the **Configure ProKnow DICOM Agent** link to open the Management Console in your default web browser.

8. Press **Finish** to close the installer.

What is the installer doing?

- Installs the application executable, library, configuration, and uninstaller files in the directory specified during the installation, by default *C:\Program Files\Elekta\ProKnow DICOM Agent\.*

- Installs the application as Windows service with the name *ProKnowDICOMAgentService* and startup type of *Automatic (Delayed Start)*. This ensures the service will automatically start whenever the system is restarted.

- Installs the application database as *%UserProfile%\ProKnow DICOM Agent\Database\ProKnow.DicomAgent.Infrastructure.db*.

- Sets the path to the application log file folder as *%UserProfile%\ProKnow DICOM Agent\Logs*. Please see Configuring Options and Configuring Log Retention for more information about logging.

- Initializes RootDirectory settings in the appsettings.json file, located in the application installation directory, that contains the root directories within which to restrict browsing. There is a separate root directory setting for each path type: credentials files, watched folders, anonymization configuration files, original DICOM local storage folders, and anonymized DICOM local storage folders. These settings can be edited only when the ProKnow DICOM Agent application Windows service is stopped.

- Registers the uninstaller so that the application may be located and uninstalled from your Control Panel.

> **CAUTION**: When utilizing anonymization, it is important to ensure that the database file is included in your automatic backups. Loss of the database may result in duplication of patient IDs or UIDs for subsequent anonymizations, which could cause unexpected results in DICOM associations (e.g., a newly anonymized dataset may get added to an already existing anonymized dataset where the anonymized Patient ID was the same).

ProKnow DICOM Agent: Instructions for Use

Indications for Use

ProKnow DICOM Agent is a locally installed Windows application which facilitates transfer of patient data from on-premise clinical systems to the cloud-based ProKnow RT-PACS.

Users of ProKnow DICOM Agent should be trained radiation therapy professionals familiar with the different sources of input data (such as images, structure sets, treatment plans, and calculated dose).

Intended Uses

The specific intended uses of ProKnow DICOM Agent are summarized below.

1. ProKnow DICOM Agent facilitates the transfer of patient data from on-premise clinical systems to the cloud-based ProKnow RT-PACS.

2. The ProKnow DICOM Agent provides the ability to remove or replace attributes within a DICOM dataset that may contain protected health information (PHI) or personally identifiable information (PII), prior to the transfer to ProKnow.

User Responsibilities

It is the responsibility of those utilizing this application to ensure all that all usages of this product relating to patient treatments are performed by trained and qualified personnel and that such personnel are aware that the quality of any generated patient data is highly dependent on the quality and correctness of the input data. If any questions or uncertainties exist regarding the quality, units, or identification of input data, they must be investigated and resolved before the data are used. It is the user's responsibility to validate the correctness of all patient data within the context of their normal treatment planning workflow. This general liability on the end users should be understood and communicated to all users, and a representative with signatory authority from each organization using ProKnow must sign an End User License Agreement on behalf of the organization indicating understanding of the responsibilities for quality, accuracy, and security described herein.

CAUTION: It is critical that all users read these Instructions for Use and the associated support material carefully and completely and consult the provided Online Help and other training materials to ensure proper use of the application and proper interpretation of results.

System Requirements

- Windows 10 or Windows Server 2016 or newer

- .NET Framework 3.5 - For a free version, visit https://www.microsoft.com/en-us/download/details.aspx?id=21, select your preferred language, and click on the Download button to install it.

Supported Browsers

Configuration of ProKnow DICOM Agent is performed using a browser-based (i.e., web-based) Management Console application that limits official support to the latest versions of the following browsers:

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These browsers were selected for their support of key web technologies, cross-platform availability, and cost (both are free). While other modern browsers (Microsoft Edge, Apple Safari, etc.) may function properly while using the ProKnow DICOM Agent Management Console, we make no guarantee of performance, stability, or accuracy with an unsupported browser. Furthermore, in order to obtain technical support for ProKnow DICOM Agent, all users must be using one of the officially supported browsers.

Cybersecurity Requirements

Shared Responsibility

ProKnow DICOM Agent is built to interface with ProKnow, which is built on Microsoft Azure, and follows Azure security best practices pertaining to the design of its network architecture and access model. As a cloud-based vendor, it is our responsibility to design, develop, and deploy a secure system to help protect the confidentiality of both our customers and their patients. However, **realizing a secure, cloud-based environment is ultimately a shared responsibility shared between ProKnow and our customers**. ProKnow can relieve customers' operational burden as it pertains to managing the information technology infrastructure, but it is the customer's responsibility to employ responsible access rights, manage the security of individual client workstations (including the operating systems and browsers used to access ProKnow), and ensure that their users have the necessary training related to safe computer usage. These Cybersecurity Requirements describe the recommended and suggested cybersecurity controls that should be employed by organization administrators and users of ProKnow DICOM Agent to ensure a safe and secure environment. By extension, the Cybersecurity Requirements for ProKnow have a great amount of relevance to the Cybersecurity Requirements for ProKnow DICOM Agent and can be found here.

Principle of Least Privilege

The principle of least privilege (PoLP, also commonly referred to as the principle of minimal privilege or the principle of least authority) requires that within a particular environment, every agent (such as a process, a user, or a program, depending on the subject) must be able to access only the information and resources that are necessary for its legitimate business purposes. Practically speaking, this principle implies that user accounts should only be granted access to the specific functions that they require to perform their assigned job duties.

Use of ProKnow DICOM Agent requires a credentials.json file, which is obtained by creating an API key in ProKnow. Since this API key inherits all of the permissions of the user that created it, it is imperative that the key be stored in a safe location. It is the responsibility of the creator of the API key to limit access to the credentials.json file to only qualified individuals whose access to the file satisfies a legitimate need for the organization. Should an API key be compromised, it is the responsibility of the creator of the API key to revoke the key.

Users of ProKnow DICOM Agent have the ability to configure services and options within the ProKnow DICOM Agent Management Console. It is the responsibility of the organization administrator to limit access to the Management Console of ProKnow DICOM Agent to only qualified individuals whose use of the Management Console satisfies a legitimate need for the organization.

Workstation Security

It is important to understand that a system is only as secure as the **least secure** component in the system. Imagine that you are in a public place working on sensitive information on your laptop. What is more likely: that a hacker halfway across the world is able to intercept and decode your network packets or that the person sitting behind you looks over your shoulder at your computer screen? This simple example illustrates the importance of being aware of basic workstation security. Workstation security involves being mindful of simple but critical safety measures related to your physical workstation. All   using ProKnow DICOM Agent should be aware of and abide by the following guidelines and best-practices:

- Do not open, browse, or compose content in ProKnow DICOM Agent in public areas where it would be easy for others to eavesdrop.

- Do not open, browse, or compose content in ProKnow DICOM Agent while connected to insecure or public wireless networks.

- All computing devices used to access ProKnow DICOM Agent should be secured with a password-protected screensaver with the automatic activation feature set to 10 minutes or less.

- Users should be instructed to always lock the screen or log off when leaving a device unattended.

In addition to utilizing proper secure workstation behavior, it is also critical that:

- All client workstations used to access ProKnow DICOM Agent are up to date with necessary operating system security patches and updates,

- All client workstations utilize one of the supported browsers and that all browsers are updated to the latest version,

- All client workstations employ sufficient anti-virus and malware protection to ensure that client operations or behavior is not compromised.

Ultimately, it is the responsibility of each user to employ safe computer-use practices to help ensure that the entire system remains secure.

Coordinates and Units of Measure

The following is a list of several important items that users should understand with regards to the information displays in ProKnow DICOM Agent:

- All logged timestamps are in local time and include the offset from UTC (Coordinated Universal Time), e.g., "2021-02-10 9:26:06.330 -06:00."

Support

For questions, comments, or support requests, please visit our customer support portal at https://support.proknow.com.

About

ProKnow DICOM Agent is developed by Elekta, AB.

ProKnow DICOM Agent: DICOM Conformance Statement

Issued July 30, 2021 by ProKnow DICOM Agent v1.2.0

1. Conformance Statement Overview

ProKnow DICOM Agent is a locally installed Windows application which facilitates the transfer of patient data from on-premise clinical systems to the cloud-based ProKnow RT-PACS. In addition to transferring data to ProKnow, ProKnow DICOM Agent also enables the storage of received data to the local file system.

Although ProKnow DICOM Agent supports network transfer of all standard SOP classes, ProKnow limits support to common radiotherapy types. Refer to the ProKnow DICOM Conformance Statement for more information.

Table 1-1 provides an overview of the network services supported by integration of ProKnow DICOM Agent with ProKnow.

Table 1-1: Network Services

SOP Class	User of Service (SCU)	Provider of Service SCP
Transfer		
CT Image Storage	No	Yes
MR Image Storage	No	Yes
Positron Emission Tomography (PET) Image Storage	No	Yes
RT Structure Set Storage	No	Yes
RT Plan Storage	No	Yes
Varian Ethos Private RT Plan Storage	No	Yes
RT Ion Plan Storage	No	Yes
RT Dose Storage	No	Yes

SOP Class	User of Service (SCU)	Provider of Service SCP
Spatial Registration Storage	No	Yes

Query/Retrieve

Workflow Management

Print Management

> **Note**
>
> Verification SCP (C-Echo) is not included in the table above because it is required for any Acceptor of an Association.

2. Table of Contents

2.1. List of Tables

Table Number	Table Name
1-1	Network Services
3-1	Revision History
3-2	Terms and Definitions
3-3	Abbreviations
3-4	References
4-1	SOP Classes for Storage AE
4-2	Maximum PDU Size Received as an SCP for Storage
4-3	Number of Associations as an SCP for Storage

Table Number	Table Name
4-4	Asynchronous Nature as an SCP for Storage
4-5	Acceptable Presentation Contexts for Storage SCP and Receive Storage Request
4-6	Response Status for Storage SCP and Receive Storage Request
C.7.1.1-Import	Patient Module (C.7.1.1) Import
C.7.2.1-Import	General Study Module (C.7.2.1) Import
C.7.3.1-C.8.8.1-Import	General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import
C.12.1-Import	SOP Common Module (C.12.1) Import

3. Introduction

3.1. Revision History

Table 3-1: Revision History

Document Revision	Date of Issue	Description of Change
A	February 26, 2021	Initial release
B	July 30, 2021	Add support for Varian Ethos Private RT Plan Storage SOP class

3.2. Audience

This document is written for the people that need to understand how ProKnow DICOM Agent will integrate into their healthcare facility. This includes both those responsible for overall imaging network policy and architecture, as well as integrators who need to have a detailed understanding of the DICOM features of the product. This document contains some basic DICOM definitions so that any reader may understand how this product implements DICOM features. However, integrators are expected to fully understand all

the DICOM terminology, how the tables in this document relate to the product's functionality, and how that functionality integrates with other devices that support compatible DICOM features.

3.3. Remarks

The scope of this DICOM conformance statement is to facilitate integration between ProKnow DICOM Agent and other DICOM products. The conformance statement should be read and understood in conjunction with the DICOM standard. DICOM by itself does not guarantee interoperability. The conformance statement does, however, facilitate a first-level comparison for interoperability between different applications supporting compatible DICOM functionality. This conformance statement is not supposed to replace validation with other DICOM equipment to ensure proper exchange of intended information. In fact, the user should be aware of the following important issues:

- The comparison of different conformance statements is just the first step towards assessing interconnectivity and interoperability between the product and other DICOM conformant equipment.

- Test procedures should be defined and executed to validate the required level of interoperability with specific compatible DICOM equipment, as established by the healthcare facility.

3.4. Terms and Definitions

Informal definitions are provided for the following terms used in this conformance statement. The DICOM standard is the authoritative source for formal definitions of these terms.

Table 3-2: Terms and Definitions

Term	Definition
Abstract Syntax	The information agreed to be exchanged between applications, generally equivalent to a Service/Object Pair (SOP) Class. Examples: Verification SOP Class, Modality Worklist Information Model Find SOP Class, Computed Radiography Image Storage SOP Class.
Application Entity (AE)	An end point of a DICOM information exchange, including the DICOM network or media interface software; i.e., the software that sends or receives DICOM information objects or messages. A single device may have multiple Application Entities.
Application Entity Title (AET)	The externally known name of an Application Entity, used to identify a DICOM application to other DICOM applications on the network.
Association	A network communication channel set up between Application Entities.

Attribute	A unit of information in an object definition; a data element identified by a tag. The information may be a complex data structure (Sequence), itself composed of lower level data elements. Examples: Patient ID (0010,0020), Accession Number (0008,0050), Photometric Interpretation (0028,0004), Procedure Code Sequence (0008,1032).
Information Entity (IE)	That portion of information defined by a Composite IOD which is related to one specific class of Real-World Object. There is a one-to-one correspondence between Information Entities and entities in the DICOM Application Model.
Information Object Definition (IOD)	The specified set of Attributes that comprise a type of data object, does not represent a specific instance of the data object, but rather a class of similar data objects that have the same properties. The Attributes may be specified as Mandatory (Type 1), Required but possibly unknown (Type 2), or Optional (Type 3), and there may be conditions associated with the use of an Attribute (Types 1C and 2C). Examples: MR Image IOD, CT Image IOD, Print Job IOD.
Media Application Profile	The specification of DICOM information objects and encoding exchanged on removable media (e.g., CDs).
Module	A set of Attributes within an Information Object Definition that are logically related to each other. Example: Patient Module includes Patient Name, Patient ID, Patient Birth Date, and Patient Sex.
Negotiation	First phase of Association establishment that allows Application Entities to agree on the types of data to be exchanged and how that data will be encoded.
Presentation Context	The set of DICOM network services used over an Association, as negotiated between Application Entities; includes Abstract Syntaxes and Transfer Syntaxes.
Protocol Data Unit (PDU)	A packet (piece) of a DICOM message sent across the network. Devices must specify the maximum size packet they can receive for DICOM messages.
Security Profile	A set of mechanisms, such as encryption, user authentication, or digital signatures, used by an Application Entity to ensure confidentiality, integrity, and/or availability of exchanged DICOM data.
Service Class Provider (SCP)	Role of an Application Entity that provides a DICOM network service; typically, a server that performs operations requested by another Application Entity (Service Class User). Examples: Picture Archiving and Communication System (image storage SCP, and image query/retrieve SCP), Radiology Information System (modality worklist SCP)

Service Class User (SCU)	Role of an Application Entity that uses a DICOM network service; typically, a client. Examples: imaging modality (image storage SCU, and modality worklist SCU), imaging workstation (image query/retrieve SCU).
Service/Object Pair (SOP Class)	The specification of the network or media transfer (service) of a particular type of data (object); the fundamental unit of DICOM interoperability specification. Examples: Ultrasound Image Storage Service, Basic Grayscale Print Management.
Service/Object Pair (SOP Instance)	An information object; a specific occurrence of information exchanged in a SOP Class. Example: a specific x-ray image.
Tag	A 32-bit identifier for a data element, represented as a pair of four digit hexadecimal numbers, the "group" and the "element". If the "group" number is odd, the tag is for a private (manufacturer-specific) data element. Examples: (0010,0020) [Patient ID], (07FE,0010) [Pixel Data], (0019,0210) [private data element]
Transfer Syntax	The encoding used for exchange of DICOM information objects and messages. Examples: JPEG compressed (images), little endian explicit value representation.
Type (Attribute Type)	A numeric flag used to specify whether an Attribute is mandatory or optional: 1 = Attribute is mandatory and must contain a non-zero length value 2 = Attribute must be included in data set, although it is allowed to have no value or a zero-length value 3 = Attribute is optional
Unique Identifier (UID)	A globally unique "dotted decimal" string that identifies a specific object or a class of objects; an ISO-8824 Object Identifier. Examples: Study Instance UID, SOP Class UID, SOP Instance UID.
Value Representation (VR)	The format type of an individual DICOM data element, such as text, an integer, a person's name, or a code. DICOM information objects can be transmitted with either explicit identification of the type of each data element (Explicit VR), or without explicit identification (Implicit VR); with Implicit VR, the receiving application must use a DICOM data dictionary to look up the format of each data element.

3.5. Basics of DICOM Communication

This section describes terminology used in this Conformance Statement for the non-specialist. The key terms used in the Conformance Statement are highlighted in *italics* below. This section is not a substitute for training about DICOM, and it makes many simplifications about the meanings of DICOM terms.

Two *Application Entities* (devices) that want to communicate with each other over a network using DICOM protocol must first agree on several things during an initial network "handshake". One of the two devices

must initiate an *Association* (a connection to the other device), and ask if specific services, information, and encoding can be supported by the other device (*Negotiation*).

DICOM specifies a number of network services and types of information objects, each of which is called an *Abstract Syntax* for the Negotiation. DICOM also specifies a variety of methods for encoding data, denoted *Transfer Syntaxes*. The Negotiation allows the initiating Application Entity to propose combinations of Abstract Syntax and Transfer Syntax to be used on the Association; these combinations are called *Presentation Contexts*. The receiving Application Entity accepts the Presentation Contexts it supports.

For each Presentation Context, the Association Negotiation also allows the devices to agree on *Roles* - which one is the *Service Class User* (SCU - client) and which is the *Service Class Provider* (SCP - server). Normally the device initiating the connection is the SCU, i.e., the client system calls the server, but not always.

The Association Negotiation finally enables exchange of maximum network packet (*PDU*) size, security information, and network service options (called *Extended Negotiation* information).

The Application Entities, having negotiated the Association parameters, may now commence exchanging data. Common data exchanges include queries for worklists and lists of stored images, transfer of image objects and analyses (structured reports), and sending images to film printers. Each exchangeable unit of data is formatted by the sender in accordance with the appropriate *Information Object Definition*, and sent using the negotiated Transfer Syntax. There is a Default Transfer Syntax that all systems must accept, but it may not be the most efficient for some use cases. Each transfer is explicitly acknowledged by the receiver with a *Response Status* indicating success, failure, or that query or retrieve operations are still in process.

Two Application Entities may also communicate with each other by exchanging media (such as a CD-R). Since there is no Association Negotiation possible, they both use a *Media Application Profile* that specifies "pre-negotiated" exchange media format, Abstract Syntax, and Transfer Syntax.

3.6. Abbreviations

Table 3-3: Abbreviations

AE	Application Entity
AET	Application Entity Title
CT	Computed Tomography
DICOM	Digital Imaging and Communications in Medicine
IE	Information Entity

IOD	Information Object Definition
ISO	International Organization for Standards
MR	Magnetic Resonance Imaging
NEMA	National Electrical Manufacturers Association
PACS	Picture Archiving and Communication System
PDU	Protocol Data Unit
PET	Positron Emission Tomography
RT	Radiotherapy
SCU	Service Class User
SCP	Service Class Provider
SOP	Service-Object Pair
SRO	Spatial Registration Object
UID	Unique Identifier
VR	Value Representation

3.7. References

Table 3-4: References

NEMA PS3	Digital Imaging and Communications in Medicine (DICOM) Standard, available free at https://www.dicomstandard.org/

4. Networking

4.1. Implementation Model

4.1.1. Application Data Flow

The diagram below illustrates the interactions ProKnow DICOM Agent makes with the DICOM world.
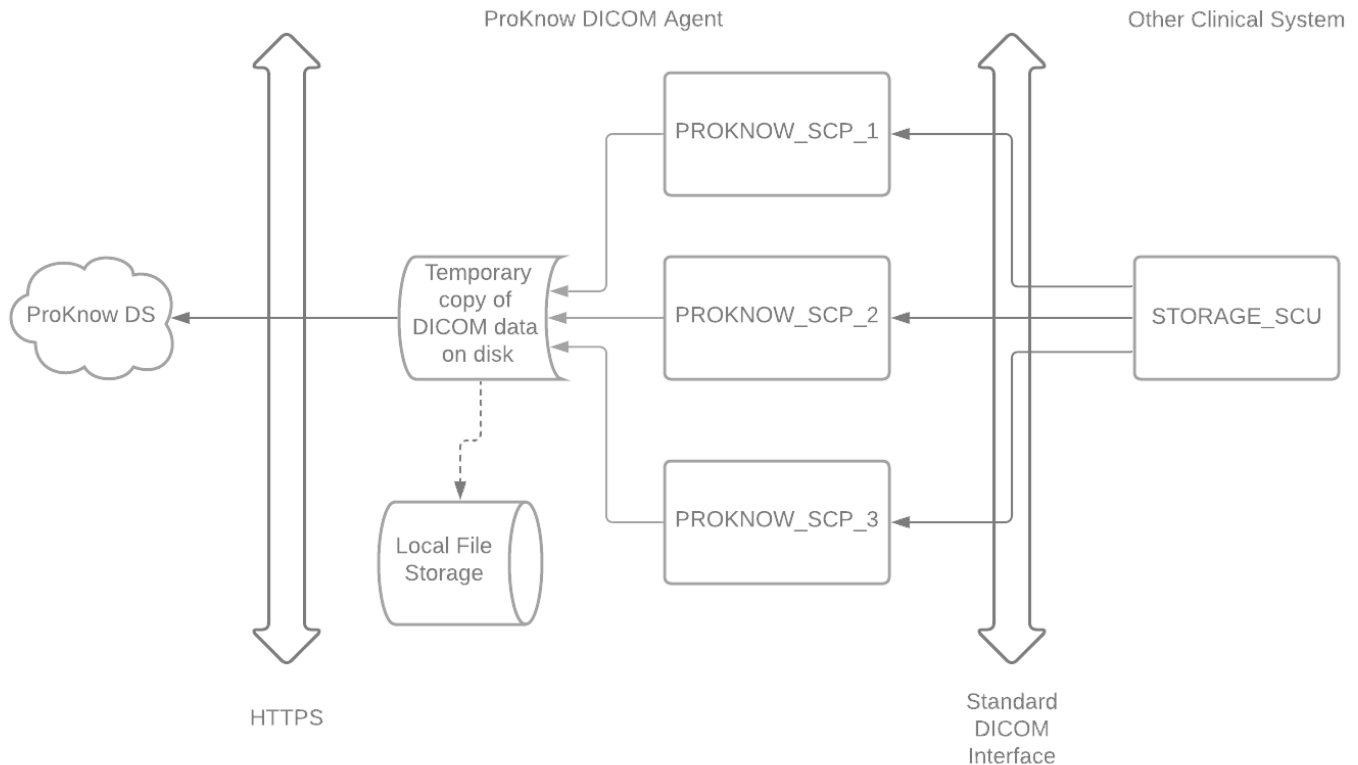
4.1.2. Functional Definition of AEs

4.1.2.1. Functional Definition of Storage AE

The AEs labeled as "PROKNOW_SCP_1", "PROKNOW_SCP_2", "PROKNOW_SCP_3" in Figure 4-1 are examples of the storage provider (C-STORE SCP) AEs that the user may configure in ProKnow DICOM Agent. The user may configure multiple AEs by providing a name, AE title, port, ProKnow domain (base URL), and ProKnow API credentials file for each AE. The user also chooses the storage destination(s) for each AE by enabling ProKnow cloud storage and/or local file storage. For ProKnow cloud storage, the user selects a workspace within the ProKnow domain. For local file storage, the user selects a root folder. For security purposes, that root folder must be within the home directory of the user with which ProKnow DICOM Agent was installed.

These C-STORE SCP AEs receive the transmitted DICOM objects and store them locally in temporary files.

If local file storage is enabled, the temporary files are copied to the configured root folder and organized into a folder hierarchy by Patient ID and Study Instance UID. Image sets are further organized into folders labeled by Modality and Series Instance UID. Files are labeled by Modality and SOP Instance UID.

If cloud storage is enabled, the temporary files are uploaded to ProKnow. For each received DICOM object, ProKnow initiates a background processing task to update its database. Once all received DICOM objects

for an association are uploaded, ProKnow DICOM Agent queries ProKnow to obtain the processing results for the entire association and logs these results.

4.1.3 Sequencing of Real-World Activities

All SCP activities are performed asynchronously in the background and not dependent on any sequencing.

4.2. AE Specifications

4.2.1 AE Specification for Storage AE

4.2.1.1 SOP Classes

This Application Entity provides Standard Conformance to the following Storage SOP Classes.

Table 4-1: SOP Classes for Storage AE

SOP Class	SOP Class UID	User of Service (SCU)	Provider of Service (SCP)
Verification	1.2.840.10008.1.1	No	Yes
CT Image Storage	1.2.840.10008.5.1.4.1.1.2	No	Yes
MR Image Storage	1.2.840.10008.5.1.4.1.1.4	No	Yes
Positron Emission Tomography (PET) Image Storage	1.2.840.10008.5.1.4.1.1.128	No	Yes
RT Structure Set Storage	1.2.840.10008.5.1.4.1.1.481.3	No	Yes
RT Plan Storage	1.2.840.10008.5.1.4.1.1.481.5	No	Yes
Varian Ethos Private RT Plan Storage	1.2.246.352.70.1.70	No	Yes
RT Ion Plan Storage	1.2.840.10008.5.1.4.1.1.481.8	No	Yes
RT Dose Storage	1.2.840.10008.5.1.4.1.1.481.2	No	Yes
Spatial Registration Storage	1.2.840.10008.5.1.4.1.1.66.1	No	Yes

4.2.1.2 Association Policies

4.2.1.2.1 General

The Storage SCP AE accepts but never initiates associations.

Table 4-2: Maximum PDU Size Received as an SCP for Storage

Maximum PDU size received	256 KB

4.2.1.2.2 Number of Associations

Table 4-3: Number of Associations as an SCP for Storage

Maximum number of simultaneous associations	Unlimited

4.2.1.2.3 Asynchronous Nature

The Storage SCP AE will perform asynchronous operations window negotiation.

Table 4-4: Asynchronous Nature as an SCP for Storage

Maximum number of asynchronous operations invoked	Unlimited
Maximum number of asynchronous operations performed	Unlimited

4.2.1.3 Association Initiation Policy

The Storage SCP AE does not initiate associations.

4.2.1.4 Association Acceptance Policy

4.2.1.4.1 Activity - Receive Storage Request

4.2.1.4.1.1 Description and Sequencing of Activities

As instances are received, they are stored locally in temporary files.

If local file storage is enabled, the temporary file is copied to the configured root folder and organized into a folder hierarchy by Patient ID and Study Instance UID. Image sets are further organized into folders labeled by Modality and Series Instance UID. Files are labeled by Modality and SOP Instance UID.

If cloud storage is enabled, the temporary file is uploaded to the configured ProKnow domain and workspace. For each received DICOM object, ProKnow initiates a background processing task to update its

database. Once all received DICOM objects for an association are uploaded, ProKnow DICOM Agent queries ProKnow to obtain the processing results for the entire association and logs these results.

4.2.1.4.1.2 Accepted Presentation Contexts

Table 4-5: Acceptable Presentation Contexts for Storage SCP and Receive Storage Request

Presentation Context Table

Abstract Syntax		Transfer Syntax		Role		Extended Negotiation
Name	**UID**	**Name List**	**UID List**			
See Table 4-1	See Table 4-1	Implicit VR Little Endian	1.2.840.10008.1.2	SCP	None	
		Explicit VR Little Endian	1.2.840.10008.1.2.1			

4.2.1.4.1.2.1 Extended Negotiation

No extended negotiation is performed, though Storage SCP:

- is a Level 2 Storage SCP (Full - does not discard any data elements)

- does not support digital signatures

- does not coerce any received data elements

4.2.1.4.1.3 SOP Specific Conformance

4.2.1.4.1.3.1 SOP Specific Conformance to Storage SOP Classes

STORAGE-SCP provides standard conformance to the Storage Service Class.

4.2.1.4.1.3.2 Presentation Context Acceptance Criterion

Storage SCP will always accept any Presentation Context for the supported SOP Classes with the supported Transfer Syntaxes. More than one proposed Presentation Context will be accepted for the same Abstract Syntax if the Transfer Syntax is supported, whether or not it is the same as another Presentation Context.

4.2.1.4.1.3.3 Transfer Syntax Selection Policies

The first transfer syntax encountered in the configuration file, which matches a transfer syntax offered for a given presentation context, will be selected as the accepted transfer syntax for that presentation context.

4.2.1.4.1.3.4 Response Status

Storage SCP will behave as described in the table below when generating the C-STORE response command message.

Table 4-6: Response Status for Storage SCP and Receive Storage Request

Service Status	Further Meaning	Error Code	Reason
Error	Class Instance Conflict	0119	The received DICOM did not contain a data set
Error	Processing Failure	0110	An application exception occurred
Success	Success	0000	The data set was successfully stored as temporary file prior to uploading to ProKnow and/or storing locally

5. Media Interchange

ProKnow DICOM Agent does not provide any media interchange services.

6. Transformation of DICOM to CDA

ProKnow DICOM Agent does not support any Structured Reporting (SR) objects.

7. Support Character Sets

ProKnow DICOM Agent does not support extended character sets.

8. Security

ProKnow DICOM Agent does not claim conformance to any of the Security and System Management Profiles defined in the DICOM Standard. That being said, data security is one of the most important

aspects of the ProKnow DICOM Agent design. All data transmission both to and from the Internet (including calls to the ProKnow REST API to upload DICOM files) is encrypted using secure HTTP access (HTTPS) and all communication between servers is encrypted using HTTPS or SSL.

8.1. Security Profiles

ProKnow DICOM Agent provides the ability to perform automated anonymization based upon user-configured anonymization rules. See Configuring Anonymization for more details. Table 8-1 contains attributes added to datasets to indicate that anonymization was performed.

Table 8-1

Attribute Name	Tag	VR	Value
Patient Identity Removed	(0012,0062)	CS	YES
De-identification Method	(0012,0063)	LO	ProKnow DICOM Agent vX.Y.Z where "vX.Y.Z" is the application version

8.2. Association Level Security

ProKnow DICOM Agent does not support Association Level Security.

8.3. Application Level Security

The ProKnow DICOM Agent design includes several security features:

- ProKnow DICOM Agent restricts resources and file access to the home directory of the user account that was used to install ProKnow DICOM Agent including:
  - The database.
  - The folder from which to browse for ProKnow credentials files.
  - The temporary folder used to store all received DICOM instances.
  - The local storage folder to which to save received DICOM instances.
  - The log files.

- All data transmission to and from the Internet (including calls to the ProKnow REST API to upload DICOM files) is encrypted using secure HTTP access (HTTPS).

- Access to the web-based Management Console is only available on the local machine (localhost).

9. Annexes

9.1. IOD Contents

9.1.1. Created SOP Instances

None.

9.1.2. Usage of Attributes From Received SOP Instances

9.1.2.1. Common Module Implementations

Patient Module (C.7.1.1) Import

Attribute Name	Tag	Type	Notes
Patient's Name	(0010,0010)	2	Used with Patient ID (0010,0020) for patient folder name for local storage.
Patient ID	(0010,0020)	2	Used with Patient's Name (0010,0010) for patient folder name for local storage. Also used for debug-level logging.

General Study Module (C.7.2.1) Import

Attribute Name	Tag	Type	Notes
Study Instance UID	(0020,000D)	1	Used for study folder name for local storage.

General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Import

Attribute Name	Tag	Type	Notes
Modality	(0008,0060)	1	Used along with SOP Instance UID (0008,0018) for filename for local storage. Also used for summary (information-level) logging and debug-logging.
Series Instance	(0020,000E)	1	Used to count images in image sets for summary (information-level) logging.

UID

SOP Common Module (C.12.1) Import

Attribute Name	Tag	Type	Notes
SOP Class UID	(0008,0016)	1	Used to count images in image sets for summary logging.
SOP Instance UID	(0008,0018)	1	Used along with Modality (0008,0060) for filename for local storage. Also used for debug-level logging.

9.1.3. Attribute Mapping

ProKnow DICOM Agent does not perform any attribute mapping.

9.1.4. Coerced/Modified Fields

ProKnow DICOM Agent does not coerce nor modify any of the input fields.

9.2. Data Dictionary of Private Attributes

ProKnow DICOM Agent does not export any private attributes.

9.3. Coded Terminology Templates

ProKnow DICOM Agent does used not support coded terminology or templates.

9.4. Greyscale Image Consistency

ProKnow DICOM Agent does not provide support for the DICOM Grayscale Standard Display Function.

9.5. Standard Extended/Specialized/Private SOP Classes

ProKnow DICOM Agent supports extensions of the standard SOP classes specified in section 1. It does not support any specialized or private SOP classes.

9.6. Private Transfer Syntaxes

ProKnow DICOM Agent does not support any private transfer syntaxes.

ProKnow DICOM Agent does not support any private transfer syntaxes.

ProKnow DICOM Agent: Configuring Services

Viewing Configured Services

To view your service configurations, point your browser to http://localhost:8768 to open the Management Console. For security purposes, the Management Console can only be opened from the machine on which ProKnow DICOM Agent is installed.

The ProKnow DICOM Agent service must first be running in order to customize your configurations. If ProKnow DICOM Agent is running, you should see a page that looks like this.
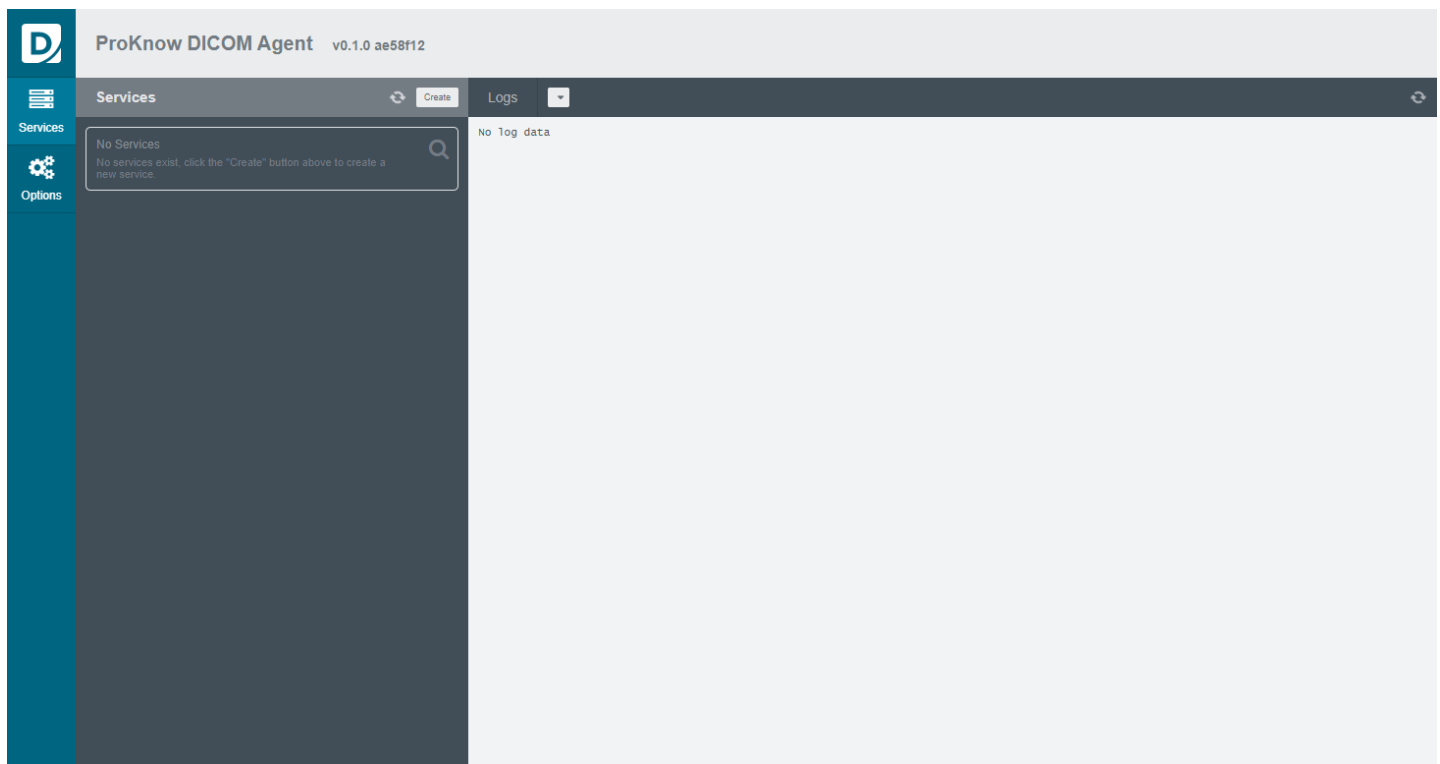
Starting or Restarting the Service

In some situations, the service may fail to start. In these situations, you may receive a failed connection message in the browser instead of the page shown in the screenshot above. Follow the instructions below to start or restart the service.

1. Open the Task Manager.

2. Switch to the Services tab.

3. Find the ProKnowDICOMAgentService (description: ProKnow DICOM Agent Service).

4. Start the service if it's not running, or restart it if it is running.

5. Wait approximately 10 seconds.

6. Reload http://localhost:8768 in the browser.

Select the **Services** module from the main navigation on the left to view the services. Services are listed in the Services sidebar. Each item denotes its Name, AE Title, Port, and Status (Running or Stopped). The toolbar for each service contains buttons for starting and stopping the service, editing the service, and deleting the service.

Creating a Service

1. Press the **Create** button in the Services sidebar header to open the Create Service dialog.

2. The dialog opens with the **General** tab selected. Please enter values for these fields.

   ○ **Service Name**: The name of the new service.

   ○ **Base URL**: The base URL for your ProKnow organization. This is the first part of the URL when you are signed into your ProKnow account. It should be of the form https://*my_custom_domain*.proknow.com (replace *my_custom_domain* with the specific domain used to login to ProKnow).

   ○ **Credentials File**: The path to your credentials file. Use the **Browse** button to select the file. The credentials file should be a JSON file containing an object with properties "id" and "secret." This file may be generated from your account profile in ProKnow. See Managing API Keys for more information. Note that once the service is created, this field will display the text "Valid." This

indicates that the credentials file was read, validated, and the credentials were stored in the database.

3. Select the **Source(s)** tab.

4. Enable one or both DICOM sources and enter values for these fields.

- **C-STORE Storage Class Provider (SCP)**

    1. AE Title: Application Entity Title. An AE Title is used by an Application Entity (AE) to identify itself. The value for this field must be 16 characters or less.

    2. Port: A number between 1 to 65535. It is recommended that you choose a port value of 1024 and above to avoid ports that are typically used for network services or a port value of 49152 and above to avoid ports that may be registered. See List of TCP and UDP port numbers for a list of well-known port numbers you may want to avoid.

- **Folder Watcher**

    1. **Root Folder**: Select an existing folder using the Browse button. Any files placed within this folder or any subfolder will be processed just as if they were received using the standard DICOM protocol. Each file will be deleted once it is successfully processed. When all files have been deleted from a subfolder, the subfolder will be deleted.

5. Please enter values for the fields in the **Configuration** and **ProKnow** sections.

Enable **Anonymization**, if desired. If **Anonymization** is enabled, you must select a **Rules File** from any of your customized anonymization configurations.

Select the **Download Example** link to download an example rules file that you can use as a template to inspect, edit as desired, and save as one of your own.

> **NOTE**: You can create multiple rules files for different DICOM Agent services.

> **CAUTION**: Anonymization by ProKnow DICOM Agent is irreversible. It is possible, however, to save local copies of the original content of received DICOM objects. See the instructions for the Local Storage (Original) section below.

> **CAUTION**: It is critical that the Rules File be configured for the variety of DICOM content that may be transmitted to ProKnow DICOM Agent. See Configuring Anonymization for more detailed instructions.

> **CAUTION**: Do not re-transmit DICOM that has already been anonymized. This may prevent DICOM objects from being properly associated with the patient or other DICOM objects with which it was previously associated.

Enable at least one of the **ProKnow Cloud Storage** , **Local Storage (Original)**, or **Local Storage (Anonymized)** sections. At least one section must be enabled.

- If the ProKnow Cloud Storage section is enabled, you must select a Workspace. Services configured with this option will store received DICOM objects in ProKnow DS within the specified workspace. Either the anonymized content or original content will be uploaded to ProKnow DS, depending on whether or not Anonymization is enabled.

- If the Local Storage (Original) section is enabled, you must provide a Root Folder location, which you can select using the Browse button. Services configured with this option will store the original content of received DICOM objects locally (in the Root Folder location).

- If the Local Storage (Anonymized) section is enabled, you must provide a Root Folder location, which you can select using the Browse button. Services configured with this option and with Anonymization enabled will store the anonymized content of received DICOM objects locally (in the Root Folder location).

Permissions and the Credentials File

The API key that you create and download from ProKnow inherits the permissions of the user who created it. This user must be active for the credentials to be valid. In addition, to use the ProKnow Cloud Storage option, the user must have the View PHI, Upload DICOM, and Write Patients permissions on the specified workspace.

6. Press the **Create** button.

Starting and Stopping a Service

The status of a service is displayed in the upper right hand corner of the service row. To start a stopped service, press the **Start** button from the service toolbar. To stop a running service, press the **Stop** button from the service toolbar and use the Stop Service dialog to confirm the operation.

Editing a Service

To edit a service, the service must be stopped. Once it has been stopped press the **Edit** button, use the Edit Service dialog to make changes to the service, and then press **Save**.

Deleting a Service

To delete a service, the service must be stopped. Once it has been stopped press the **Delete** button, and use the Delete Service dialog to confirm the operation.

Troubleshooting

Symptom	Solution(s)
Creating a service fails	Verify that the Base URL is correctly formatted as `https://your-domain.proknow.com` . This URL can be obtained from your browser's address bar when you are signed into ProKnow. It SHOULD include `https://` .

Symptom	Solution(s)
	Ask your IT department to verify that the proxy and firewall settings for the workstation and network will allow access to your ProKnow domain. For more information, see the Whitelisting ProKnow DS Traffic support article.

ProKnow DICOM Agent: Configuring Anonymization

Anonymization Configuration

ProKnow DICOM services can be set up to automatically anonymize DICOM data prior to upload to ProKnow. The anonymization is customizable via anonymization configuration "rules files" that determine (1) which of the DICOM attributes to anonymize and (2) how to anonymize each attribute for the applicable DICOM service(s).

If you enable auto-anonymization for a DICOM service, you must specify a rules file. See Configuring Services for instructions on how to select the rules file for a service. A rules file can be shared by services running within the same ProKnow DICOM Agent installation.

> **CAUTION**: Do not share a rules file across multiple ProKnow DICOM Agent installations that are uploading to the same ProKnow workspace when using the GeneratePatient rule for (0010,0020) Patient ID and (0010,0010) Patient's Name or the GenerateUid rule for DICOM UID attributes. Because the ProKnow DICOM Agent database is not shared, different anonymized patient IDs and patient names will be generated for the same original patient ID and patient name and different anonymized UIDs will be generated for the same original UID. This will result in data not being properly associated.

> **SUGGESTION**: If you do have multiple DICOM Agent installations uploading to the same ProKnow workspace (e.g., a network of computers at work using one DICOM Agent installation and all of its services, plus additional installations on personal computers you are running from home), then set up the rules file to product unique Patient IDs by using set prefixes or suffixes to be added to the rest of the ID strings.

Format

The rules files are XML files. You will edit each XML file to define your anonymization configuration and save as a rules file.

The best method to ensure correct format of the rules file is to download the example rules file from the Create Service or Edit Service dialogs. Then, create a copy and edit that new file according to your preferences. See Configuring Services for instructions on how to download the example rules file. It is important to preserve this format, including the labels, so that the file can be properly parsed by the application.

The format of the rules file will allow you to (1) define individual elements and their anonymization rules and (2) define the global rule for changing (e.g., shifting) date/time values for applicable elements.

Individual Elements

An XML rules file will contain a list of elements, one for each attribute to be anonymized. If you do not specify an element, then that element's attributes will always be preserved, i.e., remain unchanged.

See the Table 1. Element Properties for descriptions of the element properties. Only required properties need to be present. The properties can appear in any order. For example, an element to remove the private attribute PET Patient ID look like this:

```
<Element>
  <PrivateCreator>GEMS_PETD_01</PrivateCreator>
  <Name>PET Patient ID</Name>
  <Tag>(0009,1002)</Tag>
  <ValueRepresentation>LO</ValueRepresentation>
  <Rule>Remove</Rule>
</Element>
```

Table 1: Element Properties

Name	• Example: "Referring Physician's Name" • Only used for error messages
Tag	• Example: "(0008,0090)" • Format is flexible (parentheses are optional, whitespace is optional)
ValueRepresentation	• Must be one of the following: AE, AS, AT, CS, DA, DS, DT, FL, FD, IS, LO, LT, OB, OD, OF, OL, OV, OW, PN, SH, SL, SQ, SS, ST, SV, TM, UC, UI, UL, UN, UR, US, UT, UV • Only used for validating anonymization configuration
Rule	• See Table 2. Anonymization Rules in this document
Value	• Always interpreted as a string value • Required for Fixed and GeneratePatient rules

Private Creator	• Required for private attributes (odd tag group). The value to which this should be set is the value the vendor provides for the associated (xxxx,0100) Private Creator attribute that appears in the same dataset where "xxxx" is the same tag group number.

Global Date/Time Shift

An XML rules file will also contain a specification of a global date/time shift method. This method will be applied to any attribute for which the Shift rule has been specified, which by definition must have a value representation (VR) of either date (DA), time (TM), or date/time (DT).

Using a global date/time shift rule will ensure a uniform shift of the applicable date/timestamps, preserving the temporal relationship of the associated data. Once used, changing this value may impact the temporal relationship between data previously anonymized and future data to be anonymized.

In the downloadable example rules file that you can use as a template, the global date/time shift will be located near the top of the default rules file (preceding the list of Elements). The default setting will be as follows:

+00000000000

The syntax of the value is "sDDDDDHHMMSS" where:

- The "s" character is an optional sign ("+" or "-") indicating the direction of the shift. If omitted, a "+" will be assumed.
- DDDDD is the zero-padded number of days to be shifted.
- HH is the zero-padded number of hours to be shifted.
- MM is the zero-padded number of minutes to be shifted.
- SS is the zero-padded number of seconds to be shifted.

For example, a setting of

+10000101010

will result in shift forward (i.e., positive) in time of 10000 days, 10 hours, 10 minutes, and 10 seconds.

Anonymization Rules

Table 2: Anonymization Rules

Keep	• Makes no changes

Remove	• Removes the element from the dataset altogether
	• Cannot be used for (0010,0020) Patient ID or (0010,0010) Patient's Name, as those must be present

Clear	• Does not remove the element, but sets the element value to either an empty string or an empty byte array, as appropriate
	• Cannot be used for (0010,0020) Patient ID or (0010,0010) Patient's Name, as those cannot be blank

Fixed	• Sets the element value to the user-specified fixed value
	• The VR must be one of the following: AE, AS, CS, DA, DS, DT, IS, LO, LT, PN, SH, ST, TM, UC, UI, UR, UT

GenerateUID	• Sets a UID to a randomly generated new UID
	• The VR must be the "UI" type
	• Consistently maps an old UID to the same new UID across all services within the ProKnow DICOM Agent application
	• The generated values will be, for all practical purposes, universally unique

GeneratePatient	• Sets a Patient ID or Patient's Name to a unique value based on a user-defined value key. The key syntax includes a placeholder for incrementing numeric characters:
	◦ The rule value must contain exactly one placeholder
	◦ The placeholder syntax is curly braces surrounding one or more number signs, e.g., {########}
	◦ Example: A value of "SiteXYZ{####}" generates SiteXYZ0000, SiteXYZ0001, SiteXYZ0002, etc.
	• The tag must be (0010,0020) Patient ID or (0010,0010) Patient's Name

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- Consistently maps an old Patient ID (Patient's Name) to the same new Patient ID (Patient's Name) across all services within the ProKnow DICOM Agent application

- Patient's Names are mapped in conjunction with the mapping of their corresponding Patient IDs, i.e., the Patient ID is the key for determining whether a mapping for a Patient ID and/or Patient's Name already exists.

- The generated values will be unique within the ProKnow DICOM Agent application for the specific tag, provided the placeholder has enough digits.

CopyPatientID

- Sets a Patient's Name to the anonymized Patient ID value

- The tag must be (0010,0010) Patient's Name

Shift

- Shifts a temporal value using the global date/time shift rule

- The VR must be one of the following: DA, TM, or DT

Verification of an Anonymization Configuration

CAUTION: Make sure to include an element for every DICOM attribute that may contain PHI/PII that you want to anonymize, including private DICOM attributes. It is important to verify that the rules file works for the variety of DICOM content that may be transmitted to ProKnow DICOM Agent.

To verify, it may help to do the following:

1. Use a DICOM browsing tool to examine each variety of DICOM object that will be transmitted to ProKnow DICOM Agent. Be sure to inspect attributes at the root level as well those contained within nested sequences. Make a list of all the attributes you wish to anonymize.

2. Define a rules file that anonymizes each attribute in your list with your preferred anonymization method.

3. After the rules file has been defined, set up a service that only stores the anonymized DICOM locally (e.g., does not yet upload to ProKnow). Send a number of dataset transmissions through the server to create the anonymized output that is saved locally. Use a DICOM browsing or compare tool to verify that all desired PHI/PII has been removed and the anonymized values are as expected.

4. Manually upload representative anonymized datasets to ProKnow to verify that the replaced values are acceptable, i.e., that the rules you used are valid for each attribute and not rejected as invalid DICOM.

ProKnow DICOM Agent: Configuring Options

Accessing ProKnow DICOM Agent Options

To access the configuration options for ProKnow DICOM Agent, point your browser to http://localhost:8768 to open the Management Console. If ProKnow DICOM Agent is running, you should see a page that looks like this.
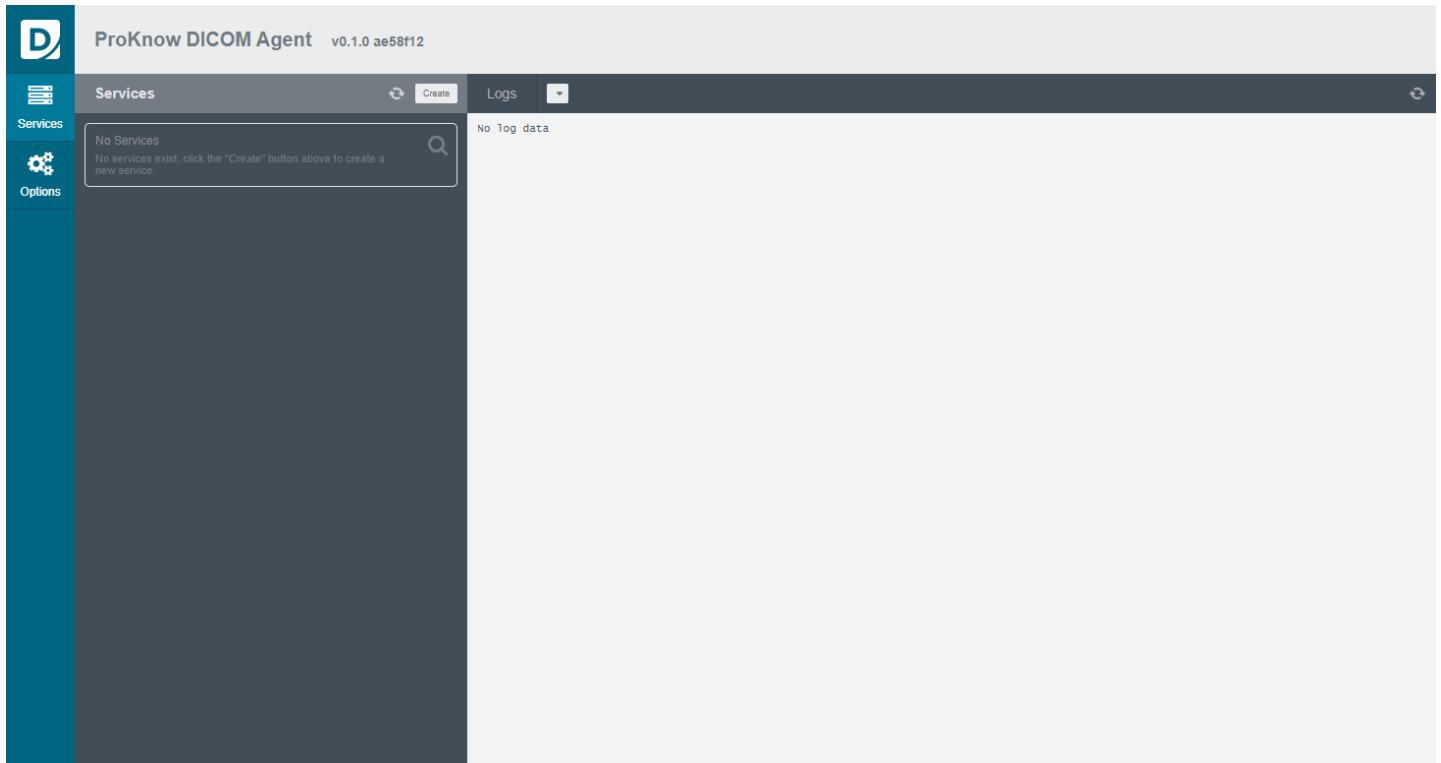
Select the Options module from the main navigation on the left to view the configurable options for ProKnow DICOM Agent.
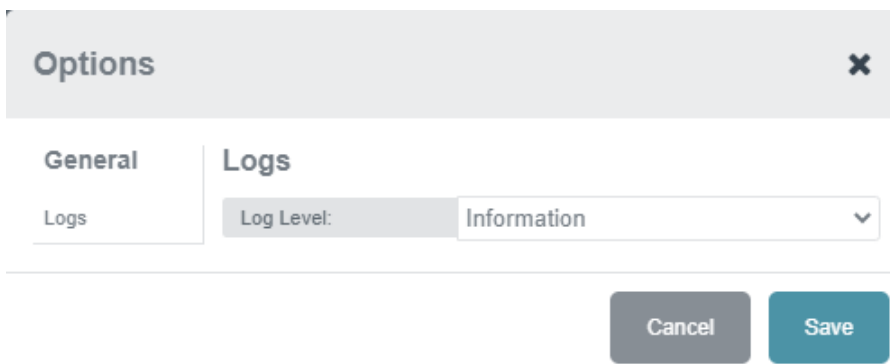
Configuring the Log Level

1. Configuration of the log level only controls the application logs. The anonymization logs are always enabled regardless of the log level. With the Options module selected from the main navigation menu, select the **Logs** section under the **General** category.

2. Update the **Log Level** using the provided dropdown. The *Information* level is the default and is recommended, however, a ProKnow support engineer may recommend another level while attempting to diagnose a problem with ProKnow DICOM Agent. Note that selecting the *Debug* level may cause the logging of messages containing protected health information (PHI) or personally identifiable information (PII).

3. Press **Save** to save your configuration options.

ProKnow DICOM Agent: Configuring Log Retention

Rolling Log File Configuration

ProKnow DICOM Agent utilizes the Serilog .NET logging library along with its Serilog.Sinks.File package to provide rolling log file functionality. This feature causes the logging to automatically roll to a new log file based on configured time and/or log file size. It also allows configuration of the maximum number of log files. Together, this configuration can prevent runaway disk usage.

The rolling log file configuration can only be modified while ProKnow DICOM Agent is not executing. Use the Services tab within Task Manager to stop ProKnowDICOMAgentService prior to editing the configuration. The configuration is in the appsettings.json file located in the application installation folder (typically C:\Program Files\Elekta\ProKnow DICOM Agent). Make a backup of this file prior to attempting to edit it. Use a text editor such as Notepad to edit this file, making sure to preserve the JSON format.

Attempting to edit any other settings other than those specified below may cause ProKnow DICOM Agent to stop working.

The configurable log retention settings are:

- **rollingInterval** – Specifies the frequency at which the log file should roll. Set to "Day" by default, resulting in a new log file every day. Allowable values are "Infinite" (never rolls), "Year", "Month", and "Day".

- **fileSizeLimitBytes** – Specifies the file size threshold. Once reached, no further log messages will be written until the next roll point (see the rollOnFileSizeLimit setting). Set to 1048576 bytes (1 MB) by default. If this setting is removed, the file size is limited to 1 GB. If this setting is set to null, there is no file size limit (not recommended).

- **retainedFileCountLimit** – Specifies the number of log files retained. Once this limit is reached, older log files will be deleted. Set to 365 by default. Removing this setting limits the number of logs files to 31. If this setting is set to null, there is no limit to the number of log files (not recommended).

- **rollOnFileSizeLimit** – Specifies whether to roll to a new log file when the fileSizeLimitBytes setting is reached. Set to true by default. Allowable values are true and false.

Location of Log Files

The two "Path" settings in the appsettings.json file indicate the folders in which the log files are written. The application and anonymization log messages are written to separate files. The format of the filenames is app-YYYYMMDD.log for the application logs and anonymization-YYYYMMDD.log for the anonymization

logs. If logging rolls over to additional log files during the day, the new log files will be named, for example, app-YYYYMMDD_001.log, app-YYYYMMDD_002.log, etc.

Long-Term Archiving of Log Files

A user can keep an archive of logs (e.g., anonymizations performed) by setting an automatic backup of their log files before they get deleted based on the log retention settings.

Is there a way to export files directly from my TPS?

Yes! The ProKnow DICOM Agent is a complementary software to ProKnow that allows you to run local services (or, "listeners") that can automatically receive data exported from your treatment planning systems (TPS) and other medical software then "send" those files (1) up to your ProKnow cloud storage and/or (2) to local storage repositories. Below is a summary of key features of the ProKnow DICOM Agent.

- DICOM storage "service class provider" (SCP) that can run on any operating system

- Run different services in parallel

- Ability to install run DICOM DS as a Windows Service

- Monitor and manage all services from a web interface

Head over to our ProKnow DICOM Agent page for information on how to use the ProKnow DICOM Agent.

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How are uploads organized within patient records?

Within the patient record, the association of DICOM objects (e.g., image set, structure set, plan, and dose) will be driven by internal DICOM associations. These associations will determine the automated organizational hierarchy within a patient record, such as:

- The image set to which an RT Structure Set is assigned

- The RT Structure Set to which an RT Plan is assigned

- The RT Plan to which an RT Dose is assigned

If necessary you can manually re-associate your DICOM objects after the upload is completed.

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Managing Patients in a Workspace

IN THIS ARTICLE

Once you have uploaded patients using either the Uploads module or the ProKnow DICOM Agent, you can view a list of patients for a given workspace in the Patients module. This article explains how to manage the patients in your workspaces.

- Viewing the Patient List

- Creating a Patient

- Selecting Patients

  - Create a New Collection

  - Add to Existing Collection

  - Export as CSV

  - Establish Entity Associations

  - Move Patients

  - Copy Patients

  - Delete

Note: You must have the *Read Workspace* permission on a workspace to view that workspace. You must have the *Read Patients* permission on a patient to view that patient in the list of patients within a workspace.

Viewing the Patient List

To view the patients in your organization, select the **Patients** module from the main navigation on the left. Use the workspace dropdown at the top of the page to switch workspaces. If your organization has many workspaces, search for the one you're looking for by filtering the workspaces by name.

A similar filter mechanism is available to filter the list of patients. You can filter the patients by typing the patient's ID or name.

Viewing Patient Details

Double-click on a patient row in the table to view details about a patient including any associated image sets, structures, plans, doses, and scorecards.

Creating a Patient

1   Press the **Create Patient** button located in the gray bar at the top.

2   Enter the unique patient **ID** and the patient **Name**. This ID must be unique within each workspace. Optionally, enter the **Birth Date**, **Birth Time**, and **Sex** fields.

3   Press the **Create** button to create the patient.

Note: You must have *Create Patients* permissions on a workspace to create patients in that workspace.

Selecting Patient

Patients may be selected in several ways:

- *Click* on the row to select only that row.

- *Click* on the checkbox in the first column to add the patient to the selection.

- *Ctrl + Click* on the row to add the patient to the selection.

- *Shift + Click* to add a range of patients to a selection.

Once you have one or more patients selected, the patient actions dropdown will become enabled with the options enumerated below.

Create New Collection

1   With one or more patients selected, click on the **Actions** dropdown and press **Create New Collection**.

2   Enter the **Name** and **Description** of the new collection.

3   Press the **Create** button to create the collection with the selected patients.

Skipping Patients

Collections may only have 0 or 1 representative entity per patient. For each patient selected, the system will attempt to add the patient to the collection according to the following algorithm:

1. If the patient has more than one dose object, skip the patient.

2. Otherwise, if the patient has exactly one dose object, add the patient with the dose as the representative entity to the collection.

3. Otherwise, if the patient has more than one plan object, skip the patient.

4. Otherwise, if the patient has exactly one plan object, add the patient with the plan.

5. Otherwise, if the patient has more than one structure set object, skip the patient.

6. Otherwise, if the patient has exactly one structure set object, add the patient with the structure set.

7. Otherwise, if the patient has more than one image set object, skip the patient.

8. Otherwise, if the patient has exactly one image set object, add the patient with the image set.

9. Otherwise, the patient should be added without a representative entity.

Note: You must have an *Analytics* license and the Create *Collections* permission on the workspace to create a new workspace collection for the selected patients.

Add to Existing Collection

1   With one or more patients selected, click on the **Actions** dropdown and press **Add to Existing Collection**.

2   Select the collection from the list of available collections. Use the collection filter to filter the list of collections available for the current workspace.

3   Press the **Submit** button to add the selected patients to the collection.

Skipping Patients

Collections may only have 0 or 1 representative entity per patient. For each patient selected, the system will attempt to add the patient to the collection according to the following algorithm:

1. If the patient has more than one dose object, skip the patient.

2. Otherwise, if the patient has exactly one dose object, add the patient with the dose as the representative entity to the collection.

3. Otherwise, if the patient has more than one plan object, skip the patient.

4. Otherwise, if the patient has exactly one plan object, add the patient with the plan.

5. Otherwise, if the patient has more than one structure set object, skip the patient.

6. Otherwise, if the patient has exactly one structure set object, add the patient with the structure set.

7. Otherwise, if the patient has more than one image set object, skip the patient.

8. Otherwise, if the patient has exactly one image set object, add the patient with the image set.

9. Otherwise, the patient should be added without a representative entity.

Note: You must have an *Analytics* license and the *Add Collection Patients* permission for a collection to add patients to an existing collection.

Export as CSV

1   With one or more patients selected, click on the **Actions** dropdown and press **Export as CSV**.

2   Open the downloaded CSV, which will contain the standard and custom fields that have been set for the selected patients.

Establish Entity Associations

1   With one or more patients selected, click on the **Actions** dropdown and press **Establish Entity Associations**.

2   Select the type of operation to perform. Currently, ProKnow only supports the *Single Entity Assumption* type. Press the **Next** button to continue.

3   Press the **Search** button to search for entities that can be automatically associated.

4   If no entities are found, press **Close** to exit the wizard. Otherwise, press **Continue** to view the results.

5   Download the list of proposed entity associations, and follow the instructions given in the wizard. Modify and reupload the file as needed. Once you're ready to continue, read and acknowledge the disclaimer by checking the box at the bottom of the wizard, and choose **Continue**.

6   Press the **Start** button to begin the association process.

7   Press the **Finish** button to exit the wizard.

Move Patients

1   With one or more patients selected, click on the **Actions** dropdown and press **Move**.

2   Select the workspace where you wish to move the selected patients. Press the **Next** button to continue.

3   Press the **Move** button to execute the move operation.

4   Once the operation is complete, you may download the results CSV file to review the results of each copy, including any errors. Press the **Finish** button to exit the wizard.

> **Note**: You must have the *Move Patients* permissions on a patient to move the patient and the *Read Workspace* permission for the destination workspace you choose.

Copy Patients

1   With one or more patients selected, click on the **Actions** dropdown and press **Copy**.

2   Select the workspace where you wish to copy the selected patients. Press the **Copy** button to begin the operation.

> **Note**: You must have the *Copy Patients* permission for a patient to copy the patient and the *Read Workspace* permission for the destination workspace you choose.

Delete

CAUTION: Deleting patients is an irreversible action, so use caution. Deleting a patient will also delete all patient data associated with that patient.

1   With one or more patients selected, click on the **Actions** dropdown, and press **Delete**.

2   Press the **Delete** button to confirm that you wish to delete the selected patients and all their data.

Note: You must have the *Delete Patients* permission for a patient to delete the patient.

Managing the Current Patient

IN THIS ARTICLE

When accessing a patient, the Actions menu and the various right sidebars listed in this article are always available regardless of the current tab.

- Editing a Patient

- Downloading Patient Objects

- Moving Patients

- Copying Patients

- Uploading Files

- Uploading a Directory

- Patient Right Sidebars

Editing a Patient

1   With a patient opened, click on the Actions menu in the top right corner of the page and press **Edit**.

2   Modify field values as needed. Please note that **ID** and **Name** are required fields, and **Birth Date**, **Birth Time**, and **Sex** are optional.

3   Press the **Update** button to save your changes.

Note: You must have the *Update Patients* and View PHI permissions on a patient to edit the patient.

Downloading Patient Objects

ProKnow DS allows you to download the archived DICOM files for any (or all) objects associated with a patient. It is important to note that ProKnow DS will never modify any DICOM file uploaded into the system. Any modifications to an existing object (e.g., as a result of contouring) will create a new DICOM file and a new version of the object. Furthermore, any changes to the patient information within ProKnow DS will only be reflected in new DICOM files generated after the modifications have been made (to ensure that ProKnow DS acts as a DICOM archive).

1   With a patient opened, click on the Actions menu in the top right corner of the page and press **Download**.

2   Use the checkbox to select the patient objects to include in the download and press the **Download** button. An Active Downloads popup will appear in the bottom right corner of your screen that indicates when the download is being prepared and when the download has started.

3   Locate the file in your downloads folder.

Note: When downloading structure sets using the patient download tool, you will always download the **current** version of each structure set. For more information on structure set versions and instructions on how to download a previous version of a structure set, please refer to the Structure Set Versions documentation.

Note: You must have the *Download Patient DICOM* permission on a patient to download DICOM data for that patient.

Moving Patients

1   With a patient opened, click on the Actions menu in the top right corner of the page and press **Move**.

2   Select the workspace where you wish to move the patient, and press the Move button.

Note: You must have the *Move Patients* permissions on a patient to move the patient and the *Read Workspace* permission for the destination workspace you choose.

Copying Patients

1   With a patient opened, click on the Actions menu in the top right corner of the page and press **Copy**.

2   Select the workspace where you wish to move the patient, and press the Copy button.

Note: You must have the *Copy Patients* permission for a patient to copy the patient and the *Read Workspace* permission for the destination workspace you choose.

Uploading Files

1   With a patient opened, click on the Actions menu in the top right corner of the page and press **Upload Files** to upload files directly to the current patient.

2   Select one or more DICOM files from your file system.

3   Wait for the files to be uploaded and processed. After processing is complete the patient objects will appear in the Browse tab for the patient.

Note: You must have Patient DICOM Upload permission on a patient to upload files to directly to that patient.

Uploading a Directory

1   With a patient opened, click on the Actions menu in the top right corner of the page and press **Upload Directory** to upload a directory of files directly to the current patient.

2   Select a directory containing DICOM files from your file system.

3   Wait for the files to be uploaded and processed. After processing is complete the patient objects will appear in the Browse tab for the patient.

Note: You must have Patient DICOM Upload permission on a patient to upload files to directly to that patient.

Patient Right Sidebars

⊘ Extracted & Custom Data (Information Tab)

Learn how to view extracted DICOM data and view and edit custom metric data.

⊘ Multiple Image Set Display (Images Tab)

Learn how to multiple image sets, overlaid in the same patient viewer.

⊘ Patient Task and Workflow Management (Checklists Tab)

Learn how to create and manage patient checklists.

⊘ Patient-Level Comments (Notes Tab)

Learn how to record and view patient notes.

⊘ Storing and Viewing Non-DICOM Documents (Documents Tab)

Learn how to archive and retrieve miscellaneous document storage for patients.

Managing Patient Checklists within Workflows

IN THIS ARTICLE

Patient checklists that belong to a workflow may be viewed from the Workflows page. Use this article to learn how to view and manage patient checklists within workflows.

- Accessing Patient Checklists

- Updating the State of a Patient Checklist

Accessing Patient Checklists

To view the patient checklists in your organization belonging to each workflow, select the **Workflows** module from the main navigation on the left. Use the workspace dropdown at the top of the page to filter the patient checklists by a particular workspace or choose *All Workspaces* to view the patient checklists across the entire organization. Use the workflow selector to switch the selected workflow, which will update the main view with only the patient checklists belonging to that workflow.

The patient checklists for the selected workflow are organized by the current state of each workflow. Each patient checklist denotes the name of the checklist and the name and ID of the patient. If the checklist has tasks, the proportion of tasks marked as either *Done* or *Exception* will be shown along with any users still assigned to an uncompleted task.

What does everything mean?
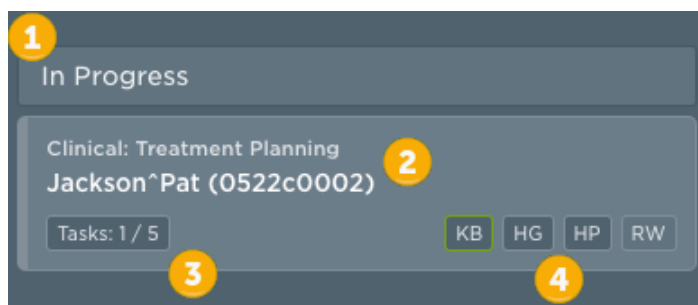
1. **Workflow State**. The workflow state in which the patient checklist belongs.

2. **Workspace, Checklist Name, and Patient Information**. This section lists information related to the workspace (if "All Workspaces" is selected), the name of the checklist, and the name and ID of the patient.

3. **Task Count**. The number of tasks marked as Done or Exception over the total number of checklists.

4. **Assigned Users**. The users who are assigned to uncompleted tasks in the patient checklist. If a task is assigned to you, your initials will be outlined in green. Additionally, pending assignments (assignments beyond an unreached checkpoints) will appear slightly greyed out (e.g., RW above).

Updating the State of a Patient Checklist

1 Identify the patient checklist you wish to move to another state.

2 Click and drag the checklist to the new state, and drop it to complete the operation.

Note: You must have the *Update Patient* permission on a patient to update the state of a checklist for the patient.

Patient — Browse

IN THIS ARTICLE

The patient browse tab is useful for managing the patient object hierarchy. You can perform various actions on patient objects by entering edit mode and selecting them in the Browse tab.

- Accessing the Patient Browse Tab

- Updating the Patient Hierarchy

- Editing Patient Object Labels

- Creating a Structure Set

- Running Auto-Segmentation

- Copying a Structure Set

- Merge Structure Sets

- Creating a Plan

- Composite Dose Objects

- Deleting Patient Objects

- Forcing a Frame of Reference

- Monitoring Patient Tasks

Accessing the Patient Browse Tab

When you access a patient, the Browse tab will be activated by default. The majority of the screen is devoted to the patient viewer, where you can examine the active image set, structure set, and dose. On the left is the browse sidebar, which contains the hierarchy of patient objects. These objects can be activated by double-clicking the object you wish to activate. This operation will also activate all of the object's ancestors in the hierarchy. Eyeball icons are aligned to the right of the sidebar and can be used to toggle the visibility of entities.

In addition to allowing you to view, activate, and manage patient objects, the Browse tab also displays useful **DICOM Alerts** that have been identified by ProKnow DS. These DICOM Alerts are displayed as a blue information icon or an orange warning icon to the right of a particular object, as shown in the following screenshot:
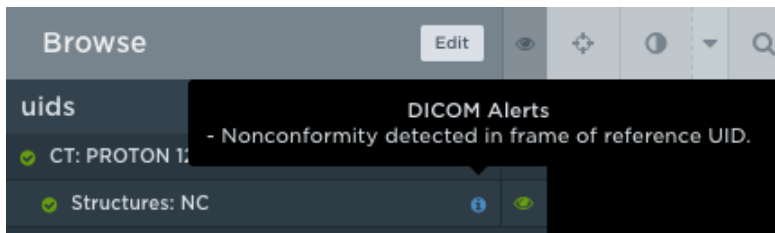
By moving your mouse over the associated DICOM Alert, you can inspect the details of the alert.

Updating the Patient Hierarchy

Note: You must have the *Update Patients* permission on a patient to update the patient hierarchy.

CAUTION: It is important to perform appropriate validation anytime you update the patient hierarchy to ensure that the new associations are valid.

1. With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2. Use the object handles on the left of each row to drag an object and its children to the desired position in the hierarchy.
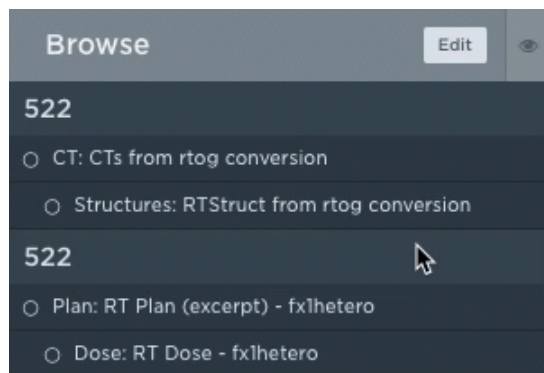
3. Drop the object(s) into place.

NOTE: ProKnow allows you to re-associate any object to any valid parent (i.e., structure set with any image set; plan with any structure set or image set; or dose with any plan, structure set, or image set). However, ProKnow will display an appropriate DICOM Alert if it detects any of the following situations: (1) if a parent and child object do not share the same DICOM Frame of Reference, (2) if a structure set is associated with a different image set than originally specified in DICOM, (3) if a plan is associated directly with an image set, (4) if a plan is associated with a different structure set than originally specified in DICOM, (5) if a dose is associated directly with an image set or structure set, or (6) if a dose entity is associated with a different plan than originally specified in DICOM.

Editing Labels

Note: You must have the *Update Patients* permission on a patient to edit patient object labels.

1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   If you wish to re-label several objects with the same name, select those objects by toggling the checkbox aligned to the right of the sidebar. Otherwise, check the object you wish to rename.

3   In the Available Actions menu, choose the **Edit Patient Object Labels...** option, and enter a new label name for the selected object(s).

4   Press the **Save** button to save your changes.

Object Label Defaults

- For **Image Sets** and **RT Dose**, the default description is determined by the 'Series Description' (0008,103E) tag.

- For **Structure Sets**, ProKnow looks first to the 'Structure Set Name' (3006,0004) tag, then the 'Structure Set Label' (3006,0002) tag, then the 'Series Description' (0008,103E) tag.

- For **RT Plans**, ProKnow looks first to the 'RT Plan Name' (300A,0003) tag, then the 'RT Plan Label' (300A,0002) tag, then the 'Series Description' (0008,103E) tag.

Creating a Structure Set

Note: You must have the *Update Patients* permission on a patient to create a new structure set for the patient.

1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   Select a single image set on which you wish to create the structures.

3   In the Available Actions menu, choose the **Create Structure Set...** option.

4   Enter a **Name** for the new structure set.

5   Select a **Structure Set Template** to initialize the structure set with the structures configured in the template, or leave as *None* to create an empty structure set.

6   Press the **Create** button to create the structure set.

Running Auto-Segmentation

> **Note**: You must have the *Create Patient Tasks* permission on a patient to create run auto-segmentation to create a new structure set using auto-segmentation for the patient. You must also have an *Auto-Segmentation* license to create a structure set using auto-segmentation.

1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   Select a single image set on which to run auto-segmentation.

3   In the Available Actions menu, choose the **Run Auto-Segmentation...** option.

4   Select the **Algorithm** from the list of algorithms configured for the workspace.

5   Enter a **Description** for the new structure set.

6   Optional: Select a structure set **Template**. When processing the auto-segmentation result, the system will apply a structure set template by comparing the structures in the result to the list of structures defined in the template. The system will initialize an empty structure for each structure defined in the template that does not exist in the auto-segmentation result, using the type and color specified in the template.

7   Place a check mark next to the algorithm-defined structures that should be included in the result structure set.

8   Remove a check mark next to the algorithm-defined structures that should not be included in the result structure set.

9   Enter the **Desired Structure Name** for each structure. Use the undo button to revert the name back to the name defined by the algorithm.

10   Choose the **Color** for each structure. Use the undo button to revert the color back to the color defined by the algorithm.

11   Press **Run** to invoke the auto-segmentation algorithm.

Copying a Structure Set

> **Note**: You must have the *Create Patient Tasks* permission on a patient to copy a structure set for the patient.

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1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   Select a single structure set to copy.

3   In the Available Actions menu, choose the **Copy Structure Set...** option.

4   Enter a description for the new structure set.

5   Press the **Copy** button to copy the structure set.

Merging Structure Sets

Note: You must have the *Create Patient Tasks* permission on a patient to merge structure sets for the patient.

1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   Select two or more structure sets in the same frame of reference to merge.

3   In the Available Actions menu, choose the **Merge Structure Set...** option, and enter a name for the new structure set.

4   If there is more than one parent image set from the selected structure sets, choose the **Primary Image Set**. This will become the parent object ob the merged structure set.

5   Check the **Delete after merge** checkboxes for the structure sets you wish to delete once the merge operation is complete.

6   Press the **Merge** button to create a merged structure set.

Note

- A structure set cannot be selected for deletion after merge if it has child plan or dose objects.

- Structure sets cannot be merged when one or more of the selected structure sets are not in the same frame of reference.

Creating a Plan

Note: You must have the *Update Patients* permission on a patient to create a plan for the patient.

1. With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2. Select a single image set, structure set, or dose. If an image set or structure set is selected, the plan will be created under that image set or structure set. If a dose is selected, the plan will be created as the parent object of the selected dose. Plans may not be created from doses that already belong under a plan object.

3. In the Available Actions menu, choose the **Create Plan...** option, and enter a name for the new plan.

4. Press the **Create** button to create the plan.
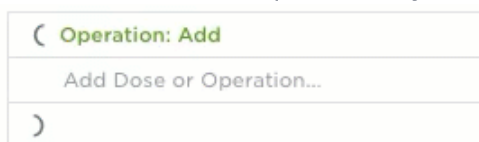
NOTE: ProKnow allows you to create plan objects for the purpose of defining prescriptions, which can be useful when analyzing patients planned with different dose references. Please note that ProKnow does not provide any capabilities to design or simulate plans (i.e., it is not a Treatment Planning System). Additionally, plans created within ProKnow are not able to be exported as DICOM.

Composite Dose Objects

Note: You must have the *Create Patient Tasks* permission on a patient to create a composite dose for the patient.

1. With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2. Select one or more dose objects to composite.

3. In the Available Actions menu, choose the **Composite Dose Objects...** option, and enter a name for the new dose.

4. The composite dose tree defaults to an "Add" operation with the each of the selected doses as operands. For more complex operations, use the following tools to change the dose tree according to your needs.

    1. Add a new dose or operation by selecting one from the **Add dose or operation...** select box.

    2. Change a dose or operation by clicking on the name of the dose or operation and making a selection from the select box.

3   Delete a dose or operation by clicking on the trash icon for the dose or operation.

4   For doses or operations requiring an SRO, select an SRO from the select box.

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5   For doses or operations, set a scale factor as a fraction.

6   Move a dose or operation by dragging and dropping into place.

5   Press the **Create** button to create the composite dose.

Reference Dose Grid

The reference dose grid for an operation is indicated by a green star in the composition tree. The reference dose grid is used to determine the study and parent object of the result dose. In addition, the result dose will always be in the same frame of reference as the reference dose grid.

The result dose grid geometry and resolution will also be based on the reference dose grid. The composition process begins with a dose grid that is aligned with, and has the same resolution as, the reference dose grid. It then grows or shrinks the dose grid geometry to ensure that all dose grids are encapsulated in the resulting grid (i.e., the resulting grid geometry represents the union of the geometry of all operands). Finally, it will attempt to refine the resulting dose grid geometry if the composition algorithm detects that refinement may increase accuracy of the final result. Please note that any refinement is performed such that the voxel centers of the reference dose grid will always be represented in the final dose grid (i.e., it adds rows, columns, and planes between the voxel

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centers). This process occurs locally within each mathematical operation based on the first operand, and then overall based on the reference dose grid.

0 Gy

For addition and multiplication operations, a dose value of 0 Gy in an operand is treated exactly as you might expect. That is, the sum of the dose value d and 0 is, of course, d. Similarly, for multiplication, the product of the dose value d and 0 is 0. For division, there are two scenarios involving a dose of 0 Gy: a dose value of 0 in the dividend and a dose value of 0 in the divisor. In both of these scenarios (and, by extension, the 0/0 scenario), the resulting dose value will be 0.

Units

The result of a composite dose will always be in the units of Gy. Each time you make a change to the composite dose operation, ProKnow DS checks the formula you have provided to ensure that there are consistent units in the operands of each addition operation and that the final dose is Gy. If your formula does not pass this check, a warning and confirmation will be presented under the composite dose tree. Check the box to acknowledge the warning and then press the **Create** button to submit the composite dose task.

Deleting Patient Objects

Note: You must have the *Delete Patients* permission on a patient to delete patient objects for the patient.

CAUTION: Deleting patients objects is an irreversible action, so use caution.

1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   Select one or more patient objects to delete.

3   In the Available Actions menu, choose the **Delete Patient Objects...** option.

4   Press the **Confirm** button to delete the data.

Forcing a Frame of Reference

Note: You must have the *Update Patients* permission on a patient to force a frame of reference for the patient.

CAUTION: The Force Frame of Reference tool allows you to force the currently active objects into a consistent frame of reference. Please note that the frame of reference indicates the unique coordinate system of each patient object. **By forcing consistency (i.e., overriding the default values) you take full responsibility for ensuring that the objects are in the same coordinate system.** In addition, this operation will permanently override the frames of reference for the selected patient objects and is an irreversible action, so use extreme caution.

1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   The **Force Frame of Reference...** option will be available if there is one or more active patient objects with a different frame of reference than the primary image set.

3   In the Available Actions menu, choose the **Force Frame of Reference...** option, which will open the **Force Frame of Reference** dialog.

4   The **Force Frame of Reference** dialog lists the active patient objects and indicates which items have a different frame of reference from the primary image set (indicated by a warning triangle). By default, all active patient objects that have a different frame of reference will be selected, however, you may deselect specific items if desired.

5   Once you have selected the active objects that you wish to force into the consistent frame of reference, click the confirmation checkbox and press the **Apply** button to apply the changes.

Monitoring Patient Tasks

Note: You must have the *Read Patient Tasks* permission on a patient to monitor patient tasks for the patient.

Once a patient task has been submitted (e.g., producing a composite dose), the task will show up in the **Tasks** panel at the bottom of the **Browse** sidebar. Once the task has been completed, the patient object hierarchy will be updated automatically, and the task will disappear from the list after about a minute. Completed tasks are denoted by a green checkmark icon to the left of the task while failed tasks are denoted by a red triangular icon. Completed and failed tasks may be cleared from display by clicking on the trash icon located to the right of the task row.

Patient — Fusion

IN THIS ARTICLE

Use this article to learn about managing spatial registration objects (SROs).

- Viewing SROs

- Creating SROs

- Copying SROs

- Editing SROs

- Reviewing SROs

- Deleting SROs

- Downloading SROs

Viewing SROs

When you access a patient, click on the **Fusion** tab to view and manage SROs. The fusion sidebar holds a list of SROs that belong to the patient with a details panel at the top. Click on one of the SROs to activate it and display its details.
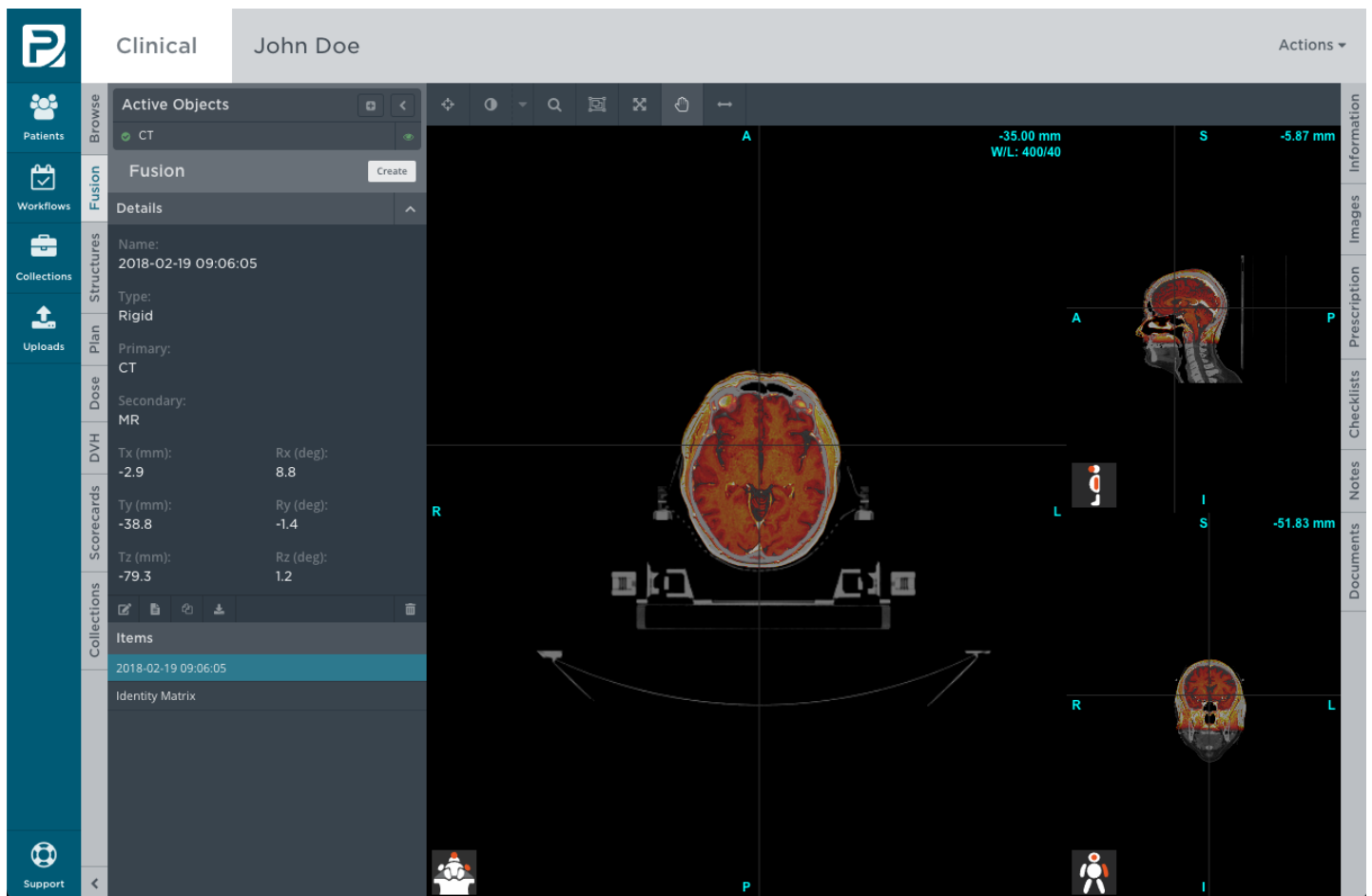
Creating SROs

> **Note**: You must have the *Update Patients* permission on a patient to create SROs for that patient. You must have a *Manual Registration* license to create SROs.

1 Use the **Active Objects** tool to choose the primary image set for the new SRO.

2 Press the **Create** button.

3 Enter the **Name** of the SRO.

4 Select the **Secondary** image set.

5 Edit the translation and rotation values as needed. See Using the Manual Registration Translate & Rotate Tools.

6 Press the **Save** button.

Copying SROs

Note: You must have the *Update Patients* permission on a patient to copy SROs for the patient. You must have a *Manual Registration* license to copy SROs.

1   With an SRO selected, press the **Copy** button.

2   Update the **Name** of the SRO as needed.

3   Update the **Secondary** image set as needed.

4   Edit the translation and rotation values as needed. See Using the Manual Registration Translate & Rotate Tools.

5   Press the **Save** button.

Editing SROs

Note: You must have the *Update Patients* permission on a patient to edit SROs for the patient. You must have a *Manual Registration* license to edit non-imported SROs.

1   With an SRO selected, click on the **Edit** icon located in the details panel footer.

2   Update the **Name**.

3   If **Full Editing Mode** is enabled, edit the translation and rotation values as needed. See Using the Manual Registration Translate & Rotate Tools.

4   Press the **Save** button to save you changes.

Full Editing Mode vs. Limited Editing Mode

In order to enter Full Editing Mode, the following conditions must be met:

- Your organization must have a Manual Registration license.

- The SRO must be an SRO that was created in ProKnow, not imported from DICOM.

- The referenced primary and secondary image sets must be present in the patient record in ProKnow.

If these criteria are met, Full Editing Mode allows the Name, translation, and rotation values to be changed. If these criteria are not met, only Limited Editing Mode will be permitted. In Limited Editing Mode, only the Name may be changed.

Reviewing SROs

In order to enter review mode, choose an SRO whose referenced primary and secondary image sets are present in the patient record in ProKnow. Then press the **Review** button. While review mode is active, some registration tools will be available, including the Spyglass (available in the toolbar) and the Image Pattern tool (available in the Images right sidebar). See Using the Image Registration Review Tools

Deleting SROs

Note: You must have the *Delete Patients* permission on a patient to delete SROs belonging to that patient.

1   With an SRO selected, click on the **Delete** icon located in the details panel footer.

2   Once you've read and understood the confirmation message, press the **Delete** button to delete the SRO.

Downloading SROs

Note: You must have the *Download Patient DICOM* permission on a patient to download SROs belonging to that patient.

With an SRO selected, click on the **Download** icon located in the details panel footer.

Patient — Structures

IN THIS ARTICLE

Use this article to learn about viewing patient structures.

- Viewing Structures

- Toggling Structures

- Toggling Patient Object Visibility

- Creating a New Structure Set

- Accessing Structure Set Versions

- Downloading a Structure Set Version

- Previewing a Structure Set Version

- Editing a Structure Set Version

- Deleting a Structure Set Version

Viewing Structures

When you access a patient, click on the Structures tab to view the list of structures. The majority of the screen is devoted to the patient viewer, where you can examine the active image set, structure set, and dose. On the left is the structures sidebar, with a list of structures that belong to the active structure set. Eyeball indicators aligned to the right of each row indicate whether the structure is active. Clicking on a structure will reveal a details panel where you can find information such as the **type** of the structure, the **algorithm** used to generate the structure, and the **description** of the structure. Clicking on the **Go to Structure** button located in the details panel footer will navigate to the center of the structure in the visualizer and make it active.

Using the Go to Structure Feature

You can quickly jump to the central slice of a structure in the patient viewer by double-clicking the structure row.

Toggling Structures

You can toggle structures on and off by clicking the eyeball icon aligned to the right of each row. Click on the eyeball icon in the sidebar header to toggle all of the structures at once.

Toggling Patient Object Visibility

Toggle other active patient objects on and off using the Patient Object Visibility dropdown.
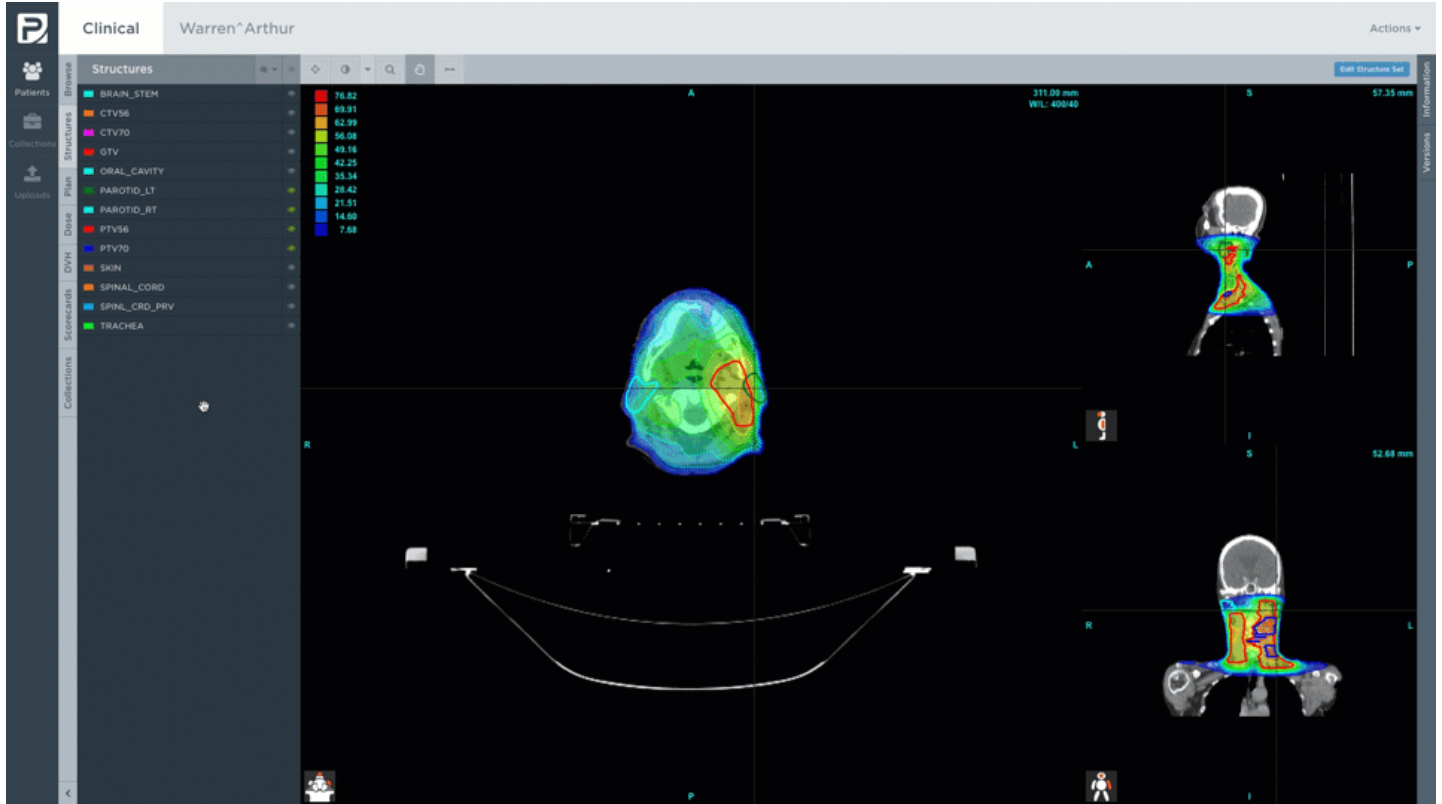
Creating a New Structure Set

If you did not upload an existing DICOM RT structure set but want to start contouring patient anatomy, you can create a new structure set for a patient directly in ProKnow DS.

Accessing Structure Set Versions

With the Structures tab selected, locate and open the Versions tab in the right sidebar. You will see the current version highlighted in blue. If there are other versions of the structure set, they will also be listed here. You can find additional details about the version by expanding each of the panels.
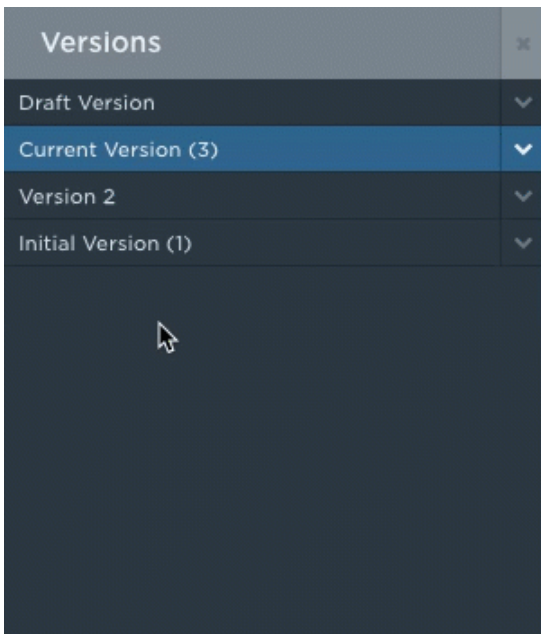
Downloading a Structure Set Version

1   With the Versions tab opened in the right sidebar, click on the version you wish to download by clicking on it. Note that *draft versions cannot be downloaded*.

2   Click on the download button in the ribbon at the bottom of the panel. An Active Downloads popup will appear in the bottom right corner of your screen that indicates when the download is being prepared and when the download has started.

3   Locate the file in your downloads folder.

Note: You must have the *Download Patient DICOM* permission for a workspace to download a structure set version for a patient in that workspace.

Previewing a Structure Set Version

1   With the Versions tab opened in the right sidebar, click on the version you wish to download by clicking on it. Note that *draft versions cannot be previewed*. To view a draft, edit the structure set instead.

2   Click on the preview button in the ribbon at the bottom of the panel. The patient viewer will load the selected structure set version.

3   From here, you can either close the preview or commit the previous structure set version as the current version.

⊘   To close a structure set version preview, press the **Close Preview** button located in the toolbar of the patient viewer.

⊘ To commit the previous structure set version, press the **Commit** button, review and confirm that you've read the notice, and press the **Revert** button.

Note: You must have the *Contour Patients* permission for a patient to commit previous structure set version for the patient.

Editing a Structure Set Version

The label and message for a structure set version may be changed. If provided, the label for a structure set version will appear in the panel header for that version, and the message will be listed with the version details.

1   With the Versions tab opened in the right sidebar, toggle open the panel for the version you wish to edit by clicking on it.

2   Click on the edit button in the ribbon at the bottom of the panel.

3   Enter a version **Label** and **Message**, and press **Save** to save you changes.

Note: You must have the *Contour Patients* permission on a patient to edit structure set versions for the patient. In addition, all active patient objects (image sets, structure set, plan, and dose) must be in the same coordinate system in order to edit a structure set (in order to prevent creating contours based on misaligned objects). If you are attempting to edit a structure set that does not have the same frame of reference, but you believe that it is in the same coordinate system, it is possible to use the Force Frame of Reference tool from the Patient Browse tab to force a consistent frame of reference across all active entities.

Deleting a Structure Set Version

1   With the Versions tab opened in the right sidebar, toggle open the panel for the version you wish to delete by clicking on it.

2   Click on the delete button in the ribbon at the bottom of the panel.

3   Confirm that you wish to delete the file by checking the confirmation box and pressing the **Delete** button.

Note: You must have the *Contour Patients* permission on a patient to delete draft structure set versions and the *Delete Patients* permission on a patient to delete archived structure set versions for

the patient. The currently approved structure set version cannot be deleted (delete the structure set instead).

Patient — Plan

IN THIS ARTICLE

Use this article to learn about viewing patient plan information.

- Viewing Plan Data

Viewing Plan Data

When you access a patient, click on the Plan tab to view plan information. The contents of this tab are split between the patient viewer and the plan information sidebar. Limited beam information is shown by default. However, you can expand the plan details by clicking on the chevron icon in the header of the sidebar.
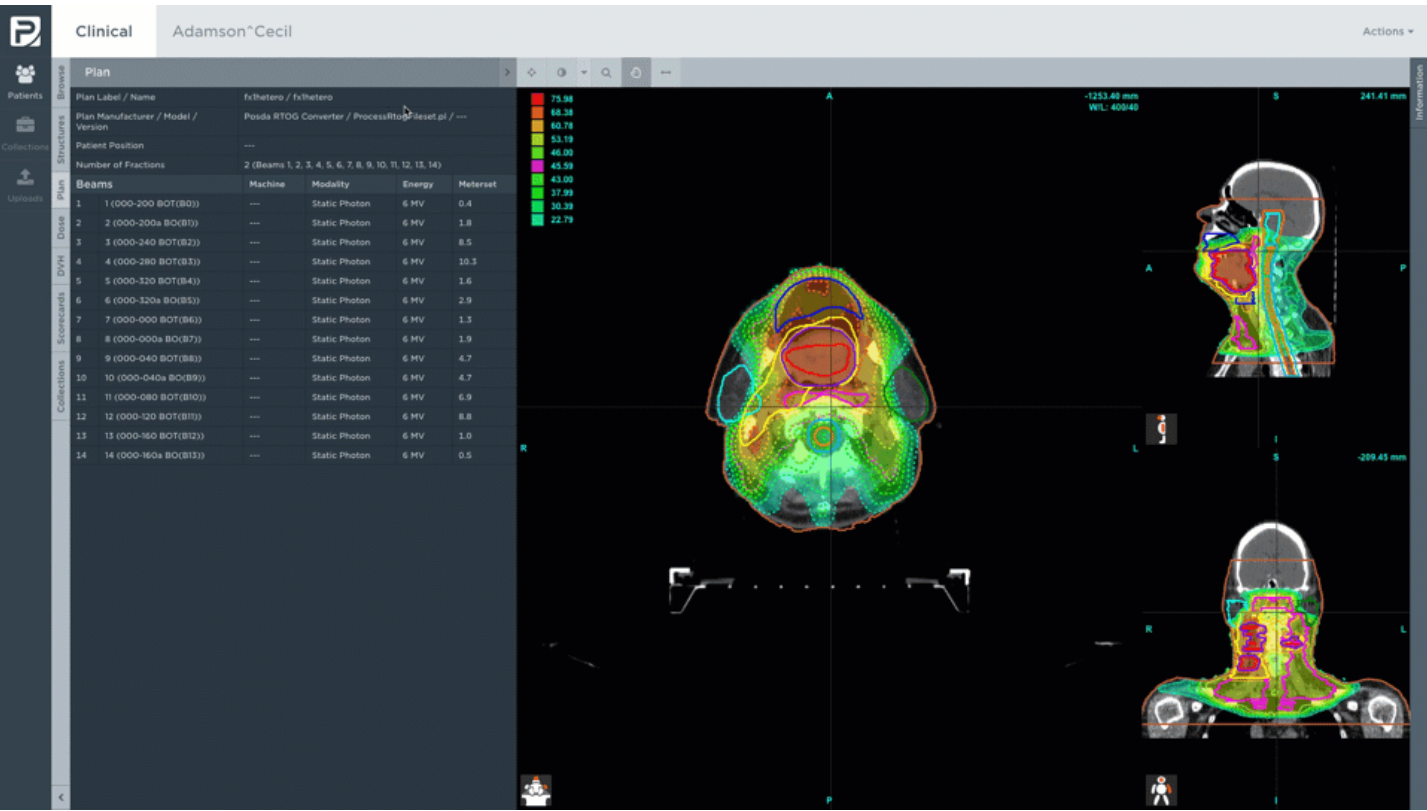
A Note on Brachytherapy Plans

Viewing full plan details for brachytherapy plans is not yet supported. If this is something you're interested in, please let us know.

Patient — Dose

IN THIS ARTICLE

Use this article to learn about configuring dose levels and dose visibility settings.

- Dose Levels and Visibility
- Configuring Dose Visibility Settings
- Configuring Dose Levels
  - Auto Level
  - Adding, Editing, and Removing Levels

Dose Levels and Visibility

When you access a patient, click on the Dose tab to view and manage the dose display. The majority of the screen is devoted to the patient viewer, where you can examine the active image set, structure set, and dose. On the left is the dose sidebar, with a list of the isodose levels defined for the patient's active dose object. Default dose levels come preconfigured when you first load the patient but can be customized to suit your needs.

Determining Initial Dose Levels

When there is a single prescribed dose in the plan, that value is used as the normalization dose in Gy. If there are multiple prescribed doses in the plan, then we choose the value that best represents the entire prescription. If there are no prescribed doses, the maximum dose is used as the normalization dose.

Configuring Dose Visibility Settings

1   With the Dose tab activated, press the eyeball dropdown button at the top of the sidebar.

2   Under **Colorwash**, uncheck the **Colorwash Enabled** checkbox to disable the colorwash. With the colorwash enabled, however, you can set the **Opacity** using the opacity slider.

Under **Isodose**, uncheck the **Isodose Enabled** checkbox to hide the isodose lines.

Configuring Dose Levels

With the Dose tab activated, there are two ways to configure the dose levels for the active dose. The first method is using the Auto Level tool, which sets up levels for you automatically based on the Normalization Dose and Increment you provide. The second method involves manually adding, updating, and removing individual levels until you have exactly the set you need.

Auto Level

1. Click on the auto level button denoted by an icon showing group of small cogs.

2. Choose between **Derived** or **Manual** mode.

   1. **Manual** mode allows you to enter any value for the **Normalization Dose** in Gy.

   2. **Derived** mode allows you to select the normalization value from a list of options. These options include the **Max Dose** value in Gy and the values of the prescribed doses in the current plan (if any) in Gy.

3. If in **Manual** mode, specify a **Normalization Dose** in Gy. If in **Derived** mode, select a **Normalization Dose** from the list of options.

4. Specify an **Increment** percentage.

5. Press the **Apply** button to configure the levels based on your configuration settings.

Adding, Editing, and Removing Levels

- **Add a Level**: Click the plus icon in the header to add a level. Enter the Dose value in Gy for the level and press Add.

- **Edit a Level**: Click the pencil icon for the level you wish to edit. Modify the value and Color as needed, and press Save to apply your changes.

- **Remove a Level**: Click the trash icon for the level you wish to remove.

> **NOTE**: ProKnow automatically saves the configured dose visibility settings and levels for each patient if the current user has the *Update Patients* permission on the patient. If the current user does not have the *Update Patients* permission on the patient, they can still modify the dose visibility settings and levels, but any changes will not be saved.

Patient — DVH

IN THIS ARTICLE

You can view a patient's dose volume histogram (DVH) curves if the patient structure set and dose are activated. Use this guide to learn more about the DVH tab.

- Viewing the DVH

- Updating DVH Settings

- Downloading DVH Data

Viewing the Dose Volume Histograms

When you access a patient, click on the DVH tab to view the patient's dose volume histogram (DVH) curves. The main content area is devoted to the DVH curves, and the left sidebar shows a list of the structures. You can collapse the sidebar by clicking on the chevron icon at the top of the sidebar, and the DVH display will adjust automatically. When expanded, the sidebar shows additional information about each structure, such as min and max dose. You can toggle structures on and off by clicking on the eyeball icon or the row itself.
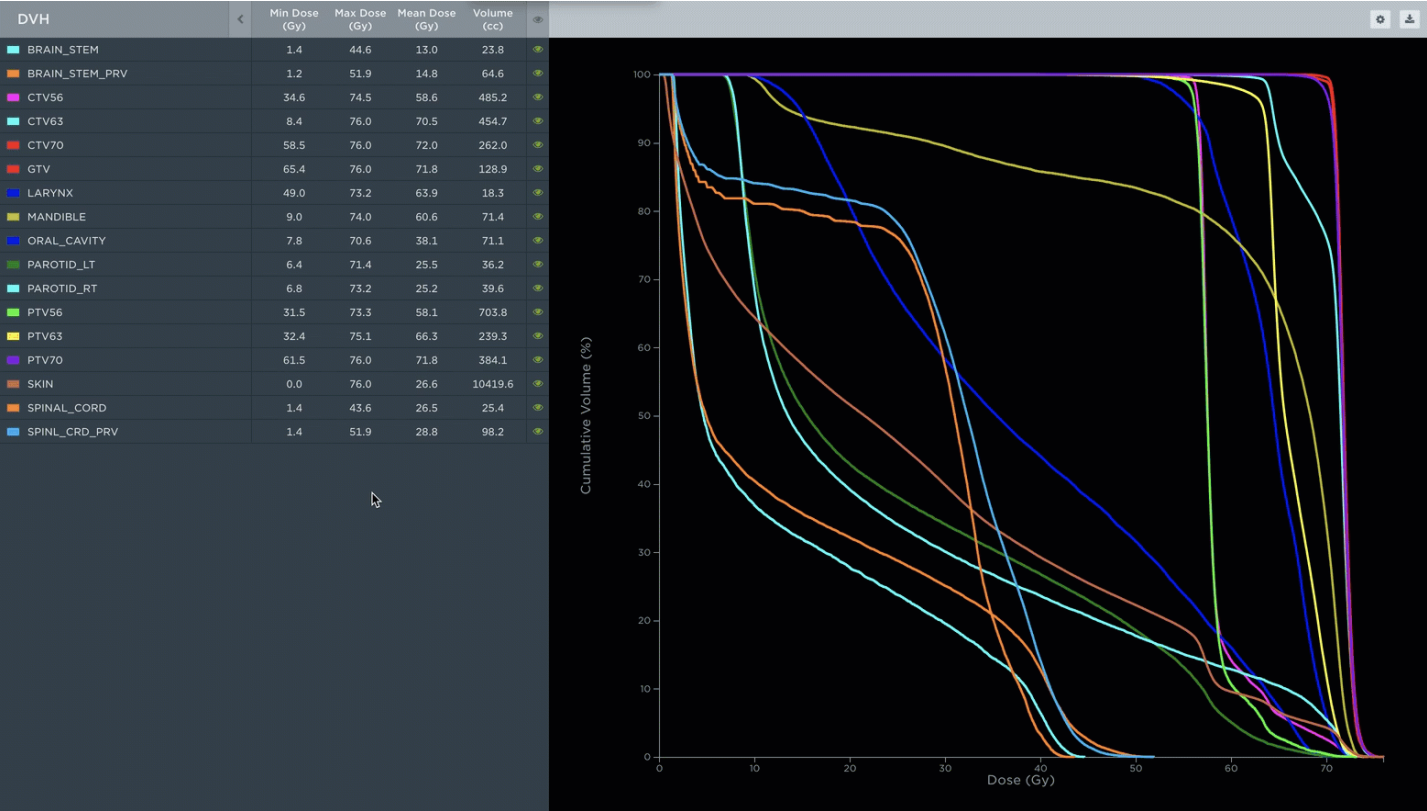
Updating DVH Settings

1 Click on the button with the cog icon above the DVH display.

2 Select a **Mode** from the available options. Next, choose a **Theme**. The Dark theme (displayed in the screenshot above) uses a black background while the Light theme uses a white background.

3 Press **Save** to save your changes.

Downloading DVH Data

1 Click on the download button above the DVH display.

2 Enter a **Resolution** value (0.001 ≤ x ≤ 1.000). Next, select an option for the **Structure** field. You can choose to export *All Structures* or a single structure.

3 Press **Download** to download the data.

Patient — Scorecards

IN THIS ARTICLE

Define scorecards for patients to standardize methods and implement robust measures to document plan quality across your organization.

- Accessing Patient Scorecards

- Using the Active Objects Panel

- Creating Patient Scorecards

- Exporting Scorecards to PDF

- Renaming Patient Scorecards

- Defining a Scorecard Template

- Importing a Scorecard Template

- Editing Patient Scorecards

- Downloading/Uploading Scorecard Rules as Local Files

- Deleting Patient Scorecards

Accessing Patient Scorecards

When you access a patient, click on the **Scorecards** tab to view and manage the scorecards. The scorecards sidebar holds a list of scorecards that belong to the patient with a button to create a scorecard at the top. Clicking on one of the scorecards will select it, thereby making it the active scorecard.

With a scorecard selected, the main content area will update to display the details for the selected scorecard. Links in the toolbar will allow you to jump to the computed or custom metrics defined in the scorecard (if applicable). A button to edit the scorecard is available on the far right side of the toolbar.
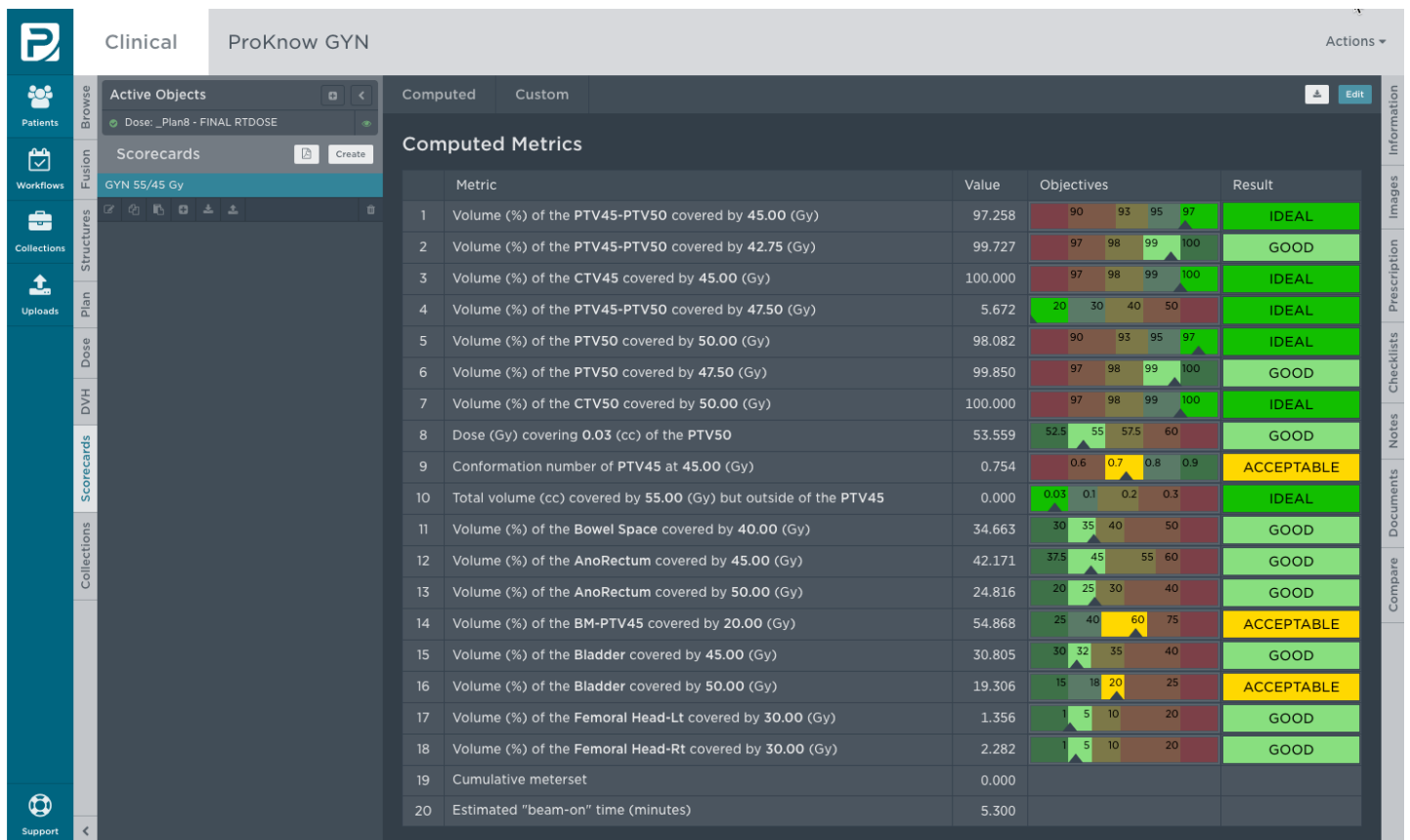
> **Note**: You must have the *Read Patient Scorecards* permission on a patient to access scorecards for the patient.

Using the Active Objects Panel

The scorecard metric values will be displayed according to the current set of primary patient objects. The Active Objects panel is available to indicate the primary objects and allow you to switch the primary objects without leaving the current tab. The panel comes with the following set of features.

- **Update Visibility**: Toggle the visibility of an object by clicking on the visibility icon for the object.

- **Toggle Parent Entities**: Toggle whether parent entities are shown by clicking on the plus or minus icons in the panel header.

- **Open Browse Tab**: Open the Browse tab without leaving the current tab by clicking on the chevron icon in the panel header.

  - **Update Visibility**: With the Browse tab open, toggle the visibility of an object by clicking on the visibility icon for the object. Toggle the visibility of all objects by clicking on the visibility icon in the Browse tab header.

  - **Switch Primary Objects**: With the Browse tab open, single-click an object to activate it or double-click an object to activate it and close the tab.

- **Close Browse Tab**: Close the Browse tab by clicking on the arrow icon in the Browse tab header.

Creating Patient Scorecards

1   Press the **Create** button located at the top of the sidebar.

2   Select a **Scorecard Template** from the list of the available templates, or choose *None* instead to define a scorecard from scratch. Enter a **Name** for your scorecard. You can use any characters you'd like, but the name must not contain more than 64 characters.

3   Press the **Create** button to create the scorecard. Your new scorecard should be selected.

Note: You must have the *Create Patient Scorecards* permission on a patient to create scorecards for the patient.

Copying a Scorecard

Another way to create a scorecard is to copy an existing scorecard. Just select a scorecard, and press the **Copy Scorecard** button in the small ribbon of tools below the selected scorecard in the sidebar.

Exporting Scorecards to PDF

1   (Optional) Use the **Compare** tab to activate additional doses for comparison. See Compare Patient Object (Compare Tab) for more information.

2   Press the **Export Scorecard(s) as PDF** button located at the top of the sidebar.

3   Use the checkboxes next to each scorecard to specify which scorecards should be included in the export.

4   Press the **Export** button to generate and download the PDF.

Renaming Patient Scorecards

1   Choose the scorecard you wish you edit from the sidebar on the left.

2   Press the **Rename Scorecard** button in the small ribbon of tools below the selected scorecard in the sidebar.

3   Edit the **Name** in the field provided, and press **Rename** to save your changes.

> **Note**: You must have the *Update Patient Scorecards* permission on a patient to edit the scorecards for the patient.

Defining a Scorecard Template

1   Choose the scorecard you wish to use to define a scorecard template.

2   Press the **Define Template from Scorecard** button from the small ribbon of tools below the selected scorecard in the sidebar.

3   Enter the **Name** in field provided. Next, select what will happen if a template already exists with the same name. It's best to choose "Leave the template unchanged." if you're not sure. Finally, press the **Save** button to define the template.

> **Note**: You must have the *Create Scorecard Templates* permission on the organization to define a new scorecard template for the organization. You must have the *Create Scorecard Templates* permission on the workspace to define a new scorecard template for the workspace. You must have the *Update Scorecard Templates* permission on the organization to update an existing scorecard template for the organization. You must have the *Create Scorecard Templates* permission on the workspace to update an existing scorecard template for the workspace.

Importing a Scorecard Template

1   Choose the scorecard into which you wish to import a scorecard template.

2   Press the **Import Metrics from Template** button from the small ribbon of tools below the selected scorecard in the sidebar.

3   Select the **Scorecard Template** to import. Then select how duplicate metrics should be resolved, and press the **Import** button to import the metrics.

> **Note**: You must have the *Update Patient Scorecards* permission on a patient to edit the scorecards for the patient.

Editing Patient Scorecards

1   Choose the scorecard you wish you edit from the sidebar on the left.

2   Press the **Edit** button.

3   Press the **Add computed metric...** button, and select one or more metrics from the categorized lists of available absolute dose metrics, relative dose metrics, relative dose metrics, plan metrics, and structure set metrics.

> For more information about computed metrics, visit our Computed Metric Library.

4   Fill in the computed metric parameters parameters.

5   Press the **Add custom metric...** button, and select one or more metrics from the list of custom metrics defined in your ProKnow organization by a custom metric manager.

> To learn about how to create custom metrics, please visit the Defining Custom Metrics page.

6   Press the swap icon to exchange an absolute or relative metric for its variant. Note that this button will be disabled if the metric does not have a variant.

7   Press the copy icon to copy a metric to the row below.

8   Press the pencil icon to chose a different metric from the metric selection dialog.

9   After adding or editing a computed metric, you may click the **Calculate Value** button from the Value column to immediately calculate the metric. This is useful in situations where you wish you quickly evaluate a particular metric without saving the entire scorecard (e.g., when determining appropriate objectives).

10   Press the **Add...** or **Edit...** button in the Objectives column to add, edit, or remove objectives for a particular metric. Objectives are useful for defining performance bins for your data. In the following example, for instance, you might set up objectives for the volume PAROTID_LT where you define ranges as follows:

   ✓ VERY SMALL: less than 8 cc

   ✓ SMALL: 8 cc to 15 cc

   ✓ NORMAL: 15 cc to 29 cc

   ✓ LARGE: 29 cc to 36 cc

   ✓ VERY LARGE: greater than 36 cc

These ranges can be assigned a color and displayed end-to-end as follows.

Objectives are completely customizable, allowing you to configure ranges for organs-at-risk metrics and target metrics, too.

Sometimes, a computed metric value or custom metric value may equal the threshold value for an objective level. You can customize which objective level should be assigned in those cases by clicking the bracket indicators to toggle the level. A bracket that opens upward indicates that the objective level above will be used. A bracket that opens downward indicates that the objective level below will be used. In addition to the direction of the bracket, the background color behind the bracket indicates the level to which the threshold value belongs.

In the following example, you'll notice that the two objective sets vary only in the direction of the brackets (see orange outlined region). For the objectives on the left, a value of 0 would produce a result of IDEAL, a value of 10 would produce the result GOOD, a value of 20 would produce the result ACCEPTABLE, and a value of 30 would produce the result MARGINAL. Compare that with the objectives on the right, where a value of 0 would now produce the result GOOD (not IDEAL), a value of 10 would now produce the result ACCEPTABLE (not GOOD), a value of 20 would now produce the result MARGINAL (not ACCEPTABLE), and a value of 30 would now produce the result UNACCEPTABLE (not MARGINAL).

Saving Custom Objective Templates

The labels, colors, and bracket direction may be customized and saved as a custom objective template. To accomplish this, first make your edits to the objective levels. The dropdown field

should appear with the value *Custom*. Press the edit button next to the dropdown field, enter a name for your template, and then press the **Save** button.

This template may be recalled and used when defining objectives for other metrics. To delete a custom objective template, select it from the dropdown, and press the delete button.

Note: You must have *Create Objective Templates* permission to create objective templates. You must have Delete Objective Templates permission to delete objective templates.

How do I build scoring functions into scorecard objectives?

Great question! We have an in-depth article in our Patient Module FAQs. Check out How do I build scoring functions into scorecard objectives?

11 You may reorder metrics within a scorecard template by dragging and dropping rows to the desired location. Each row has an icon on the left containing three small horizontal lines. Using this icon as a

handle, identify the item you wish to reorder, and drag and drop it into its new position:

12 Delete metrics from your scorecard by pressing the trash icon.

13 Press the **Save** button to save your changes.

Note: You must have the *Update Patient Scorecards* permission on a patient to edit the scorecards for the patient.

Downloading/Uploading Scorecards as Local Files

1 Choose the scorecard you wish you download (to local file) or upload (from local file).

2 Press the **Download Scorecard** button or **Upload Scorecard** button in the small ribbon of tools below the selected scorecard in the sidebar.

Note: You must have the *Update Patient Scorecards* permission on a patient to upload the scorecards for the patient.

Using Scorecard Downloads for Templating

This is useful for users who do not have permission to create and manage scorecard templates for the entire organization (all workspaces).

Deleting Patient Scorecards

1   Choose the scorecard you wish you delete from the sidebar on the left.

2   Press the **Delete Scorecard** button in the small ribbon of tools below the selected scorecard in the sidebar.

3   Press the **Delete** button to delete the scorecard.

Note: You must have the *Delete Patient Scorecards* permission on a patient to delete the scorecards for the patient.

Patient — Collections

IN THIS ARTICLE

Collections allow you to analyze population statistics, study variation, and establish benchmarks across a group of patients. A patient can belong to one or more collections, allowing you to analyze diverse but intersecting cross sections of the patients in your organization. The patient collection tab lists the collections to which the current patient belongs. Use this guide to learn about adding a patient to one or more collections in your organization.

- Viewing Patient Collections

- Updating Patient Collections

Note: You must have an *Analytics* license to access the Collections tab.

Viewing Patient Collections

When you access a patient, click on the Collections tab to view the patient collections. The main content area is blank and is reserved for future patient collection content. On the left is the collections sidebar, which contains a list of the collections to which the patient belongs. A patient can be added to a collection with or without a representative patient object. If the representative object for a patient collection matches the primary patient object from the patient object hierarchy, it will appear as a standard list item. Otherwise, the collection will appear with a grayed out, italicized style.
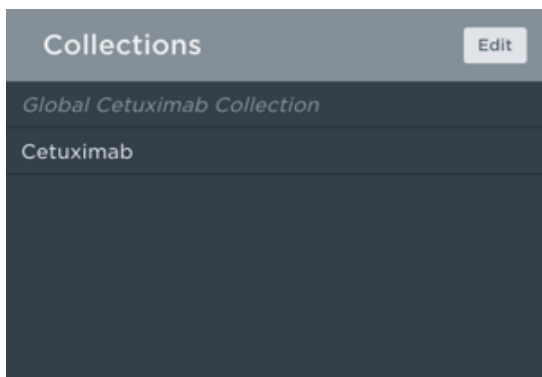
Hovering over a grayed out collection allows you to see which patient object belongs to the collection.

The Primary Patient Object from the Patient Hierarchy

On the patient Browse tab, the "primary patient object" (or primary object) is the lowest active object in the patient hierarchy (active objects being those with green checkmarks). For example, in the first image below, the primary patient object is the dose, whereas in the second image, the primary patient object is the plan.

Updating Patient Collections

Note: You must have the *Remove Collection Patients* permission on a collection to remove a patient from that collection. You must have the *Add Collection Patients* permission on a collection to add a patient to that collection.

1. With the Collections tab activated, press the **Edit** button at the top of the sidebar.

2. Use the checkboxes aligned to the right of each row to select the collections to which you wish to add the patient. Note that checkboxes will be shown in the indeterminate state if the primary patient object (see above) does not match the representative entity for the patient in that collection.
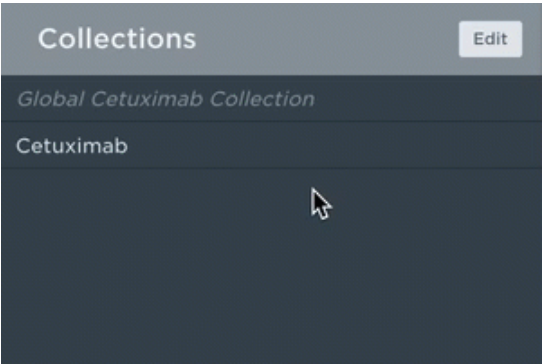
3. Press the **Save** button.

4. Once you've read and understood the confirmation message, check the confirmation checkbox, and press the **Save** button.

Representative Patient Objects

Computed metrics, like those reported on patient and collection scorecards, are derived from a patient's dose. Therefore, it's usually best to use the patient dose as the representative patient object when adding patients to collections.

Extracted & Custom Data (Information Tab)

IN THIS ARTICLE

The Information sidebar allows quick access to information related to the active patient, study, image set, structure set, plan, and dose, including custom metrics. In addition, the Information sidebar can be used to update the custom metric data attached at each level.

- Viewing Information

- Editing Information

Note: You must have the *Update Patients* permission on a patient to edit custom metrics for the patient.

Viewing Information

To view information for the selected patient, click the Information tab located in the right sidebar. The panels corresponding to the activated patient objects will be displayed in the sidebar content area. Each panel may be opened and closed independently by clicking on the panel header.

Editing Information

1   Open the Information tab located in the right sidebar.

2   Open the panel you wish to modify, and click the edit button in the footer of the panel.

3   Click on **Customize** to add and remove custom metrics from the panel.

4   Modify the custom metric values as needed.

5   Press **Save** to save your changes.

Plan Prescription Management (Prescription Tab)

IN THIS ARTICLE

Plan prescription descriptions and dose references for the selected plan may be viewed and edited from the Prescription tab.

- Viewing the Plan Prescription

- Updating the Plan Prescription Description

- Adding a Dose Reference

- Editing a Dose Reference

- Deleting a Dose Reference

Viewing the Plan Prescription

To view the prescription information for a plan, activate a primary plan entity from the Browse tab (see Patient — Browse). Next, open the Prescription tab located in the right sidebar. The description of the prescription will be displayed at the top of the right sidebar with the list of dose references below.

Coordinate-Based Dose References

Dose references with the structure type value COORDINATES are displayed in the list of dose references with the following restrictions:

- The coordinate values are not currently displayed in the list or the patient visualizer.

- Creating a dose reference with the structure type value COORDINATES is not yet supported.

- Editing the structure type value for dose references with the current structure type value COORDINATES is not yet supported.

Updating the Plan Prescription Description

Note: You must have the *Update Patients* permission on the patient to make changes to the plan prescription.

1. Click on the **Edit Description** button located in the sidebar header.

2. Update the **Description** field.

3. Press the **Save** button.

Adding a Dose Reference

Note: You must have the *Update Patients* permission on the patient to make changes to the plan prescription.

1. Click on the **Add Dose Reference** button located in the Dose References subheader.

2. Enter values for the **Description**, **Type**, **Structure Type**, and **Prescribed Dose** fields.

3. Press the **Save** button to add the dose reference.

Editing a Dose Reference

Note: You must have the *Update Patients* permission on the patient to make changes to the plan prescription.

1. Choose a dose reference from the list.

2. Press the **Edit** button.

3. Enter values for the **Description**, **Type**, **Structure Type**, and **Prescribed Dose** fields.

4   Press the **Save** button to save the dose reference.

Deleting a Dose Reference

Note: You must have the *Update Patients* permission on the patient to make changes to the plan prescription.

1   Choose a dose reference from the list.

2   Press the **Edit** button.

3   Press the **Delete** button.

4   Press the **Delete** button in the confirmation dialog to confirm.

Multiple Image Set Display (Images Tab)

IN THIS ARTICLE

The Images sidebar allows you to simultaneously display multiple image sets that have been uploaded to the patient. This is especially useful while contouring to be able to view information from multiple image modalities (e.g., CT and MR). To view the available images for the selected patient, click the Images tab located in the right sidebar.

- Displaying Multiple Image Sets

- Unlocking Image Sets in Different Coordinate Systems

- Adjusting Image Set Display Options

Displaying Multiple Image Sets

The Images sidebar contains two sections, the first lists the currently "Active" image sets in the patient. Active image sets include the primary image set (indicated by a green checkmark in the Browse tab) as well as any secondary image sets (indicated by a blue checkmark in the Browse tab). The second section lists the currently "Inactive" image sets in the patient (if available). An inactive image set will fall into one of the following cases.

1. The image set is located in the same coordinate system as the primary image set, as indicated by the DICOM 'Frame of Reference UID' (0020,0052) tag.

2. The image set is not located in the same coordinate system as the primary image set, but there is at least one spatial registration object (SRO) available that registers it to the primary image set.

3. The image set is not located in the same coordinate system as the primary image set, and there are no spatial registration objects available that register it to the primary image set.

The following screenshot depicts how each of these are displayed in the Inactive section. The first image set in the list ("CT: ABDOMEN_RAD_PLAN mibh") is an example of an image set in the last category. It is not able to be activated by default as indicated by the "not allowed" icon and the lock button on the right. The second image set in the list ("CT: Registered CT output") is an example of an image set in the first category. It's an image set that is already in the same coordinate system as the primary image set. The third image set in the list ("MR: Registered-Everything") is an example of an image set in the second category. In other words, while the coordinate systems differ, a registration object is available to register the secondary MR image set with the primary image set. These image sets are denoted by an asterisk icon on the right.

To activate an inactive image set, simply click on the checkbox to the left of the inactive image set. Similarly, to deactivate an active secondary image set, simply uncheck the checkbox to the left of the active image set. Please note that you can not deactivate the primary image set from the Images sidebar (this can only be done by double-clicking on a different item from the Browse tab).

Unlocking Image Sets in Different Coordinate Systems

Caution

The DICOM 'Frame of Reference UID' (0020,0052) tag is how DICOM-compliant systems communicate that one or more objects are in the same coordinate space. If ProKnow DS indicates that two images are not in the same coordinate system, it implies that the source images were not transmitted with the same frame of reference and no registration object is available to register one with the other. However, in some rare cases, the frame of reference may be set incorrectly in the source DICOM files, and the images may actually be in the same coordinate system. To accommodate this scenario, ProKnow DS allows you to unlock an image set in a different coordinate system, allowing it to be displayed simultaneously with the primary image set. In these situations, it is important to understand that even though two image sets may appear to be in the same coordinate system, there may be subtle differences that are difficult to detect. As such, by unlocking an image set in a different coordinate system, you take full responsibility for ensuring that the objects are in the same coordinate system, despite the fact that the files imported to ProKnow DS indicate otherwise.

To unlock an inactive image set that does not share the same coordinate system as the primary image set and does not have a registration object available, you can click the lock icon to the right of the inactive image set. Once unlocked, you can click the checkbox to the left of the unlocked image set to activate. Please note that unlocking an image set in a different coordinate system has the following restrictions:

- It is not possible to view secondary images that are not in the same coordinate system as the primary image set while contouring. Therefore, it is not possible to unlock images while contouring, nor it is possible to start editing a structure set if there are any active patient objects that are not in the same coordinate system.

- The unlocked state of an image set is not saved with the patient state, and any activated secondary image sets that are not in the same coordinate system as the primary image set will be automatically returned to the inactive state upon reloading the patient. This is to ensure that it is not possible for a user to unknowingly view a set of images in different coordinate systems while viewing or analyzing a patient.

In the event that one or more image sets with different frames of reference are indeed in the same coordinate system, it is possible to use the Force Frame of Reference operation from the Patient Browse tab to permanently force the objects to have a consistent frame of reference.

Adjusting Image Set Display Options

Once an image set has been activated, the Images sidebar allows editing the display options for the image set, including:

- Visibility

- Fusion (if the image set is registered to the primary image set via one or more registration objects)

- Style (e.g., Grayscale, Inverted, Glow)

- Window

- Level

- Opacity

Please note that the Window/Level dropdown available from the Patient toolbar will always reflect the current display options of the primary image set (and not secondary image sets). In addition, with two image sets enabled, it is possible to synchronize the opacity of the two image sets by clicking on the **Synchronize Opacity** button located on the right side of the Active section header (this option is only available when there are exactly two active image sets).

Patient Task and Workflow Management (Checklists Tab)

IN THIS ARTICLE

The Checklists sidebar organizes tasks to be completed by users for the current patient. To view the checklists for a patient, click the Checklists tab located in the right sidebar of the patient. Checklists are organized alphabetically. To refresh the list at any time, press the refresh button located in the header of the Checklists sidebar.

- Creating Patient Checklists

- Editing Patient Checklists

- Deleting Patient Checklists

- Viewing Checklist Details

- Managing Tasks and Checkpoints

  - Adding Tasks and Checkpoints

  - Marking Tasks as Done

  - Editing Individual Tasks and Checkpoints

  - Editing Multiple Tasks

  - Reordering Tasks

Creating Patient Checklists

Note: You must have the *Create Patient Checklists* permission on a patient to create checklists for the patient.

1   Click on the **Create** button in the Checklists sidebar header.

2   If you wish to create a checklist from a predefined template, choose a **Template** from the dropdown list. Otherwise, leave **Template** set to *None*. Then give the checklist a **Name** and a **Description** (optional). If you are creating a checklist from a template, the workflow will be disabled and will inherit the workflow assigned to the template (you can change the workflow later). However, if you are defining a template from scratch, you can also select a workflow to use when assigning templates or leave it set to *None*.

3   Press the **Create** button to create the checklist.

Editing Patient Checklists

> **Note**: You must have the *Update Patient Checklists* permission on a patient to edit checklists for the patient.

1. From the list of checklists, click on the checklist you wish to edit.

2. Press the **Edit Checklist** button (pencil icon) in the Details sidebar header.

3. Update the **Name**, **Description**, and **Workflow** as needed, and press the **Save** button to save you changes.

Deleting Patient Checklists

> **Note**: You must have the *Delete Patient Checklists* permission on a patient to delete checklists for the patient.

1. From the list of checklists, click on the checklist you wish to delete.

2. Press the **Delete Checklist** button (trash icon) in the Details sidebar header.

3. Once you've read and understood the confirmation message, press the **Delete** button to delete the checklist.

Viewing Checklist Details

> **Note**: You must have the *Read Patient Checklists* permission on a patient to view checklists for the patient.

From the list of checklists, click on the checklist to view its details.
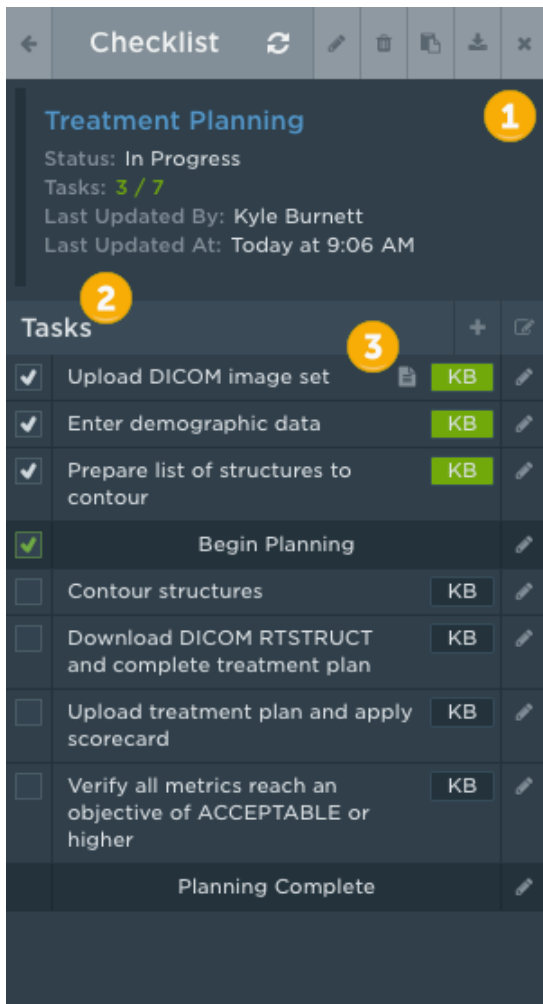
1. At the top of the checklist details panel is the checklist summary section that includes the **Status** of the checklist (if it belongs to a workflow), the number of **Tasks** that have been marked as completed (done or exception) out of the total number of items, and information concerning who **Last Updated** the checklist and when the update was performed (displayed in your local timezone).

2. The *Tasks* toolbar separates the checklist summary section from the list of tasks. It also contains tools for adding tasks and editing multiple tasks at once.

3. You may see indicators aligned to the right of the task row. The document icon indicates that there is a comment associated with the note. You can hover your mouse cursor over this icon to view the comments. The box containing initials denotes a user. A green box indicates that the item was completed by the user while a gray box indicates that the item has been assigned to the user but not yet completed. Hover over the initials to view the user's full name and timestamp of when the item was assigned or completed.

Managing Tasks and Checkpoints

> **Note**: You must have the *Update Patient Checklists* permission on a patient to edit the checklist tasks and checkpoints for the patient.

Once you have clicked on a checklist to view its details, use the following procedures below to interact with the task and checkpoint elements.

Tasks and Checkpoints

A *task* is an assignable "to do" item. In the context of a patient checklist, each checklist task is has one of four statuses: Unstarted, Started, Done, and Exception.

A *checkpoint* marks a break in a checklist. A checkpoint is useful for indicating a group of tasks that can be done in parallel and tasks which should be complete before moving on to another group of tasks. When used with workflows, checkpoints can also allow patient checklists to be automatically transitioned to a specific workflow state. If a checkpoint appears at the beginning of the checklist, the checklist will transition to the defined transition state once any task in the checklist has been marked as Started, Done, or Exception. If a checkpoint appears anywhere else in checklist, the checklist will transition to the defined transition state when all preceding tasks have been completed (marked as either Done or Exception).

Adding Tasks and Checkpoints

1   Click on the **Add Task or Checkpoint** button (plus icon) from the Tasks toolbar.

2   Choose the **Type**. The type of *Task* will be selected by default.

   For a task, enter a **Name**. You may also add a **Description** and **Comments**, set the task **Status**, and set the **Assigned** user.

   For a checkpoint, simply enter a **Name**, and optionally set the **Transition To** state if the checklist is assigned to a workflow.

3   Press the **Save** button to add the new task or checkpoint.

Marking Tasks as Done

Marking a task as *Done* is as simple as checking the box next to the item. When this occurs, the status will change to *Done*, and you will be marked as the user who completed the task. To undo this operation, simply uncheck the box, which will reset the status back to *Unstarted*. If you wish to set the status to something other than *Unstarted* or *Done* (i.e., *Started* or *Exception*), you will need to use one of the editing methods described below.

Editing Individual Tasks and Checkpoints

1   To edit a task, expand the row by clicking on the task name or chevron icon; then press **Edit**. For checkpoints, click on the **Edit Checkpoint** button (pencil icon).

2   For a task, set the **Name**. You may also edit the **Description** and **Comments**, set the task **Status**, or set the **Assigned** user.

For a checkpoint, you may update the **Name** or optionally set the **Transition To** state if the checklist is assigned to a workflow.

3   Press the **Save** button to save the task or checkpoint.

Editing Multiple Tasks

1   Click on the **Reorder or Edit Multiple Tasks** button (small pencil icon) from the Tasks toolbar.

2   Use the checkboxes on the right to select the items you wish to edit together. With at least one item selected, press the **Edit** button that will appear in the Task toolbar.

3   Select a **Status** and **Assigned User**. These values will overwrite the status and assignment for all selected tasks.

4   Press **Save** to apply the changes to the selected items.

Reordering Tasks

1   Click on the **Reorder or Edit Multiple Tasks** button (small pencil icon) from the Tasks toolbar.

2   Each row has an icon on the left containing three small horizontal lines. Using this icon as a handle, identify the item you wish to reorder, and drag and drop it into its new position.

Patient-Level Comment (Notes Tab)

IN THIS ARTICLE

The Notes sidebar records patient notes for the current patient. To view the notes for a patient, click the Notes tab located in the right sidebar of the patient. Notes are displayed with the most recent note appearing first in the list. To refresh the list at any time, press the refresh button located in the header of the Notes sidebar.

- Adding Patient Notes

- Updating Patient Notes

- Deleting Patient Notes

Note: You must have *View PHI* permission on a patient to create, view, update, or delete notes for that patient. You must have the *Create Patient Notes* permission on a patient to create a note for that patient. To delete notes for patients, you must be the user who originally authored that note or have the *Delete Patient Notes* permission on the patient to which the note belongs. Patient notes may only be edited by the original note author who also must have the *Update Patient Notes* permission.

Adding Patient Notes

1. Click the **Notes** tab located in the right sidebar to open the Notes sidebar.

2. Type your note into the input at the top of the sidebar.

3. Press `Shift + Enter` or the add button to create the note.

Advanced Formatting in Patient Notes

Patient notes can contain text that is bolded and italicized. To bold text, surround it with a set of asterisks like this: `*bold text*` . To italicize text, surround it with a set of underscores like this: `_italicized text_` .

In addition, URLs will be automatically turned into clickable clicks for you. Just be sure to include the protocol in the link: (i.e., `http://` , `https://` , or `ftp://`).

Updating Patient Notes

1   Click the **Notes** tab located in the right sidebar to open the Notes sidebar.

2   Hover over the note you wish to edit and press the edit button.

3   Modify the note, and press `Shift + Enter` or the **Save Changes** button to save the note.

Deleting Patient Notes

1   Click the **Notes** tab located in the right sidebar to open the Notes sidebar.

2   Hover over the note you wish to delete and press the delete button.

3   You will be prompted to confirm you wish to delete the note; press the **Delete** button to delete the note.

Storing and Viewing Non-DICOM Documents (Documents Tab)

IN THIS ARTICLE

The Documents sidebar allows you to upload and attach arbitrary documents (e.g., PDFs, images, and Word documents) to the current patient. To view the documents for a patient, click the Documents tab located in the right sidebar of the patient. Documents are displayed in alphabetical order, grouped by document category (categories can be assigned to documents once they have been uploaded). To refresh the list at any time, press the refresh button located in the header of the Documents sidebar.

- Uploading Patient Documents

- Viewing Patient Documents

- Updating Patient Documents

- Deleting Patient Documents

Note: You must have *View PHI* permission on a patient to create, view, update, or delete documents for that patient. You must have *Create Patient Documents* permission on a patient to add documents to that patient. To delete documents for patients, you must be the user who originally uploaded the document or have the *Delete Patient Documents* permission on the patient to which the document belongs. The name and category of documents may be edited by any user who has *Update Patient Documents* permission on the patient.

Uploading Patient Documents

1   Click the **Documents** tab located in the right sidebar to open the Documents sidebar.

2   Click the **Upload** button in the header of the Documents sidebar.

3   Select one or more files you wish to upload from your local machine.

4   Once the upload is complete, the documents will automatically appear in the list of documents associated with the patient.

Note: Patient document names must be unique within a patient (even if they assigned to different categories). If you wish to replace a particular document with a newer version with the same name, you can either (a) rename the current document in ProKnow DS, (b) rename the new version of the file on your local machine (i.e., before you upload it to ProKnow DS), or (c) delete the current document in ProKnow DS (and replace it with the new version of the file from your local machine).

Viewing or Downloading Patient Documents

1   Click the **Documents** tab located in the right sidebar to open the Documents sidebar.

2   **If you wish to view the document in your browser**, you may click the **Open Document** button that is located to the right of the document name. This will open the file in a new tab and either display the document (if it is a file format that can be displayed natively in the browser, such as PDFs or images) or it will download (or prompt you to download) the file to your local machine.

3   **If you wish to download the document to your local machine**, you must first expand the document by clicking on the document's name or the chevron icon located to the right side of the document row. Once expanded, you can click the **Download Document** button, which will cause the file to be downloaded to your local machine (i.e., not viewed in the browser).

Updating the Name or Category of Patient Documents

1   Click the **Documents** tab located in the right sidebar to open the Documents sidebar.

2   Click the name of the document (or the chevron icon located to the right side of the document row) to expand the document's information panel.

3   Click the **Edit Document** button at the bottom of document's information panel to open the Edit Document dialog.

4   Once you are finished editing, click the **Save** button to save the name and category of the document. Please note that although ProKnow DS will allow you to change the file extension of a document, it will provide a warning letting you know that changing the file extension may cause the file to no longer open properly when downloaded. If you still wish to proceed, you can click the **Rename** button to proceed with renaming the file.

Deleting Patient Documents

1   Click the **Documents** tab located in the right sidebar to open the Documents sidebar.

2   Click the name of the document (or the chevron icon located to the right side of the document row) to expand the document's information panel.

3   Click the **Delete Document** button to open the Delete Document dialog.

4   Click the **Delete** button from the Delete Document modal to delete the patient document.

Compare Patient Object (Compare Tab)

IN THIS ARTICLE

The Compare tab allows you to activate additional patient objects for comparison to other active patient objects. The Compare tab consists of the same hierarchy of patient objects that appear on the left Browse tab. Checkboxes to the right of a row indicate that the patient object may be activated for comparison.

- Comparing DVH Curves and Statistics

- Comparing Scorecards

Comparing DVH Curves and Statistics

1   Activate a primary dose entity from the Browse tab (see Patient — Browse).

2   Select the **DVH** tab.

3   Open the right **Compare** tab.

4   Check the boxes to the right of the doses you wish to activate. Up to five doses may be activated at once (including the primary dose).

5   Use the view selector in the toolbar to switch between the DVH comparisons and the statistics tables for Max Dose (Gy), Min Dose (Gy), and Mean Dose (Gy).

Comparing Scorecards

1   Activate a primary dose entity from the Browse tab (see Patient — Browse).

2   Select the **Scorecards** tab.

3   Choose a scorecard from the sidebar on the left.

4   Open the right **Compare** tab.

5   Check the boxes to the right of the doses you wish to activate. Up to five doses may be activated at once (including the primary dose).

6   Use the Custom and Computed tabs to switch between the computed and custom metrics defined for the scorecard.

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Interactive Viewer Toolset

IN THIS ARTICLE

The interactive viewer includes familiar tools including zoom, pan, and slice navigation. This article describes the tools available in the interactive viewer.

- Toolbar

    - Slice Navigation

    - Window/Level

    - Zoom

    - Zoom to Selection

    - Zoom to Fit

    - Pan

    - Probe

- Toggling Dose Levels

- Toggling Structures

- Using the Right Click Menu

NOTE: ProKnow automatically saves the configured slice, window/level, zoom, pan, dose, and active dose levels and structure visibility settings for each patient if the current user has Write Patients permissions within the current workspace. If the current user does not have Write Patients permissions, they can still modify the visibility settings, but any changes will not be saved.

Toolbar

Slice Navigation

There are a few ways to choose the current slice.

1. With any tool selected, place your cursor so that it is on one of the three patient views. Use your mouse's scroll wheel to scroll through slices on the axial, coronal, and sagittal views.

2. With any tool selected, place your cursor so that it is on one of the three patient views. Use the arrow keys on your keyboard to change the axial slice position.

3. Choose the **Slice Navigation** tool represented by the crosshairs icon in the interactive viewer toolbar (or the **Navigation** command in the interactive viewer right-click menu). Point and click in any one of the three views to navigate to a particular slice position in all three views.

Window/Level

There are a couple ways to adjust your window/level settings.

1. With any tool selected, open the window/level dropdown next to the brightness icon in the interactive viewer toolbar. Use the sliders or number fields to adjust the window width and level values.

2. Choose the **Window/Level** tool represented by the brightness icon in the interactive viewer toolbar (or the **Window/Level** command in the interactive viewer right-click menu). Click and drag up and down on the image set to adjust the window width. Click and drag left and right on the image set to adjust the window level.

Zoom

Choose the **Zoom** tool represented by the magnifying glass icon in the interactive viewer toolbar (or the **Zoom** command in the interactive viewer right-click menu). Click the point of focus (i.e., where you want to "zoom in to" or "zoom out from") and, while holding down the mouse button, drag the mouse to the top right to zoom in to the indicated focus point or to the bottom left to zoom out from the indicated focus point.

Zoom to Selection

Choose the **Zoom to Selection** tool represented by the selection group icon in the interactive viewer toolbar (or the **Zoom to Selection** command in the interactive viewer right-click menu). Using the mouse, click and drag to draw a selection window in any of the three viewports (axial, sagittal, or coronal). Once satisfied, release the mouse button and the viewport will center and zoom the window to the indicated selection. Please note that the zoom to selection tool only allows you to zoom in to a specified area, there is no way to zoom out using this tool (it is common to use the zoom to selection in conjunction with zoom to fit).

Zoom to Fit

Choose the **Zoom to Fit** command represented by the four arrows icon in the interactive viewer toolbar (or the **Zoom to Fit** command in the interactive viewer right-click menu). The zoom to fit command automatically resizes the indicated viewport to be centered and properly zoomed based on the primary subject (i.e., image set, structure set, plan, or dose). When clicked from the interactive viewer toolbar, the primary subject is centered and fit inside the axial viewport; when clicked from the right-click menu, it is centered and fit inside the viewport where the right-click menu was opened.

Pan

Choose the **Pan** tool represented by the hand icon in the interactive viewer toolbar (or the **Pan** command in the interactive viewer right-click menu). Click and drag in any direction to position the subject in the desired position.

Probe

Choose the **Probe** tool represented by the line icon in the interactive viewer toolbar (or the **Probe** command in the interactive viewer right-click menu). The axial view will slide up to make room for the dose and image profile. Click and drag to create a line along the path you wish to probe. The dose and image profile graph will update as you draw the line.

Measuring Distance

In addition to providing you with dose and image profiles along a line, you can also use the probe tool to measure the distance between two points in the interactive viewer. Simply create a line between two points. The highest value along the x-axis is the distance in millimeters between the two points.

Toggling Dose Levels

There are two ways to toggle dose levels.

1. With an active and visible dose object, dose levels will be displayed in the upper left corner of the interactive viewer. To toggle the levels individually, click on the colored block representing the dose level you wish to toggle on or off.

2. With an active and visible dose object and the Dose tab selected, toggle individual dose levels by clicking on the eyeball icon for the level you wish to toggle. Toggle all dose levels at once by clicking the eyeball icon in the sidebar header.

For information on how to set dose levels, please visit our complete user guide on the Patient - Dose tab.

Toggling Structures

With an active and visible structure set and the Structure tab selected, toggle individual structures by clicking on the eyeball icon for the structure you wish to toggle. Toggle all structures at once by clicking on the eyeball icon in the sidebar header.

For information about structure sets, structures, and structure set versions, please visit our complete user guide on the Patient - Structures tab.

Using the Right Click Menu

The right-click menu provides quick access to the following tools: Slice Navigation, Window/Level, Zoom, Zoom to Selection, Zoom to Fit, and Pan from any interactive viewer. To open the right-click menu, position your cursor over the interactive viewer and right click your mouse. Select the menu option you wish to enable, or click outside the menu to close.

Keyboard Shortcuts

> ## IN THIS ARTICLE
>
> - Basic Viewer Controls
>
> - Contouring Controls
>
> - Registration Controls
>
> - Spyglass Controls

Basic Viewer Controls

Next Slice: `⇑` , `⇨` , `W` , `D`

Previous Slice: `⇓` , `⇦` , `A` , `S`

Advance 5 Slices: `Page Up`

Back 5 Slices: `Page Down`

Navigation: `1`

Window/Level: `2`

Pan: `3`

Zoom: `4`

Cycle through controls: `C`

Explore Mode: `Ctrl` , `Space`

Close Context Menu: `Esc`

Contouring Controls

Draw: `5`

Cancel Drawing (Draw Mode Only): `Esc`

Paint: `6`

Increase Brush Diameter (Paint Mode Only): `E`

Decrease Brush Diameter (Paint Mode Only): `Q`

Cycle Through Controls: `C`

Toggle Additive/Subtractive Modes (Draw and Paint Mode): `Shift` , `Alt`

Registration Controls

Translation: `T` `F` `G` `H`

Rotate Counter-Clockwise: `R`

Rotate Clockwise: `Y`

Finer Adjustments: Hold `Shift`

Spyglass Controls

Decrease Spyglass Diameter: `V`

Increase Spyglass Diameter: `B`

Temporarily Toggle Spyglass: Hold `N`

Editing Structures

IN THIS ARTICLE

Use this article to learn how to edit the patient structure set.

- Editing a Structure Set

- Running Auto-Segmentation on an Existing Structure Set

- Downloading Structure Templates

- Importing Structure Templates

- Adding a Structure

- Editing a Structure

- Cloning a Structure

- Create a New Structure as Uniform Margin

- Deleting a Structure

- Updating Contours Using the Contouring Tools

  - Draw

  - Paint

  - Interpolation

  - Copying Contours

  - Clearing Contours

- Managing Drafts

Note: You must have the *Contour Patients* permission on the patient to edit structures for that patient.

Editing a Structure Set

1   With a patient selected, choose the Structures tab.

2   In the toolbar above the interactive viewer, press the **Edit Structure Set** button.

See below for further instructions on how to add, edit, and delete structures.

Running Auto-Segmentation on an Existing Structure Set

Note: You must have the *Create Patient Tasks* permission on the patient to run auto-segmentation on an existing structure set in that patient. You must also have an *Auto-Segmentation* license to update a structure set using auto-segmentation.

1   With a patient selected, choose the **Structures** tab.

2   In the toolbar above the interactive viewer, press the **Run Auto Segmentation** button.

3   Select the **Algorithm** from the list of algorithms configured for the workspace.

4   Optional: Select a structure set **Template**. When processing the auto-segmentation result, the system will apply a structure set template by comparing the structures in the result to the list of structures defined in the template. The system will initialize an empty structure for each structure defined in the template that does not exist in the auto-segmentation result, using the type and color specified in the template.

5   Place a check mark next to the algorithm-defined structures that should be included in the result structure set.

6   Remove a check mark next to the algorithm-defined structures that should not be included in the result structure set.

7   Enter the **Desired Structure Name** for each structure. Use the undo button to revert the name back to the name defined by the algorithm.

8   Choose the **Color** for each structure. Use the undo button to revert the color back to the color defined by the algorithm.

9   Press **Run** to invoke the auto-segmentation algorithm.

10   When the task is complete, the list of structures on the left will refresh with the auto-segmented structures.

Downloading Structure Templates

While editing a structure set, press the Export Structure Template button (denoted by a download icon) located in the toolbar at the top of the left sidebar. This will produce a CSV file, containing columns for the structure name, the structure type, and the RGB components of the structure color. Exported structure templates can then be imported (with modification if desired) using the procedure below to facilitate the standardization of structure names, types, and colors.

Importing Structure Templates

1   With the Structures tab activated, press the **Edit Structure Set** button located on the right side of the contouring toolbar.

2   Press the **Import Structures** button at the top of the left sidebar.

3   Choose **Import Structures from Structure Set Template**, **Import Structures from Existing Structure Set**, or **Import Structures from File**.

4   If you select **Import Structures from Existing Structure Sets** (this will be the default option):

   1   Choose the **Structure Set** you wish to import.

   2   Select how duplicate structures should be handled by choosing one of the following options described below.

      - 3   **Keep both structures.** Conflicting structures will be resolved by checking for the presence of structure data (contours, lines, and points). If one structure does not contain structure data, it will be ignored in favor of the other structure. Otherwise, both structures will be kept, and duplicates will be resolved by adding the name of the structure set or a numeric identifier in parenthesis as a suffix.

      - 4   **Keep current structures** (ignore imported). Conflicting structures will be resolved by retaining the structure from the current structure set and ignoring the structure from the structure set selected for import.

      - 5   **Keep imported structures** (overwrite current). Conflicting structures will be resolved by overwriting the structure from the current structure set with the structure from the structure set selected for import.

5   If you select **Import Structures from Structure Set Template**:

   1   Choose a **Template** you wish to import.

   2   Select how existing structures with the same case-sensitive name should be handled. Choose either **Leave existing structure color and type unchanged** or **Update structure color and type to match template**.

6   If you select **Import Structures from File**:

   1   Press the **Select File** button to browse for the CSV file that contains structure template information from your computer.

   2   Select how existing structures with the same case-sensitive name should be handled. Choose either **Leave existing structure color and type unchanged** or **Update structure color and type to match template**.

7   Press the **Import** button.

Adding a Structure

1   While editing a structure set, press the create structure button (denoted by the plus symbol) located in the left sidebar.

2   Choose a **Name**, **Type**, **Description**, and **Color** for the structure. Structure names must be 80 characters or less. Descriptions must be less than 1024 characters.

3   Choose a creation **Method**. The *Manually Contoured* method creates an empty structure with no contours. The other methods allow you to clone existing structures, perform boolean operations on existing structures, and apply uniform margins to existing structures.

4   Press the **Create** button to create the structure.

Editing a Structure

1   While editing a structure set, choose the structure you wish to edit by clicking on it.

2   In the row of tools that appears below the selected structure, select the edit button denoted by the pencil icon.

3   Set the **Name**, **Type**, **Description**, and **Color** for the structure.

4   Press the **Save** button to save your changes.

Cloning a Structure

1   While editing a structure set, choose the structure you wish to clone by clicking on it.

2   In the row of tools that appears below the selected structure, select the clone button denoted by the clone icon. This will open the Create Structure dialog.

3   Set the **Name** and **Color** for the structure (the **Type**, **Method**, and **Structure to Clone** will automatically be populated based on the selected structure).

4   Press the **Create** button to create the structure.

Create a New Structure as Uniform Margin

1   While editing a structure set, choose the structure you wish to use as the basis for the new, uniformly margined structure by clicking on it.

2   In the row of tools that appears below the selected structure, select the "Create New Structure as Uniform Margin" button denoted by the expansion icon. This will open the Create Structure dialog.

3   Set the **Name**, **Color**, and **Uniform Margin** amount for the structure (the **Type**, **Method**, and **Structure to Clone and Add Margin** will automatically be populated based on the selected structure).

4   Press the **Create** button to create the structure.

Deleting a Structure

1   While editing a structure set, choose the structure that you wish to delete by clicking on it.

2   Confirm that you wish to delete the structure by pressing the **Remove** button.

Updating Contours Using the Contouring Tools

While editing a structure set, click on a structure to select it. Then use the tools described below to edit the contours for the selected structure.

Draw

Click on the draw tool to activate it. With the draw tool activated, you can contour a structure in a point-and-click fashion or by clicking and dragging to draw a continuous line. To add to an existing contour, start from inside the contour and draw outwards. To remove from an existing contour, start from outside the contour and draw inwards. Toggle the default add/edit mode by holding down the `Shift` or `Alt` key. You must close each draw operation at the same point you began.

Smooth Lines

When using the draw mode, ProKnow automatically smooths your contour lines as your draw. If you would like to turn this feature off, press the dropdown arrow next to the draw tool, and toggle the **Smooth Lines** option off.

Paint

Click on the paint tool to activate it. With the paint tool activated, you can contour a structure by clicking and dragging the paintbrush across the image. Toggle the default add/edit mode by holding down the `Shift` or `Alt` key.

Paintbrush Options

To access the available paintbrush options, press the dropdown arrow next to the paint tool. Adjust the brush diameter using the input field or slider. Click on the **Smooth Brush** option to toggle the option on and off.

Interpolation

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To interpolate between slices, click on the **Interpolate** button. Once clicked, ProKnow DS will attempt to generate contours for the current structure on all empty slices between slices containing contours. There are several situations in which warnings will be reported after the interpolation has completed. Please note that when these warnings are displayed, only the indicated range will have not been interpolated. Any other empty slices able to be interpolated will be completed. The most common warnings include:

- **Unable to interpolate between the slice at X.XX mm and the slice at Y.YY mm as the slices each contain multiple contours and the contour orientations are not consistent (most commonly caused by complex bifurcation scenarios).** This is an uncommon case that can occur when attempting to interpolate between slices that have the same number of contours, but the orientations of the contours are not consistent from one slice to the other. For example, in the following images, you can see two slices, Slice A, which contains two contours: a circle and a hole; and Slice B, which also contains two contours: two circles. Please note that in both of these images, the "interior" portion of the contours have been slightly filled to aid in the visual distinction.

    In this case, the contour orientations between the two slices (1 CCW and 1 CW in Slice A and 2 CCW in Slice B) do not match, and indeed, there is no obvious solution for how to interpolate between these two slices.

- **Unable to interpolate between the slice at X.XX mm and the slice at Y.YY mm as no valid combination of overlapping contours could be found.** This situation can occur when interpolating between slices that contain different numbers of contours. When there is a different number of contours from one slice to another, for example, between Slice A and Slice B below, ProKnow DS attempts to determine the most suitable pairwise combination of contours by looking at the overlapping area between all contours from one slice to another. ProKnow DS interpolates, in order of greatest overlapping area, from each contour on the first slice to the corresponding contour on the second slice. For example, when interpolating between Slice A and Slice B, ProKnow DS will interpolate the larger circle from Slice A to the single circle on Slice B since, if superimposed onto the same slice, their areas would overlap.

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However, when interpolating from Slice B to Slice C, the circles share no area in common and thus, ProKnow DS will report a warning when attempting to interpolate between these two slices.
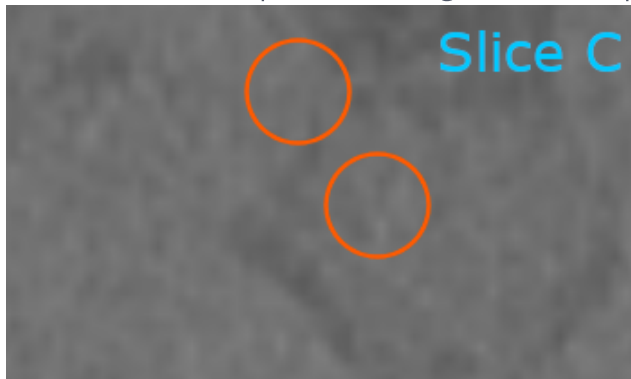
In general, it is always best to interpolate between highly similar slices, especially in cases where there are multiple contours present on each slice.

In addition to the warnings listed above, there are also several situations which can cause critical failures during interpolation. If you receive a message indicating that the "Interpolation Failed," then ProKnow DS encountered an error that prevented interpolation from completing. There are two cases where you may encounter errors during interpolation:

- **Slice at position X.XX mm contains contour data but does not exist in the slice position list.** This can occur in rare cases where the source structure set was contoured on image slices that have not been uploaded to ProKnow DS. In other words, contour information exists outside of the visible range of the image set slices. In this case, double check that all image slices have been uploaded to ProKnow DS and try again.

- **Interpolation failed because ProKnow detected a mismatch in contour orientations between two slices.** This is a rare case that can occur if there is an issue with the source contour data. Generally, it

indicates that the source contour data is malformed or otherwise corrupt. Please contact ProKnow support and they can help investigate the issue.

Copying Contours

To copy from the inferior slice, press the **Copy from Inferior Slice** button. To copy from the superior slice, press the **Copy from Superior Slice** button.

Clearing Contours

To clear the current slice, press the **Clear Current Slice** button. To clear several slices at once, press the **Clear Slices...** button and choose from one of the available options ("Clear all," "Clear every other slice," and "Clear specific slices").

Managing Drafts

When you press the **Edit Structure Set** button, a structure set draft is created for you if one does not exist already. While editing a draft, the structure set remains locked from other edits, meaning that other users cannot edit the same structure set. Your contours are saved in the background as you edit.

When you are finished contouring, you have three options. If you would like to delete the draft completely, press the **Delete Draft** button. This operation is permanent and will discard all changes to the structure set. To save the draft without making it the current version of the structure set, press the **Save as Draft & Close** button. To save changes and make the draft the current version of the structure set, press the **Commit**. When you commit a structure set, you'll be prompted to give it an optional label and commit message.

Structure Set Locks and Inactivity Timeouts

Only one user can contour at a time. When a user begins to edit a structure set, the structure set becomes locked to other users. Other users may view the current or previous versions of the structure set, but they will not be able to edit the current draft until the user who is editing is finished. If there are no changes made to the structure set for 10 minutes, the structure set will be unlocked, and the user who is editing the structure set will be presented with a message giving them the option to either close the draft or continue contouring.

A structure set will also be locked to all users while auto-segmentation is running on the structure set. Other users will not be able to edit or invoke Auto Segmentation on the structure set until the task is finished.

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Dose Levels

> ## IN THIS ARTICLE
>
> - Toggling Dose Levels

Toggling Dose Levels

When a dose is active, dose levels will be displayed in the interactive viewer in the upper left corner. Toggle individual dose levels by clicking on the colored dose levels.

To learn how to configure custom dose levels, please visit the Patient - Dose article.

> **NOTE**: ProKnow automatically saves the configured dose visibility settings and levels for each patient if the current user has the *Update Patients* permission on the patient. If the current user does not have the *Update Patients* permission, they can still modify the dose visibility settings and levels, but any changes will not be saved.

Using the Image Registration Review Tools

When creating, editing, copying, or reviewing an SRO, additional review tools will be available, along with several useful keyboard shortcuts.

Spyglass

1. Press the Spyglass button to switch to the Spyglass mode.

2. Use the Spyglass dropdown or the `V` and `B` keys to adjust the diameter of the spyglass.

3. Use the keyboard shortcut `N` to temporarily toggle the spyglass tool.

4. Move your mouse over the secondary image set to hide the pixels of the secondary image set within the spyglass region.

Image Pattern

1. Open the Images sidebar.

2. Press the Image Pattern button to switch to Image Pattern mode.

3. Use the Image Pattern dropdown to chose an Image Pattern Style: Checkerboard, Vertical Stripes, or Horizontal Stripes.

4. Use the Image Pattern dropdown to chose an Image Pattern Count: 2, 4, 8, 16, or 32

5. Optionally, press the Image Pattern Move button from the main toolbar, and click and drag the pattern to adjust its position.

Using the Image Registration Translate & Rotate Tools

When creating, editing (only Full Editing Mode), or copying an SRO, the Translate & Rotate tools will become available, along with several useful keyboard shortcuts. Press the Translate & Rotate button to toggle the Translate & Rotate tools. Use the Translate & Rotate dropdown to use the following controls:

- **Mode**: Selecting *Translation & Rotation* will enable both translations and rotations. Selecting *Translation Only* will disable rotations.

- **Allow Arbitrary Center of Rotation**: Leave this checked if you wish to be able to move the center of rotation (see instructions below). Uncheck this box is you wish to disable this feature.

- **Reset Center of Rotation**: Press this button to reset the center of rotation to the center of the secondary image set.

A yellow guide will appear in the in all three views when the Translate & Rotate tools are active. The guide consists of three distinct regions:

- **Inside Inner Circle** (only available if Allow Arbitrary Center of Rotation is checked): Press and hold your mouse within this region to drag the center of rotation to another position.

- **Outside Inner Circle, Inside Outer Circle**: Press and hold the mouse within this region to translate the secondary image set.

- **Outside Outer Circle**: Press and hold the mouse within this region to rotate the image set about the center of rotation (the center of the crosshairs).

For information on using the Review tools while editing an image registration, please see Using the Image Registration Review Tools.

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How do I build scoring functions into scorecard objectives?

ProKnow DS allows you to build scoring functions into the computed metric objectives for patient scorecards. If there is at least one scoring function defined within a scorecard, the total score and maximum possible points across all scoring functions within the scorecard will be displayed in the toolbar at the top.
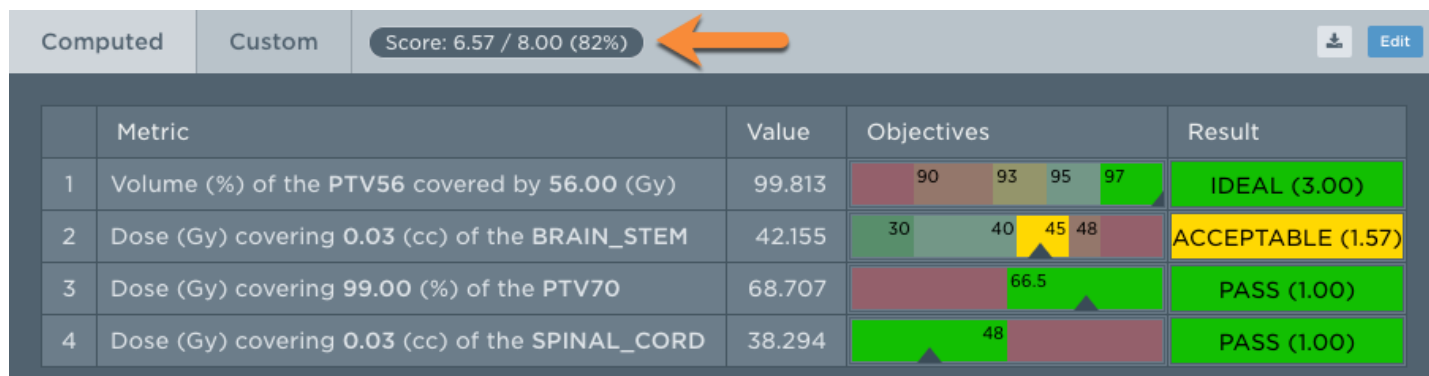
There are two different configurations for objectives that support scoring functions. The first is the Pass/Fail configuration, and the second the Performance Bin configuration. For each configuration, this article will explain how to define a valid scoring configuration and how the scores will be computed.

Pass/Fail

A Pass/Fail scoring configuration consists of two objectives. One objective must be labeled `PASS [N1]` (case insensitive), where N1 is any number, and the other must be labeled `FAIL` (case insensitive) or `FAIL [N2]` (case insensitive), where N2 is any number.

The resulting score function will be a step function with N1 points assigned to any metric value that is "better" than the passing threshold and N2 points (or 0 if N2 is omitted) to any metric value is "worse" than the passing threshold. Please note that in this case "better" and "worse" are based on the direction of the pass and fail objective levels. In the rare case that a metric value is exactly the threshold score, the inclusion marker will be used to determine the assigned score.

Example 1

In this Pass/Fail example, any value less than 66.5 will be assigned the default score of 0, whereas any value greater than or equal to 66.5 will be assigned the score of 1.
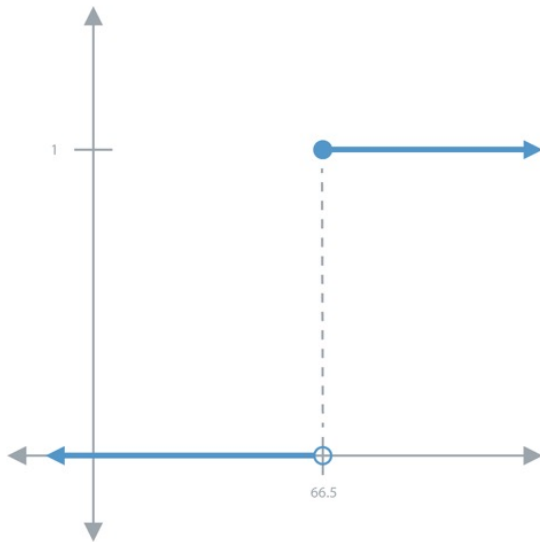
Example 2

In this Pass/Fail example, any value greater than 48 will be assigned the default score of 0, whereas any value less than or equal to 48 will be assigned the score of 1.
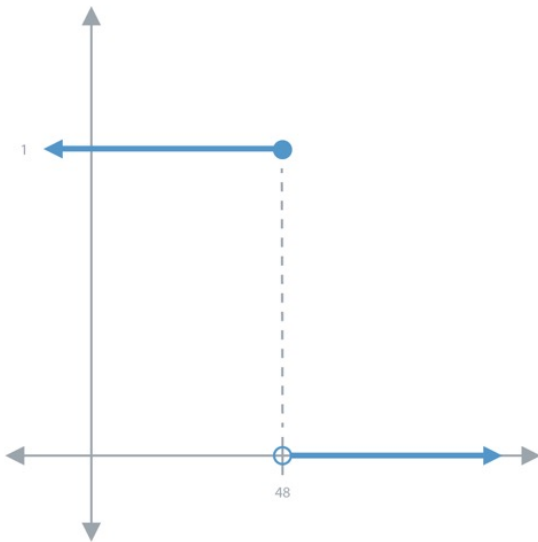
Performance Bin

A Performance Bin configuration consists of at least two objectives and up to five objectives. The objective labels must begin with one of the following (case insensitive): UNACCEPTABLE, MARGINAL, ACCEPTABLE, GOOD, IDEAL. All levels other than UNACCEPTABLE must specify a score in brackets next to the label like this: `IDEAL [3]`. UNACCEPTABLE may also include a score in brackets but will default to 0 if not provided. The points provided in brackets must be in either non-decreasing or non-increasing order. Labels must also be in logical order (the order listed above, forward or backward). Some examples of valid and invalid objective orderings are listed below:

- Valid: UNACCEPTABLE, ACCEPTABLE, IDEAL

- Valid: IDEAL, GOOD, ACCEPTABLE, MARGINAL, UNACCEPTABLE

- Invalid: IDEAL, ACCEPTABLE, GOOD, MARGINAL, UNACCEPTABLE

- Invalid: UNACCEPTABLE, IDEAL, MARGINAL

To determine the resulting score function, we start from the level that represents the "worst" outcome (usually UNACCEPTABLE). Any metric value located in this range is assigned the score associated with this level. Then as we move toward better outcomes, the score will be linearly interpolated between the 2 nearest levels. If the metric value is better than the highest threshold level, the maximum score defined by the highest objective will be assigned.

Example 1

In this performance bin example, any value less than 90 will be assigned a score of -10. A score of 0 will be assigned for a metric value equal to 90. As the metric value increases, the score will linearly increase from 0 to 1 between 90 and 93, from 1 to 2 between 93 and 95, and from 2 to 3 between 95 and 97. Any metric value greater than 97 will be assigned a score of 3.
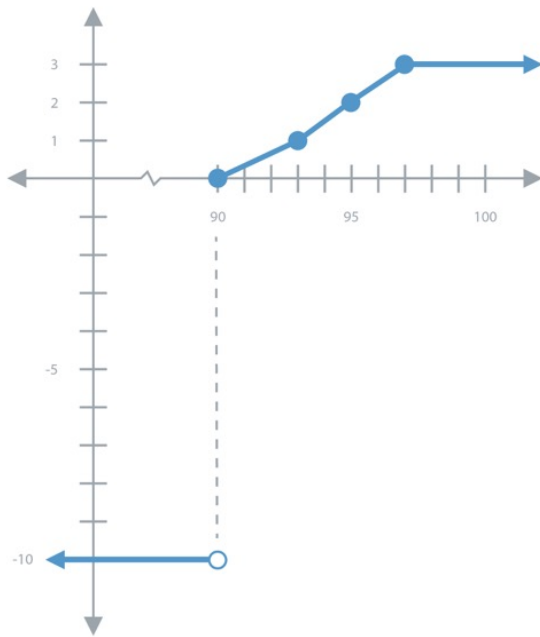
Example 2

In this performance bin example, any value greater than 48 will be assigned a score of 0 (the default for UNACCEPTABLE). A score of 0 will also be assigned for a metric value equal to 48. As the metric value decreases, the score will linearly increase from 0 to 1 between 48 and 45, from 1 to 2 between 45 and 40, and from 2 to 3 between 40 and 30. Any metric value less than 30 will be assigned a score of 3.
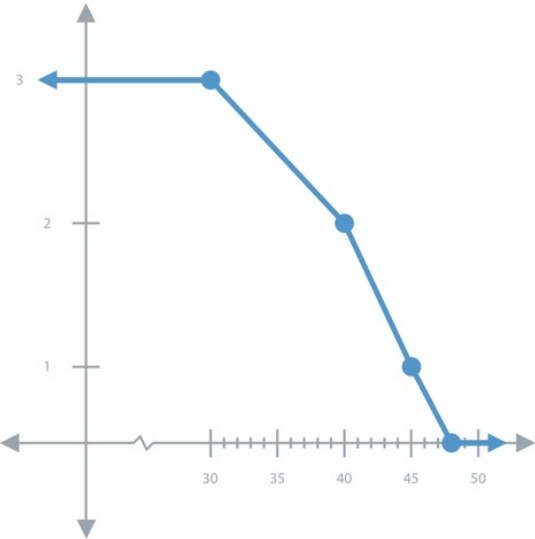
What does it mean when there is an annotation next to the patient orientation icon?

Depending on the current value of the *Patient Orientation* user setting, it is possible that in some cases an annotation can appear next to the patient orientation icon in the main axial view, as shown in the following screenshot:
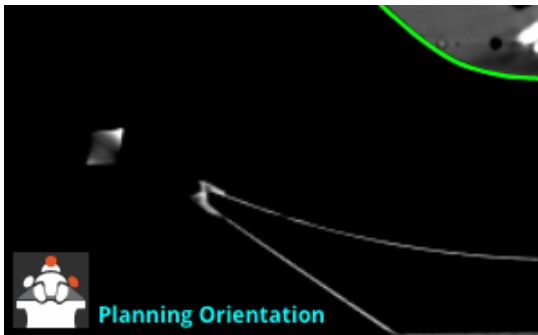
In this case the patient orientation icon is annotated with "Planning Orientation" to indicate that the current orientation is derived from the currently active treatment plan and that the plan's orientation differs from the orientation of its parent CT images. In general this message is presented to make you aware that the current orientation is different from the derived orientation from the primary image set or active plan. Specifically, the various annotations that can appear (and the situations under which they can occur) are enumerated below:

- **Planning Orientation.** This annotation can only appear if using one of the plan-based settings for *Patient Orientation* (i.e., "Planning Orientation (or Image Orientation if not available)" or "Planning Orientation (or Head First Image Orientation if not available)"). If the annotation appears, it indicates that one of two situations have occurred, either (1) the currently active plan has a different patient orientation than its parent images or (2) the parent images have been reoriented to be head first and the annotation is shown to indicate that the planning orientation is currently being utilized.

- **Image Orientation.** This annotation can only appear if using the "Image Orientation" setting for *Patient Orientation*. If the annotation appears, it indicates that the current patient orientation is being determined from the active image set and that this orientation differs from what is specified in the active plan (i.e., the plan orientation is being overridden by the image set orientation).

- **Head First Image Orientation.** This annotation can appear if using one of the the head first settings for *Patient Orientation* (i.e., "Planning Orientation (or Head First Image Orientation if not available)" or "Head First Image Orientation"). If the annotation appears, it indicates that the derived patient orientation from the active image set is being overridden by its head first equivalent.

It looks like my structure set edits have been lost! How can I recover my work?

As you're editing the structure set, changes are automatically saved in background, so it is unlikely you lost your changes unless you experienced an internet outage or discarded your draft. When you first visit a patient, the current version of the structure set is displayed. To view the current draft, activate the Structures tab and press the **Edit Structure Set** button. The structure set draft will be loaded into the patient viewer.

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How do I fix patient records whose objects were not associated correctly?

During anonymization, links between certain patient objects can be lost, preventing ProKnow from knowing how to associate the objects automatically. You can manually associate patient entities by visiting the patient Browse tab, clicking on the **Edit** button, and dragging and dropping the objects into place. For for information, please visit our step-by-step instructions for updating the patient object hierarchy.

If you need to do this for many patients, check out our instructions for establishing entity associations.

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Managing Collections

IN THIS ARTICLE

Collections in ProKnow help you analyze key metrics across your organization. This article explains how to find your collections and create new ones.

- Viewing Collections

- Creating Collections

**Note**: You must have an *Analytics* license to access collections.

What's the difference between an organization collection and a workspace collection?

This article talks about both organization and workspace collections. Each of these collection types allows you to analyze metrics across a group of patients. Workspace collections are limited in that you can only add patients that belong to a particular workspace. Organization collections, on the other hand, allow you to analyze cohorts of patients organization-wide.

Read more about the differences and when to use each type in our Organization Versus Workspace Collections guide.

Viewing Collections

To view the collections in your organization, select the **Collections** module from the main navigation on the left. Use the workspace dropdown at the top of the page to switch workspaces. Choose a workspace to view collections with representations in that workspace. Choose *All Workspaces* to view organization collections. If your organization has many workspaces, search for the one you're looking for by filtering the workspaces by name.
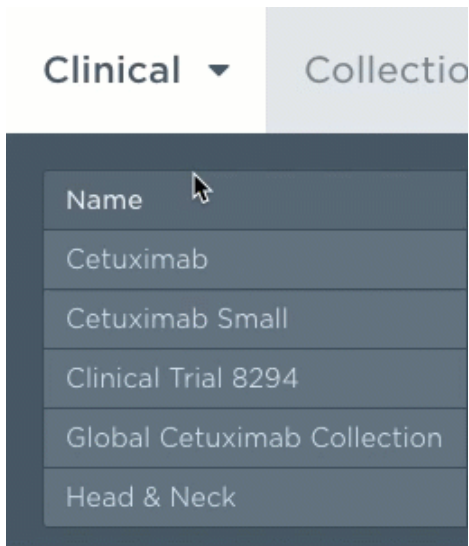
A similar filter mechanism is available to filter the list of collection. You can filter the patients by typing the collection name or part of its description.
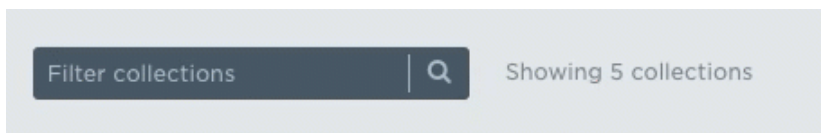
Viewing Collection Details

Double-click on a collection row in the table to view analysis information across the population of patients that have been added to the collection.

Creating Collections

1   To create a workspace collection, select a workspace from the workspace selector. To create an organization collection, select *All Workspaces*.

2   Press the create collection button aligned to the right of the large toolbar at the top of the page. If you are creating a workspace collection it will say **Create Workspace Collection**. If you are creating an organization collection, it will say **Create Organization Collection**.

3   Enter a unique collection **Name** and a **Description**. The name must be unique within each workspace (or across all organization collections if creating an organization collection). If you are creating an organization collection, you may also choose to initialize the organization collection with a set of workspaces. This will allow you to start adding patients from the selected workspaces immediately after creating the collection.

4   Press the **Create** button to create the collection.

Note: You must have the *Create Collections* permission on the organization to create organization collections. You must have the *Create Collections* permission on the workspace to create workspace collections for that workspace.

Managing the Current Collection

IN THIS ARTICLE

- Editing a Collection

- Deleting a Collection

- Importing Patients from a CSV

Note: You must have an *Analytics* license to access collections.

Editing a Collection

1   With a collection opened, click on the Actions menu in the top right corner of the page and press **Edit Collection**.

> Note: The **Edit Collection** option is not available when viewing a workspace representation of an organization collection (or when the user does not have permission to edit the collection).

2   Modify field values as needed. The name must be unique within each workspace (or across all organization collections if editing an organization collection).

3   Press the **Save** button to save your changes.

Note: You must have the *Update Collections* permission on a collection to edit the collection.

Deleting a Collection

1   With a collection opened, click on the Actions menu in the top right corner of the page and press **Delete Collection**.

> Note: The **Delete Collection** option is not available when viewing a workspace representation of an organization collection (or when the user does not have permission to edit the collection).

2   Check the confirmation checkbox and enter the collection name to confirm that you wish to delete the collection. Press the Delete button to finalize the delete operation.

3   Press the **Save** button to save your changes.

> **Note**: You must have the *Delete Collections* permission on a collection to delete the collection.

Importing Patients from a CSV

1   With a collection opened, click on the Actions menu in the top right corner of the page and press **Add Patients from CSV**.

> Note: The **Add Patients from CSV** option is not available when viewing an organization collection across All Workspaces.

2   Choose a CSV file contain a list of patient IDs that you wish to add to the collection. Press **Next** to continue to the next step.

3   Use the select box to select the column from the spreadsheet that contains the Patient ID for each patient. Press **Next** to continue to the next step.

4   Press the **Import** button to initiate the import operation.

5   Once importing is complete, you will see a message reporting how many rows were imported. To view a detailed results report, click on the "Click here to download a results report" link which will download a CSV file containing detailed information on all patients imported (and any that may have failed to import). Press **Finish** to exit the wizard.

> **Note**: You must have the *Add Collection Patients* permission on a collection to add patients to that collection.

Organization Versus Workspace Collections

IN THIS ARTICLE

- What's the Difference?

- Creating an Organization Collection

- Creating a Workspace Collection

Note: You must have an *Analytics* license to access collections.

What's the Difference?

Collections allow you to organize patients into logical cohorts that share similar prescriptions, dosimetric goals, or other common characteristics. Collections let you build population scorecards and population DVHs to assess performance across many patient plans. These collections can be defined at the level of a single workspace, or they can span across several workspaces.

A collection that is defined at the level of a single workspace is called a **workspace collection**. Only patients belonging to a given workspace can be added to a workspace collection for that workspace. If you only have one organization or you only need to analyze population statistics across a single workspace, a workspace collection will be able to meet your needs.

Sometimes, however, you may wish to analyze population statistics across several workspaces. A collection defined at the organization level that can have representations in many workspaces is called an **organization collection**. An organization collection can be configured with as many workspaces as you wish, and any patient from one of those workspaces may be added to the collection.

Creating an Organization Collection

1. Select the **Collections** module from the main navigation on the left.

2. Select *All Workspaces* from the workspace selector.

3. Press the **Create Organization Collection** button, which is aligned to the right of the large toolbar at the top of the page.

4. Enter a unique collection **Name** and a **Description**. The name must be unique across all organization collections.

5. Press the **Create** button to create the collection.

Note: You must have the *Collections Write* permission at the organization level to create organization collections.

Creating a Workspace Collection

1. Select the **Collections** module from the main navigation on the left.

2. Select the workspace in which to define a collection using the workspace selector.

3. Press the **Create Workspace Collection** button, which is aligned to the right of the large toolbar at the top of the page.

4. Enter a unique collection **Name** and a **Description**. The name must be unique across the collections within the workspace.

5. Press the **Create** button to create the collection.

Note: You must have the *Collections Write* permission for a workspace to create workspace collections for that workspace.

Collection — Browse

IN THIS ARTICLE

- Accessing the Collection Browse Tab

- Managing Workspace Representations (Organization Collections Only)

- Exporting Patients from a Collection

- Removing Patients from a Collection

- Creating a New Collection from Selected Patients

- Adding Selected Patients to an Existing Collection

Note: You must have an *Analytics* license to access collections.

Accessing the Collection Browse Tab

When you access a collection, the Browse tab will be activated by default. The majority of the screen is devoted to a list of patients that belong to the collection. If you are viewing an organization collection with All Workspaces selected from the workspace selector, you will also see a sidebar on the left, which contains a list of the workspaces that have a representation of the collection. The list of patients on the right reflects the the patients belonging to the collection from the active workspace.

Managing Workspace Representations (Organization Collections Only)

1   With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2   Use the checkboxes aligned to the right of each row to select the workspaces that should have a representation of the current collection.
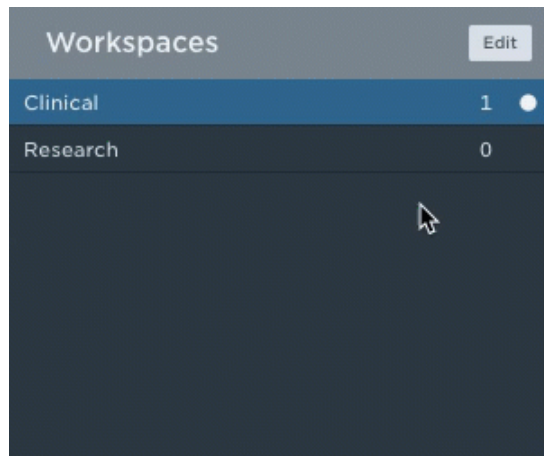
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3   Press the **Save** button.

4   Once you've read and understood the confirmation message, check the confirmation checkbox. If you are removing a workspace representation, you will be asked to type the name of the collection to confirm. Press the **Save** button to finish.

Note: You must have the *Update Collections* permission on a collection to manage to the workspace representations for the collection.

Exporting Patients from a Collection

1   With the Browse tab activated, select one or more patients from the patients table.

2   Press the **Export** button from the **Selected Patients** dropdown located in the toolbar above the table.

3   Press the **Export** button to begin the download.

Removing Patients from a Collection

1   With the Browse tab activated, select one or more patients from the patients table.

2   Press the **Remove** button from the **Selected Patients** dropdown located in the toolbar above the table.

3   Press the **Remove** button to confirm.

Note: You must have the *Remove Collection Patients* permission on a collection to remove patients from that collection.

Creating a New Collection from Selected Patients

1   With the Browse tab activated, select one or more patients from the patients table.

2   Press the **Create New Collection** button from the **Selected Patients** dropdown located in the toolbar above the table. Please note that this option is not available when viewing an organization collection across all workspaces.

3   Enter the information for the new collection, and press **Create** to create the collection.

Note: You must have the *Create Collections* permission on a workspace to create collections for that workspace.

Adding Selected Patients to an Existing Collection

1   With the Browse tab activated, select one or more patients from the patients table.

2   Press the **Add to Existing Collection** button from the **Selected Patients** dropdown located in the toolbar above the table. Please note that this option is not available when viewing an organization collection across all workspaces.

3   Choose a collection from the list, and press **Submit** to add the patients.

Note: You must have the *Add Collection Patients* permission on a collection to add patients to that collection.

Collection — Structures

IN THIS ARTICLE

- Accessing the Collection Structures Tab
- Selecting Structures
  - Renaming Structures
  - Merging Structures
- Structure Drill-down

Note: You must have an *Analytics* license to access collections.

Accessing the Collection Structures Tab

When you access a collection, click on the Structures tab to view a list of structures that are observed across all patients that belong to the collection. The majority of the screen is devoted to a filterable list of structures. Use the filter located in the small toolbar above the table to filter the list of structures. Each row specifies the structure name, the structure count (a count of the number of occurrences of the structure across the collection), and a status bar that reflects the proportion of patients in which the structure is defined and in which it is missing.

Selecting Structures

Structures may be selected in several ways:

- *Click* on the row to select only that row.
- *Click* on the checkbox in the first column to add the patient to the selection.
- *Ctrl + Click* on the row to add the structure to the selection.
- *Shift + Click* to add a range of structures to a selection.

Restrictions for Renaming and Merging Structures

1. A name conflict can occur if you try to rename a patient structure with a name that matches another structure in the same patient structure set. When ProKnow detects these errors, it will skip the renaming operation for the patient and report the error at the end.

2. Structure rename and merge operations will also be skipped if there is already a draft of the structure set in progress. When ProKnow detects these errors, it will skip the renaming operation for the patient and report the error at the end.

Note: You must have *Contour Patients* permission on a patient to rename or merge structures for that patient.

Renaming Structures

1   With one or more structures selected, press the **Rename** button aligned to the right of the toolbar above the structures table.

2   Enter the new structure name in the field provided, and press **Next**.

3   Press the **Rename** button to perform the renaming operation.

4   Once the operation completes, press the **Finish** button to close the wizard.

Merging Structures

1   With two or more structures selected, press the **Merge** button aligned to the right of the toolbar the structures table.

2   Select the name to use from the list of structure names provided, and press **Next**.

3   Press the **Merge** button to perform the merge operation.

4   Once the operation completes, press the **Finish** button to close the wizard.

Structure Drill-down

To display a list of patients that have a given structure, double-click on the row or the green segment in the status column. To display a list of patients that do not have a given structure, double-click on the orange segment in the status column. You will be navigated from the Structures tab to the Browse tab. When viewing a filtered set of patients on the Browse tab, use the buttons provided in the toolbar to invert or clear the filter.

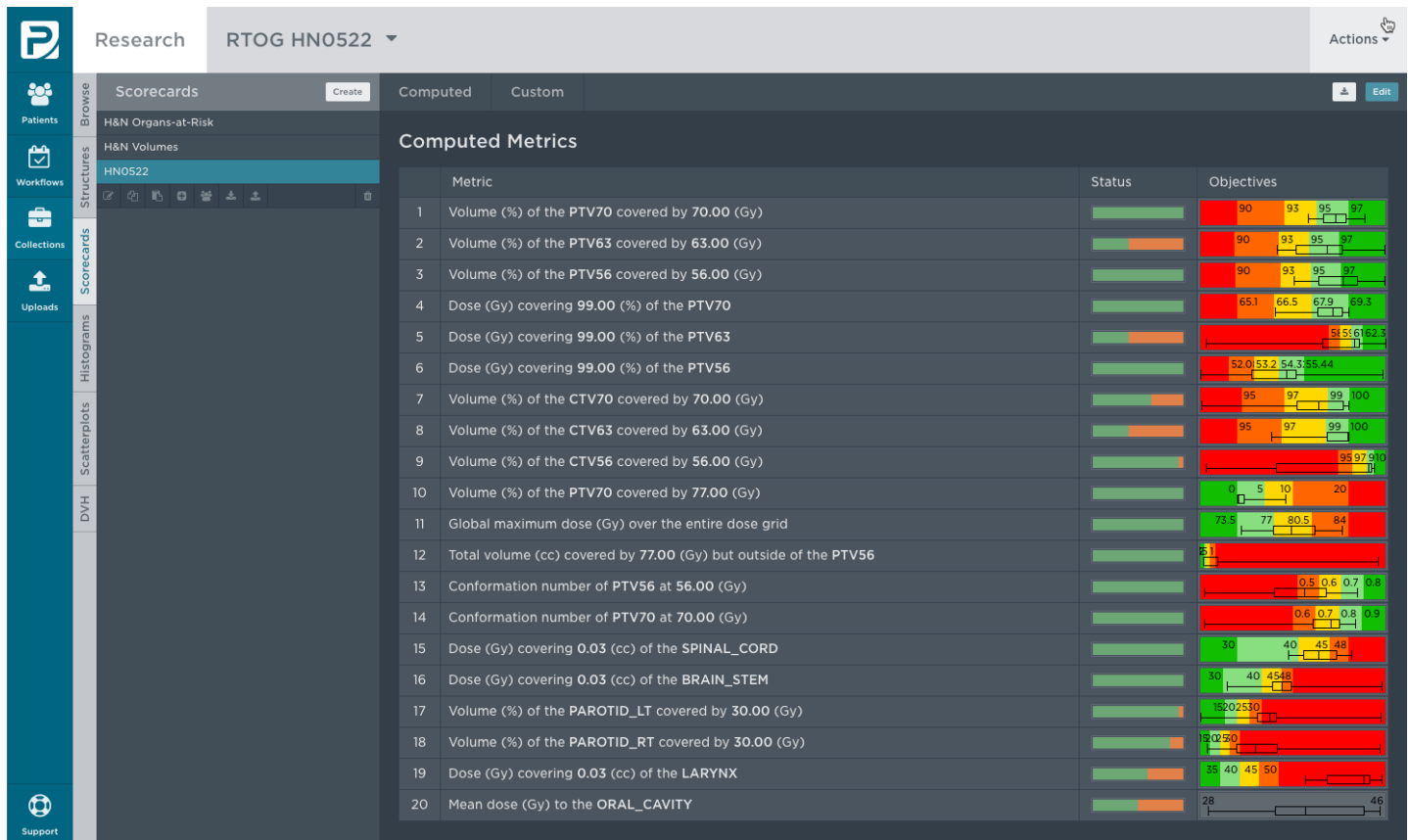## Collection — Scorecards

IN THIS ARTICLE

- Accessing Collection Scorecards
- Creating Collection Scorecards
- Renaming Collection Scorecards
- Defining a Scorecard Template
- Importing a Scorecard Template
- Adding the Scorecard to Collection Patients
- Editing Collection Scorecards
- Deleting Collection Scorecards

Note: You must have an *Analytics* license to access collections.

Accessing Collection Scorecards

When you access a collection, click on the **Scorecards** tab to view and manage the scorecards associated with the collection. The scorecards sidebar holds a list of scorecards that belong to the collection with a button to create a scorecard at the top. Clicking on one of the scorecards will select it, thereby making it the active scorecard.

With a scorecard selected, the main content area will update to display the details of the selected scorecard. Links in the toolbar will allow you to jump to the computed or custom metrics defined in the scorecard (if applicable). A button to edit the scorecard is available on the far right side of the toolbar.

Note: You must have *Read Collection Scorecards* permission on the collection to access scorecards for the collection.

Creating Collection Scorecards

1   Press the **Create** button located at the top of the sidebar.

2   Select a **Scorecard Template** from the list of the available templates, or choose *None* instead to define a scorecard from scratch. Enter a **Name** for your scorecard. You can use any characters you'd like, but the name must not contain more than 64 characters.

3   Press the **Create** button to create the scorecard. Your new scorecard should be selected.

Note: You must have *Create Collection Scorecards* permission on the collection to create scorecards for the collection.

Copying a Scorecard

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Another way to create a scorecard is to copy an existing scorecard. Just select a scorecard, and press the **Copy Scorecard** button in the small ribbon of tools below the selected scorecard in the sidebar.

Renaming Collection Scorecards

1   Choose the scorecard you wish you edit from the sidebar on the left.

2   Press the **Rename Scorecard** button in the small ribbon of tools below the selected scorecard in the sidebar.

3   Edit the **Name** in the field provided, and press **Rename** to save your changes.

Note: You must have *Update Collection Scorecards* permission on a collection to edit scorecards for the collection.

Defining a Scorecard Template

1   Choose the scorecard you wish to use to define a scorecard template.

2   Press the **Define Template from Scorecard** button from the small ribbon of tools below the selected scorecard in the sidebar.

3   Enter the **Name** in field provided. Next, select what will happen if a template already exists with the same name. It's best to choose "Leave the template unchanged." if you're not sure. Finally, press the **Save** button to define the template.

Note: You must have the *Create Scorecard Templates* permission on the organization to define a new scorecard template for the organization. You must have the *Create Scorecard Templates* permission on the workspace to define a new scorecard template for the workspace. You must have the *Update Scorecard Templates* permission on the organization to update an existing scorecard template for the organization. You must have the *Create Scorecard Templates* permission on the workspace to update an existing scorecard template for the workspace.

Importing a Scorecard Template

1   Choose the scorecard into which you wish to import a scorecard template.

2   Press the **Import Metrics from Template** button from the small ribbon of tools below the selected scorecard in the sidebar.

3   Select the **Scorecard Template** to import. Then select how duplicate metrics should be resolved, and press the **Import** button to import the metrics.

Note: You must have *Update Collection Scorecards* permission on a collection to edit scorecards for the collection.

Adding the Scorecard to Collection Patients

1   Choose the scorecard you wish to add to each of the collection's patients.

2   Press the **Add Scorecard to Patients** button from the small ribbon of tools below the selected scorecard in the sidebar.

3   Carefully read the instructions given in the wizard. On the first page, select what should happen if a patient in the collection contains a scorecard with the same name as the selected scorecard. Press the **Next** button.

4   Press the Add button to begin the operation.

5   Press Finish to exit the wizard.

Note: You must have the *Create Patient Scorecards* permission on a patient to create a scorecard for the patient. You must have the *Update Patient Scorecards* permission on a patient to update a scorecard for the patient.

Editing Collection Scorecards

1   Choose the scorecard you wish you edit from the sidebar on the left.

2   Press the **Edit** button.

3   Press the **Add computed metric...** button, and select one or more metrics from the categorized lists of available absolute dose metrics, relative dose metrics, relative dose metrics, plan metrics, and structure set metrics.

For more information about computed metrics, visit our Computed Metric Library.

4   Fill in the computed metric parameters parameters.

5   Press the **Add custom metric...** button, and select one or more metrics from the list of custom metrics defined in your ProKnow organization by a custom metric manager.

> To learn about how to create custom metrics, please visit the Defining Custom Metrics page.

6   Press the swap icon to exchange an absolute or relative metric for its variant. Note that this button will be disabled if the metric does not have a variant.

7   Press the copy icon to copy a metric to the row below.

8   Press the pencil icon to chose a different metric from the metric selection dialog.

9   Press the **Add...** or **Edit...** button in the Objectives column to add, edit, or remove objectives for a particular metric. Objectives are useful for defining performance bins for your data. In the following example, for instance, you might set up objectives for the volume PAROTID_LT where you define ranges as follows:

✓ VERY SMALL: less than 8 cc

✓ SMALL: 8 cc to 15 cc

✓ NORMAL: 15 cc to 29 cc

✓ LARGE: 29 cc to 36 cc

✓ VERY LARGE: greater than 36 cc

These ranges can be assigned a color and displayed end-to-end as follows.

Volume (cc) of the **PAROTID_LT**   8 15   29 36

Objectives are completely customizable, allowing you to configure ranges for organs-at-risk metrics and target metrics, too.

Volume (%) of the **PTV70** covered by **70.00** (Gy)   90   93   95   97

Dose (Gy) covering **0.03** (cc) of the **SPINAL_CORD**   30   40   45 48

Sometimes, a computed metric value or custom metric value may equal the threshold value for an objective level. You can customize which objective level should be assigned in those cases by clicking the bracket indicators to toggle the level. A bracket that opens upward indicates that the objective level above will be used. A bracket that opens downward indicates that the objective level below will be used. In addition to the direction of the bracket, the background color behind the bracket indicates the level to which the threshold value belongs.

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In the following example, you'll notice that the two objective sets vary only in the direction of the brackets (see orange outlined region). For the objectives on the left, a value of 0 would produce a result of IDEAL, a value of 10 would produce the result GOOD, a value of 20 would produce the result ACCEPTABLE, and a value of 30 would produce the result MARGINAL. Compare that with the objectives on the right, where a value of 0 would now produce the result GOOD (not IDEAL), a value of 10 would now produce the result ACCEPTABLE (not GOOD), a value of 20 would now produce the result MARGINAL (not ACCEPTABLE), and a value of 30 would now produce the result UNACCEPTABLE (not MARGINAL).
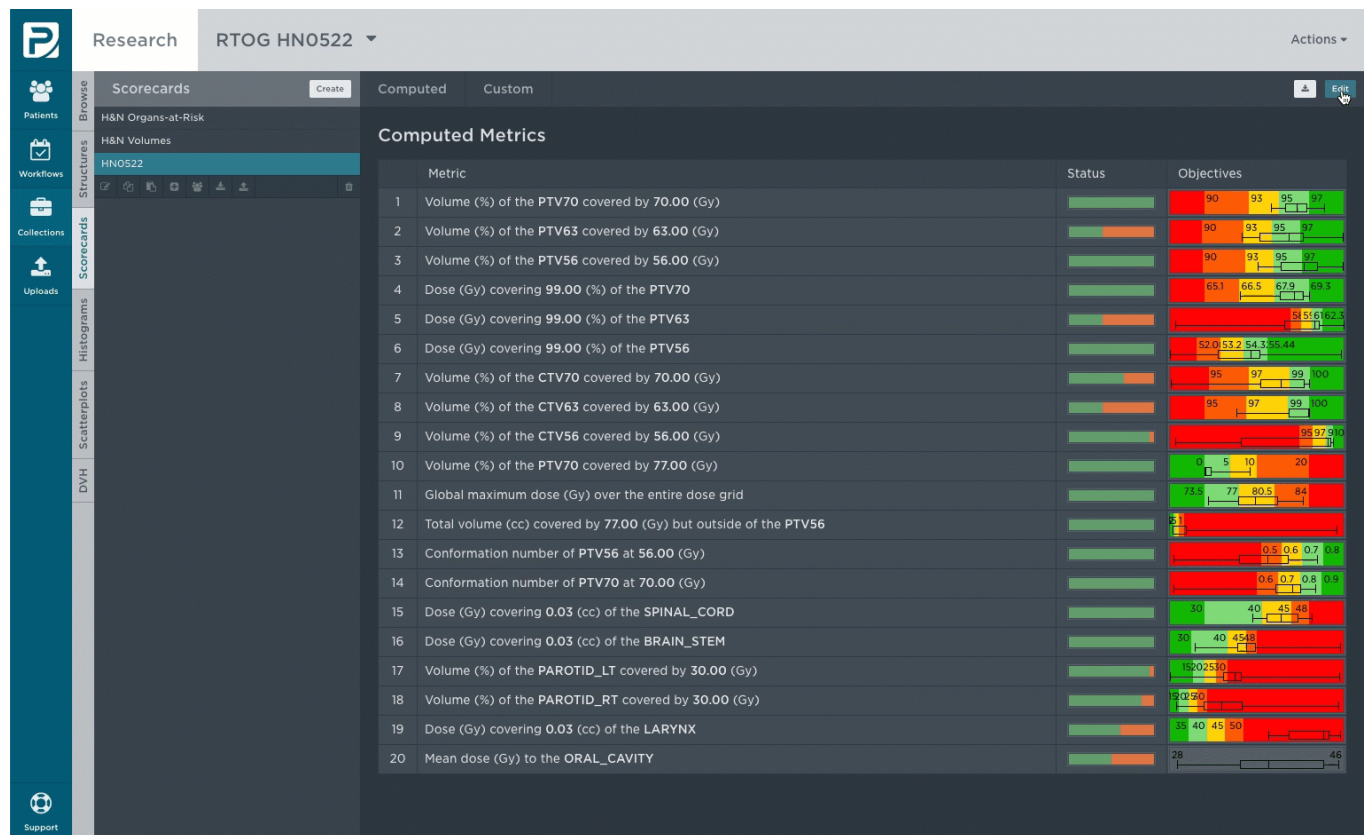

Saving Custom Objective Templates

The labels, colors, and bracket direction may be customized and saved as a custom objective template. To accomplish this, first make your edits to the objective levels. The dropdown field should appear with the value *Custom*. Press the edit button next to the dropdown field, enter a name for your template, and then press the **Save** button.

This template may be recalled and used when defining objectives for other metrics. To delete a custom objective template, select it from the dropdown, and press the delete button.

Note: You must have *Create Objective Templates* permission to create objective templates. You must have Delete Objective Templates permission to delete objective templates.

10 You may reorder metrics within a scorecard template by dragging and dropping rows to the desired location. Each row has an icon on the left containing three small horizontal lines. Using this icon as a handle, identify the item you wish to reorder, and drag and drop it into its new position:

11 Delete metrics from your scorecard by pressing the trash icon.

12 Press the **Save** button to save your changes.

> **Note**: You must have the *Update Collection Scorecards* permission on a collection to edit scorecards for the collection.

Deleting Collection Scorecards

1 Choose the scorecard you wish you delete from the sidebar on the left.

2 Press the **Delete Scorecard** button in the small ribbon of tools below the selected scorecard in the sidebar.

3 Press the **Delete** button to delete the scorecard.

> **Note**: You must have the *Delete Collection Scorecards* permission on a collection to delete scorecards for the collection.

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Collection — Histograms

IN THIS ARTICLE

- Accessing Histograms
    - Configuring Histogram Settings
    - Downloading Histogram Data
    - Data Drill-down and Patient Highlight

- Selected Patient Actions
    - Exporting Patients from a Collection
    - Removing Patients from a Collection
    - Creating a New Collection from Selected Patients
    - Adding Selected Patients to an Existing Collection

- Managing Bookmarks
    - Recalling Histogram Bookmarks
    - Creating Histogram Bookmarks
    - Renaming Histogram Bookmarks
    - Deleting Histogram Bookmarks

Note: You must have an *Analytics* license to access collections.

Accessing Histograms

When you access a collection, click on the Histograms tab to view histograms of collection metric data across the scorecards defined for the current collection.

Configuring Histogram Settings

1   Using the **Metric** field, select the metric you wish to view from the available list. If the metric that you are looking for does not exist, make sure that it has been defined in one of your scorecards.

2   (Optional) Set the **Scorecard Objectives** field to a scorecard defined in the collection to display scorecard objectives behind the histogram. If the selected metric does not exist on the scorecard or

if objectives have not been defined for that metric, this field will be ignored, and the histogram will not display any objectives.

3   (Optional) Set the **Group By** field to a custom text or choice metric (or Workspace for Organization Collections). The histogram view will update to display a series of histograms where the data is grouped by the selected item.

4   (Optional) Toggle on the **Compact** switch located in the toolbar to view the data as compact boxplots instead of histograms.

Not seeing the metric you want to analyze?

Here are some reasons why you may not be seeing a particular metric available in the metric dropdown:

- The metric is not the right type (numeric vs non-numeric). Only numeric metrics will appear in the Metric dropdown. Non-numeric custom metrics like text and choice fields are available to select in the Group By field.

- The metric has not been added yet to a collection scorecard. In order for a metric to show up in the Metric or Group By field, it must be defined in at least one scorecard that belongs to the collection.

Downloading Histogram Data

Download data for the selected metric by clicking the download button in the toolbar above the histogram. Select the type of data you wish to download. Available options include **Patient Metric Values**, **Histogram Distribution Data**, and **Boxplot Distribution Data**. Press **Download** to initiate the download.

Data Drill-down and Patient Highlight

To view a list of patients that comprise a particular histogram bin, click on the bin. A list of patients will appear below the histograms in the section titled "Bin Selected for Drill-Down Analysis." Double-click on a patient row to inspect the patient.

To determine where a patient falls in the population for the selected metric, open the patients right sidebar, and click the patient to select it. The bin containing the selected patient will be highlighted with a solid black outline.

Selected Patient Actions

Exporting Patients from a Collection

1   With a bin from the histogram(s) selected, use the table to select one or more patients.

2   Press the **Export** button from the **Selected Patients** dropdown located in the toolbar above the histogram(s).

3   Press the **Export** button to begin the download.

Removing Patients from a Collection

1   With a bin from the histogram(s) selected, use the table to select one or more patients.

2   Press the **Remove** button from the **Selected Patients** dropdown located in the toolbar above the histogram(s).

3   Press the **Remove** button to confirm.

Note: You must have the *Remove Collection Patients* permission on a collection to remove patients from that collection.

Creating a New Collection from Selected Patients

1   With a bin from the histogram(s) selected, use the table to select one or more patients.

2   Press the **Create New Collection** button from the **Selected Patients** dropdown located in the toolbar above the histogram(s). Please note that this option is not available when viewing an organization collection across all workspaces.

3   Enter the information for the new collection, and press **Create** to create the collection.

Note: You must have the *Create Collections* permission on a workspace to create a workspace collection for that workspace.

Adding Selected Patients to an Existing Collection

1   With a bin from the histogram(s) selected, use the table to select one or more patients from the patients table.

2   Press the **Add to Existing Collection** button from the **Selected Patients** dropdown located in the toolbar above the histogram(s). Please note that this option is not available when viewing an organization collection across all workspaces.

3   Choose a collection from the list, and press **Submit** to add the patients.

Note: You must have the *Add Collection Patients* permission on a collection to add selected patients to that collection.

Managing Bookmarks

Recalling Histogram Bookmarks

To recall a saved histogram bookmark, open the histogram right sidebar and click on the bookmark you wish to load. The current histogram configuration settings will be updated automatically.

Note: You must have the *Read Collection Bookmarks* permission on a collection to view bookmarks for the collection.

Creating Histogram Bookmarks

Note: You must have the *Create Collection Bookmarks* permission on a collection to create bookmarks for the collection.

1. To save a histogram configuration for later, configure your settings according to the Configuring Histogram Settings instructions above.

2. Press the bookmark button located in the toolbar above the histograms.

3. Choose a **Name** for the bookmark. You can use any characters you'd like, but the name must be 64 characters or fewer.

4. Press the **Save** button to save the bookmark.

Renaming Histogram Bookmarks

Note: You must have the *Update Collection Bookmarks* permission on a collection to rename bookmarks for the collection.

1. To rename a histogram bookmark, open the histogram right sidebar.

2. Press the edit button (denoted by a pencil icon).

3   Choose a new **Name** for the bookmark. You can use any characters you'd like, but the name must be 64 characters or fewer.

4   Press the **Save** button to save the bookmark name.

Deleting Histogram Bookmarks

Note: You must have the *Delete Collection Bookmarks* permission on a collection to delete bookmarks for the collection.

1   To delete a histogram bookmark, open the histogram right sidebar.

2   Press the **Delete** button (denoted by a trash icon).

3   Confirm that you wish to delete the bookmark by pressing the **Delete** button.

Collection — Scatterplots

IN THIS ARTICLE

- Accessing Scatterplots
  - Configuring Scatterplot Settings
  - Downloading Scatterplot Data
  - Data Drill-down and Patient Highlight

- Selected Patient Actions
  - Exporting Patients from a Collection
  - Removing Patients from a Collection
  - Creating a New Collection from Selected Patients
  - Adding Selected Patients to an Existing Collection

- Using the Correlation Finder
- Managing Bookmarks
  - Recalling Scatterplot Bookmarks
  - Creating Scatterplot Bookmarks
  - Renaming Scatterplot Bookmarks
  - Deleting Scatterplot Bookmarks

Note: You must have an *Analytics* license to access collections.

Accessing Scatterplots

When you access a collection, click on the Scatterplots tab to view scatterplots of collection metric data across the scorecards defined for the current collection.

Configuring Scatterplot Settings

1. Using the dropdowns for the **X** and **Y** fields, select the metrics you wish to view from the available list. If a metric that you are looking for does not exist, make sure that it has been defined in one of the scorecards that belong to the collection.

2   (Optional) Set the **Group By** field to a custom text or choice metric (or Workspace for Organization Collections). The scatterplot view will update to display different colored points for each group defined by the selected item.

Not seeing the metric you want to analyze?

Here are some reasons why you may not be seeing a particular metric available in one of the metric dropdowns:

- The metric is not the right type (numeric vs non-numeric). Only numeric metrics will appear in the X and Y dropdowns. Non-numeric custom metrics like text and choice fields are available to select in the Group By field.

- The metric has not been added yet to a collection scorecard. In order for a metric to show up in the X, Y, or Group By field, it must be defined in at least one scorecard that belongs to the collection.

Downloading Scatterplot Data

Download data for the selected metric by clicking the download button in the toolbar above the scatterplot. Your download will be initiated immediately.

Data Drill-down and Patient Highlight

To identify a patient corresponding to a particular point on the scatterplot, click on the point. To identify multiple patients within a rectangular area on the scatterplot, click and drag to create a rectangular selection of data points. The selected patient(s) will appear below the scatterplot in the section titled "Point Selected for Drill-Down Analysis." Double-click on a patient row to inspect the patient.

To determine where a patient falls in the population for the selected metrics, open the patients right sidebar, and click the patient to select it. The point corresponding to the selected patient will be highlighted with a solid black outline.

Selected Patient Actions

Exporting Patients from a Collection

1   With one or more points selected from the scatterplot, use the table to select one or more patients.

2   Press the **Export** button from the **Selected Patients** dropdown located in the toolbar above the scatterplot.

3   Press the **Export** button to begin the download.

Removing Patients from a Collection

1   With one or more points selected from the scatterplot, use the table to select one or more patients.

2   Press the **Remove** button from the **Selected Patients** dropdown located in the toolbar above the scatterplot.

3   Press the **Remove** button to confirm.

Note: You must have the *Remove Collection Patients* permission on a collection to remove patients from that collection.

Creating a New Collection from Selected Patients

1   With one or more points selected from the scatterplot, use the table to select one or more patients.

2   Press the **Create New Collection** button from the **Selected Patients** dropdown located in the toolbar above the scatterplot. Please note that this option is not available when viewing an organization collection across all workspaces.

3   Enter the information for the new collection, and press **Create** to create the collection.

Note: You must have the *Create Collections* permission on a workspace to create a workspace collection for that workspace.

Adding Selected Patients to an Existing Collection

1   With one or more points selected from the scatterplot, use the table to select one or more patients from the patients table.

2   Press the **Add to Existing Collection** button from the **Selected Patients** dropdown located in the toolbar above the scatterplot. Please note that this option is not available when viewing an organization collection across all workspaces.

3   Choose a collection from the list, and press **Submit** to add the patients.

Note: You must have the *Add Collection Patients* permission on a collection to add selected patients to that collection.

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Using the Correlation Finder

The correlation finder automatically calculates the r values between all pairs of metrics defined across your scorecards (and with 3 or more data points) and displays them in a list. The pairs are sorted by r value in descending order. The Correlation Finder tab is available in the right sidebar when viewing collection scatterplots. Click on one of the correlations to load the metrics for that correlation into the scatterplot.

You may, on occasion, need to refresh the list of correlations. To refresh the list, click on the refresh button located in the Correlation Finder sidebar header.

Managing Bookmarks

Recalling Scatterplot Bookmarks

To recall a saved scatterplot bookmark, open the scatterplot right sidebar and click on the bookmark you wish to load. The current scatterplot configuration settings will be updated automatically.

> **Note**: You must have the *Read Collection Bookmarks* permission on a collection to view bookmarks for the collection.

Creating Scatterplot Bookmarks

> **Note**: You must have the *Create Collection Bookmarks* permission on a collection to create bookmarks for the collection.

1   To save a scatterplot configuration for later, configure your settings according to the Configuring Scatterplot Settings instructions above.

2   Press the bookmark button located in the toolbar above the scatterplot.

3   Choose a **Name** for the bookmark. You can use any characters you'd like, but the name must be 64 characters or fewer.

4   Press the **Save** button to save the bookmark.

Renaming Scatterplot Bookmarks

> **Note**: You must have the *Update Collection Bookmarks* permission on a collection to rename bookmarks for the collection.

1   To rename a scatterplot bookmark, open the scatterplot right sidebar.

2   Press the edit button (denoted by a pencil icon).

3   Choose a new **Name** for the bookmark. You can use any characters you'd like, but the name must be 64 characters or fewer.

4   Press the **Save** button to save the bookmark name.

Deleting Scatterplot Bookmarks

Note: You must have the *Delete Collection Bookmarks* permission on a collection to delete bookmarks for the collection.

1   To delete a scatterplot bookmark, open the scatterplot right sidebar.

2   Press the **Delete** button (denoted by a trash icon).

3   Confirm that you wish to delete the bookmark by pressing the **Delete** button.

Collection — DVH

IN THIS ARTICLE

- Accessing the Population DVH

- Editing Analysis Structures

- Download Population DVH

- Patient Highlight

Note: You must have an *Analytics* license to access collections.

Accessing the Population DVH

When you access a collection, click on the DVH tab to view population DVH curves across the collection or workspace collection representation. The list of configured analysis structures with occurrence counts will be displayed in the left sidebar. Selecting one of these structures activates it and allows you to view the population DVH for the selected structure with 0, 25, 50, 75, and 100 percentile bands. Initially, there will be no analysis structures configured for the collection (see Editing Analysis Structures).

Editing Analysis Structures

1. With the DVH tab activated, press the **Edit** button at the top of the sidebar.

2. Add structures to the analysis structures by activating the **Add Structure** dropdown and choosing an available structure from the list. Use the input to filter the list by the structure name. Delete a structure from the list by clicking the trash icon for the row.

3. Press the **Save** button to save the list of analysis structures.

Note: You must have the *Update Collections* permission on the collection to edit analysis structures for the collection.

Download Population DVH

1. With the proper structure selected, press the download button located in the toolbar above the population DVH.

2   Enter a **Resolution** between between 0.1 and 1, inclusive.

3   If you are interested in just the population DVH data and not the individual DVH curves for each patient, select **Download population DVH data**.

If you are interested in the individual DVH curves in addition to the population DVH data, select **Download population DVH data AND individual DVH curves for each patient**. Then choose the **Next** button.

4   Press the **Download** button to initiate the download.

Patient Highlight

To determine where a single patient falls in the population DVH for the selected structure, open the patients right sidebar, and click the patient to select it. The DVH curve for the selected patient and the selected structure will be displayed in black on top of the population DVH curve data.

Note: You must have the *Read Patient* permission on a patient to fetch the DVH curve data for the patient.

How do I get a metric to show up the list of metrics for histograms and scatterplots?

In order for a metric to show up in the list, it must be defined in at least one scorecard that belongs to the collection. In addition, only numeric metrics may be displayed in histograms and scatterplots, and only text or choice custom metrics may be used for grouping.

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