ProKnow

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

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, physicians, 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

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

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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

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

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.

ProKnow

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.

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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

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:

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.

ProKnow

Weekly Web Q&A

Summary

ProKnow hosts a weekly web meeting for ProKnow DS users. The content is dynamic based on who attends each week, and includes topics such as:

- Live demonstration of new features
- Targeted training on requested topics
- Open question and answer (Q&A) session

Schedule

Day	Tuesdays (starting August 7, 2018)
Time	11 a.m. Eastern Time (10 a.m. Central, 8 a.m. Pacific, 4 p.m. in the UK, etc.)
Frequency	Weekly
Duration	Up to, but not exceeding, one hour each

Meeting Link & Other Details

Click this link to join the meeting during any of the session times.

You can use your speakers & mic (or headset) for the audio, or alternatively you can call in with the following details:

United States: +1 (571) 317-3129
Canada: +1 (647) 497-9391
United Kingdom: +44 330 221 0088

Access Code: 525-736-517

ProKnow

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

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.

ProKnow

Tutorial: Re-Associating DICOM Objects

IN THIS ARTICLE

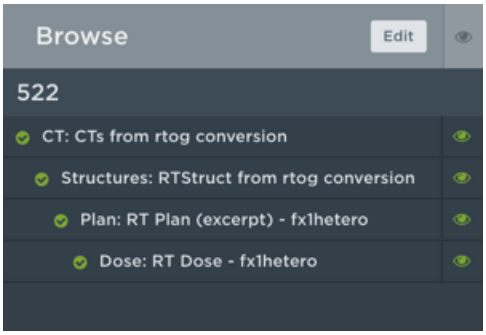
Sometimes your DICOM objects may not be associated correctly, causing an errant hierarchy of data objects in the patient module. This article explains why that might happen, and how you can use built-in tools to rectify it.

DICOM Object Associations

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.

ProKnow

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

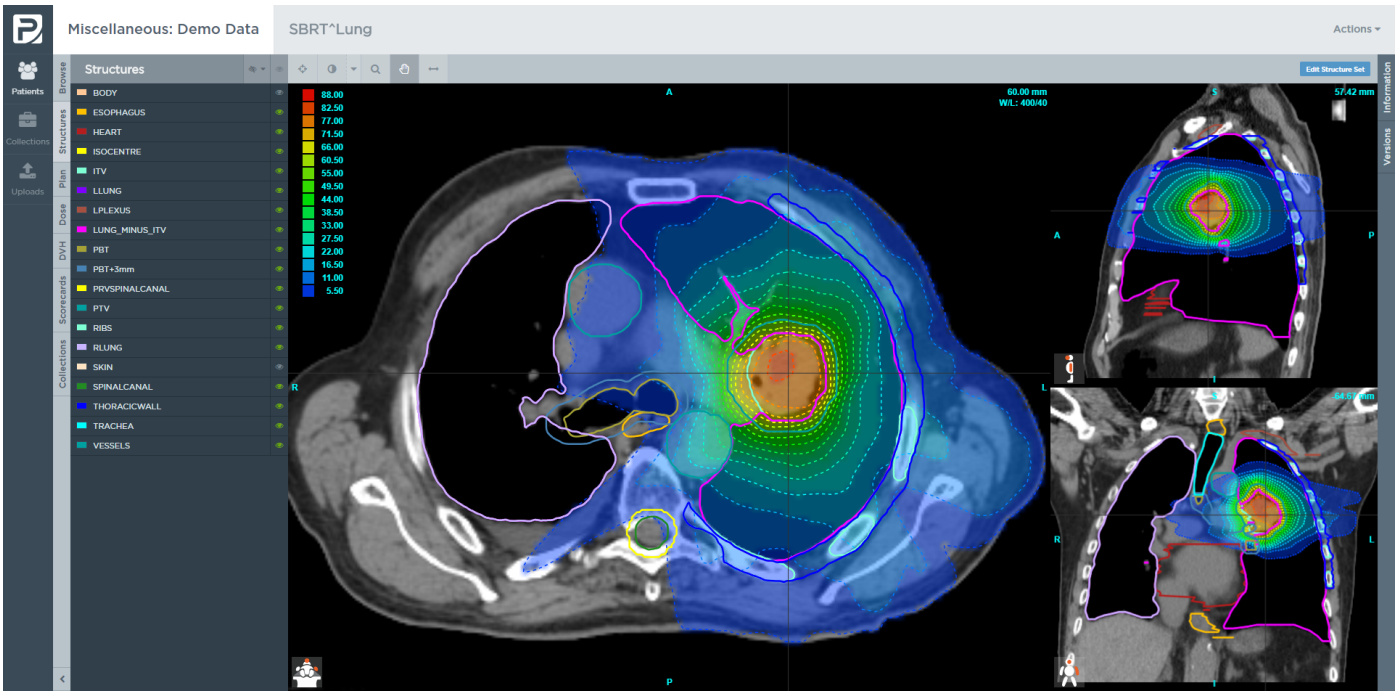


Figure 1. Patient module and interactive patient viewer. The tabs explained below can be activated from the vertical tab collection on the left of the viewer.

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

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.

ProKnow

Tutorial: Build a Plan Study Using ProKnow DS

IN THIS ARTICLE

Overview

ProKnow DS is an excellent tool to help an organization design standardized ***treatment plan studies*** that can be used to measure the quality and quantify the variation of treatment plans across multiple institutions, treatment planners, and delivery modalities. The goal can be to either build a private plan study library (available to your organization only) or create a public plan study (available to the international user base for research and/or in conjunction with scientific meetings) that will be deployed using ProKnow's quality system for treatment planning.

This article will help you get started by describing the basic steps of how to design a plan study using ProKnow DS.

> ### Note Regarding Your ProKnow DS Domain
>
> *If you are a ProKnow DS customer*, you will already have a secure, private domain.
>
> *If you are not yet a ProKnow DS customer* but you are building a plan study for a sanctioned workshop, meeting, or study, then you will be provided details about (and access to) a sub-domain dedicated for your specific project.
>
> In order to upload patient data, create and edit patient plan scorecards, etc., you will need to (1) be defined as a user for a ProKnow DS domain and (2) have a base level of permissions necessary to upload DICOM data and create and edit patient scorecards. If you are not yet a user of a domain, or if you find that your permissions are not sufficient, then contact your ProKnow administrator and have him/her configure your user account and set adequate permissions.

Designing a Plan Study

Below are the basic steps to start designing a treatment plan quality study.

1. LOG IN

Navigate your supported browser to your assigned ProKnow DS domain and log in. See Tutorial: Logging In for the

First Time and Beyond for help.

2. CREATE NEW PATIENT

(Note: If the patient is already created, you can simply select it and proceed with remaining steps.)

Select the Patients module from the main navigation on the left.

From the workspace drop-down list in the upper left, select the applicable workspace where you store (or aim to store) the patient data used for designing plan studies.

Create a new patient dataset with the ID, name, etc. that you desire.

3. UPLOAD PATIENT IMAGES

If you have not done so already, upload the axial patient images directly to this patient.

Typically, the required image set is comprised of the CT planning images. However, you can also use an axial MR image set, or a combination of registered, multi-modality images (e.g., CT and MR).

> **Important Anonymization Note**
>
> These patient images will ultimately be available via download to those participating in the plan study, so be sure to fully anonymize the DICOM files to remove any sensitive information. Edit, but do not remove, required tags (e.g., patient ID and name). You may clear non-essential tags (i.e., referring physician, institution, etc.).

4. UPLOAD OR CREATE ANATOMY CONTOURS

If you have already contoured all necessary targets and critical structures using another software system (e.g., your TPS), then you can upload a DICOM RT structure set directly to this patient. If you use this method, be sure to anonymize the RT structure set together with the axial images in order to preserve critical DICOM links.

As an alternative, you can create a new structure set for this patient and use the integrated contouring tools to define all targets and critical structures.

5. REVIEW AND FINALIZE ANATOMY CONTOURS

Remember that this dataset will be eventually distributed to all plan study participants, so *be sure to review all the anatomical structures for accuracy, names, and display colors*.

For more information on how to edit labels, colors, and/or contours and how to save the contours as a new version of the structure set, visit the Editing Structures article.

6. UPLOAD AN EXAMPLE TREATMENT PLAN & DOSE

Before you start drafting a scorecard (i.e., metrics and per-metric objectives), you will want to upload at least one

Before you start drafting a scorecard (i.e., metrics and per-metric objectives), you will want to upload at least one DICOM RT and RT Dose to serve as an example as you build out the scorecard.

After uploading to the test patient, you may need to manually re-associate the RT plan and dose to be under the RT structure set.

Select the plan/dose for the patient. On the Browse tab for the patient, make sure the entire images-structures-plan-dose branch is selected. You can do this by double-clicking the dose entity.

7. (OPTIONAL) CUSTOMIZE DISPLAY

If desired, normalize the dose display to the desired prescription dose and customize the dose display.

Though it will not affect the plan scorecard or any metrics, you may wish to set the 100% display dose to be the highest prescription dose (Gy). Go to the Dose tab, where you can set the display normalization dose and dose display preferences.

8. DESIGN THE PLAN SCORECARD (PART 1): METRICS & OBJECTIVES

Start drafting the patient plan scorecard.

Go to the Scorecards tab for the test patient.

Create a new scorecard if none exists. Note: It's helpful to assign a scorecard name that summarizes the prescription and fraction scheme, e.g., "50 Gy in 25 fractions."

Edit the scorecard by defining metrics and creating per-metric objectives. Note: It is advantageous to create multi-level (i.e., not simply pass-fail) objectives, which will make the eventual building of the plan scoring algorithm much easier.

When you have a comprehensive set of metrics and objectives drafted, then take a moment to re-order the metric list to be most intuitive for the eventual user. Re-ordering is possible when in scorecard edit mode. For example, you may wish to have all target coverage metrics first and in priority order, followed by organ-at-risk metrics in order of organ and/or metric priority.

Save your scorecard progress before you either log off each session or exit the patient module.

9. DESIGN THE PLAN SCORECARD (PART 2): SCORES & WEIGHTS

A ProKnow plan study will feature online plan scoring where absolute performance scores are computed for each metric and summed for an overall score, as originally defined in this publication in Practical Radiation Oncology.

Once you have your metrics and objectives defined (as per prior step), your final step will be to assign score functions based on your objectives. The score function encode how — and how many — points are awarded based on each plan's performance level for that metric. The composite of all the score functions makes up the plan scoring algorithm. See this article on how to assign scores to your metric objectives.

10. (OPTIONAL) TEST OTHER SAMPLE PLANS

10. (OPTIONAL) TEST OTHER SAMPLE PLANS

If desired, you can upload and associate one or more other RT Plan/RT Dose pairs to the same patient.

If you have permissions to save a scorecard as an organization scorecard template, then save it and then create a new scorecard from that template for the new dose.

If you do not have permission to create an organization scorecard template, you can download any patient scorecard as a file, then create a new scorecard (e.g., for another dose for that patient, or for another patient altogether) by uploading from that saved file.

Publish the Plan Study

Contact ProKnow by emailing support@proknowsystems.com when you are ready to convert the ProKnow DS scorecard into a PlanIQ plan scoring algorithm to be used by the ProKnow online plan study program.

This is usually accomplished with an interactive web meeting during which objectives are converted to numeric scoring functions and all metrics are prioritized (assigned weights) based on relative importance to plan quality.

ProKnow

Tutorial: Build a Contouring Library Using ProKnow DS

IN THIS ARTICLE

Overview

ProKnow DS is an excellent tool to help an organization build a standardized ***contouring accuracy library*** that can be used to measure the accuracy and quantify the variation of anatomy contouring across a population of users and/or autosegmentation methods. The goal can be to either build a private contouring accuracy library (available to your organization only) or create public contouring datasets (available to the international user base for research and/or in conjunction with scientific meetings) that will be deployed using ProKnow's quality system for anatomy contouring.

This article will help you get started by describing the basic steps of how to build a contouring library using ProKnow DS:

> ### Note Regarding Your ProKnow DS Domain
>
> *If you are a ProKnow DS customer*, you will already have a secure, private domain.
>
> *If you are not yet a ProKnow DS customer* but you are building out contours for a sanctioned workshop, meeting, or study, then you will be provided details about (and access to) a ProKnow-hosted sub-domain dedicated for your specific project.
>
> In order to upload patient data, create and edit patient anatomical contours, you will need to (1) be defined as a user for a ProKnow DS domain and (2) have a base level of permissions necessary to upload DICOM data and create and edit patient data. If you are not yet a user of a domain, or if you find that your permissions are not sufficient, then contact your ProKnow administrator and have him/her configure your user account and set adequate permissions.

Preparation

There are some necessary preparatory steps that you will need to do only once (or at least rarely) before you begin

building your contouring library.

1. VERIFY YOUR LOG IN

   Navigate your supported browser to your assigned ProKnow DS domain and log in. See Tutorial: Logging In for the First Time and Beyond for help.

2. CREATE (OR BE ASSIGNED) A PROKNOW DS WORKSPACE

   If you are a ProKnow DS customer with a secure, private domain that you use for other clinical and research purposes, then you may wish to create a dedicated workspace (or multiple workspaces, i.e., one per body site) that will house the images and contours that you are considering for your contouring accuracy library. This allows you to better organize data, but also to control who has permissions to access, upload, review, and edit patient data in the workspace(s).

   If you are not a ProKnow DS customer and you have been given access to a ProKnow-hosted domain, then the dedicated workspace will already be created for you.

3. PRIORITIZE BODY SITES

   It is a good idea to organize your contouring library into body sites and/or contouring protocols. Think about which body sites you eventually wish to cover, then prioritize them to determine the order in which you will build them.

4. PLAN IMPORTANT STRUCTURES PER BODY SITE

   Develop a list of important anatomical structures per body site or protocol category. Think about high-priority organs-at-risk (OARs) and target volumes for which contouring accuracy is critical.

   You should also formulate a list of standard contour names and syntax, as contouring accuracy studies are a great way to enforce standard naming conventions.

5. ASSIGN EXPERTS

   To create (and/or, review) the contours you will be putting forth as standards, you will need to assign appropriate experts from within your group. Without the time and effort of these experts, you may find it difficult to develop your contouring accuracy library.

6. COLLECT PATIENT IMAGES

   Start collecting representative and appropriate image sets to cover the body sites and structures you have prioritized.

   Image sets can be computed tomography (CT) or magnetic resonance (MR) as long as it is an axial series. Oblique planes (e.g., MR) can also be used, but they will be resampled to form axial planes, which in some cases may degrade image quality.

   After you collect each image set (and, potentially, RT structure set per image set), it is a good idea to anonymize all DICOM files to remove sensitive information and to assign generic and descriptive patient names.

DICOM files to remove sensitive information and to assign generic and descriptive patient names.

7. (OPTIONAL) COLLECT SUPPLEMENTARY EDUCATIONAL MATERIALS & INSTRUCTIONS

The contouring accuracy library allows for educational materials (documents, movies, etc.) to be accessed for each structure. Some materials can be accessed by the user before (and while) they contour. Other materials can be set to be available only after the user has made one attempt at contouring the full structure.

These supplementary materials are not required, but they certainly enhance the efficiency and impact of contouring exercises.

Create Standard (Expert) Contours

The following steps describe how to start building standard contours.

> ### Important Note
>
> These instructions apply to setting up a ***single set of patient images and corresponding structures***. You can repeat the applicable steps for each additional patient or patient image set.

1. LOG IN

Navigate your supported browser to your assigned ProKnow DS domain and log in. See Tutorial: Logging In for the First Time and Beyond for help.

2. CREATE NEW PATIENT

(Note: If the patient is already created, you can simply select it and proceed with remaining steps.)

On the left dashboard, click **Patients**.

From the workspace drop-down list in the upper left, select the applicable workspace where you store (or aim to store) the patient data standards used for your contouring library.

Create a new patient dataset using the labels (ID, name, etc.) that you wish to use for display and organization in ProKnow DS.

> ### Important Anonymization Note
>
> The source DICOM files will retain their original DICOM tag data, so be sure to anonymize data before uploading (next step) if you will be allowing download of image data to the intended contouring library users.
>
> If you will not allow your contouring library users to download patient data (i.e., if you will allow contouring via online ProKnow tools only), then the DICOM data will never be exposed so the ID, name, etc. are less

> important, but it is good practice to always anonymize patient data that will be used in your contouring library.

3. UPLOAD PATIENT IMAGES

After creating the patient, you can upload the axial patient images directly to this patient. The images must be an axial series of DICOM CT or MR images. Oblique MR planes must be resampled to axial planes to use in contouring.

> ### Reminder
>
> You will control if these patient images will ultimately be available via download to those with access to your contouring library, or if contouring will be online via ProKnow only. Regardless, it's is good practice to fully anonymize the DICOM files to remove any sensitive information. Edit, but do not remove, required tags (e.g., patient ID and name). Non-essential tags (referring physician, institution, etc.) you can clear.

4. UPLOAD OR CREATE STANDARD (EXPERT) CONTOURS

If you have already contoured all necessary targets and critical structures using another software system (e.g., your TPS), then you can upload a DICOM RT structure set directly to this patient.

As an alternative, you can create a new structure set for this patient and use the integrated contouring tools to define all targets and critical structures.

5. REVIEW AND FINALIZE ANATOMY STRUCTURES

Remember that your experts are building standard anatomical contours against which all your contouring library users will be compared and accuracy measured, so *be sure to review all the anatomical structures for anatomical accuracy, as well as naming standard.*

For more information on how to edit labels, colors, and/or contours and how to save the contours as a new version of the structure set, visit the Editing Structures article.

6. WRITE BRIEF INSTRUCTIONS, PER STRUCTURE

Use the patient notes tool to specify concise instructions for each structure that requires special guidance or detail. Write the instructions exactly as you would like them to appear to the users. These instructions will appear for the user prior to their contouring (in addition to any supplementary education materials, as described below).

7. (OPTIONAL) UPLOAD SUPPLEMENTARY EDUCATIONAL MATERIALS (BODY SITE- or STRUCTURE-SPECIFIC)

If you wish to give access to specific instructions or educational materials for the body site (or for each structure), you can upload these non-DICOM documents or media to ProKnow DS to be stored with the patient data.

PDF or other highly-compatible formats such as DOC, PPT, etc. are the ideal document types. Another mode

PDF or other highly compatible formats such as DOC, PPT, etc. are the ideal document types. Another mode would be movies (MP4), which can be embedded in your ProKnow contouring accuracy library. Movies are a great way to do "contouring walkthroughs" that explain how the experts came up with their contours.

Publish the Structures in the Contouring Accuracy Library

Contact ProKnow by emailing support@proknowsystems.com when you are ready to port the image sets and anatomical structures into the applicable ProKnow online contouring accuracy library.

You will need to provide the anonymized patient IDs and names for the applicable data sets, as well as the structure names you wish to add to the library.

If you are using a ProKnow-hosted sub-domain, ProKnow staff will have access to the data they need. If you are a ProKnow DS customer using your private domain, then you will need to give temporary access (to the dedicated workspace only) to a ProKnow staff member so that he/she can retrieve the data and port it to your contouring accuracy library.

ProKnow

Release Notes

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

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

- 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.

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)

ProKnow DS v0.9.2 (7b7b1f)

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.

ProKnow

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.*

ProKnow

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

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)

ProKnow

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

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

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

- 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

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).

ProKnow

DICOM Conformance Statement

Updated January 24, 2020 for ProKnow DS v1.16.0

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 operators, 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 the 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

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C.7.3.1-C.8.8.1-Export	General Series Module (C.7.3.1) / RT Series Module (C.8.8.1) Export
C.7.4.1-Export	Frame of Reference Module (C.7.4.1) Export
C.7.5.1-Export	General Equipment Module (C.7.5.1) Export
C.7.6.2-Export	Image Plane Module (C.7.6.2) Export
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C.12.2-Export	Common Instance Reference Module (C.12.2) Export
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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
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C.12.1-Import	SOP Common Module (C.12.1) Import
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

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 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 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.

	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, denoted 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 3.3	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 provide any DICOM networking services or support any networking roles.

5. Media Interchange

ProKnow DS does not provide any media interchange services.

6. Transformation of DICOM to CDA

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

7. Support 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 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 CT image set
>RT Referenced Study Sequence	(3006,0012)	SQ		N/A	
>>Referenced SOP Class UID	(0008,1150)	UI	Copied	ALWAYS	Referenced CT image set
>>Referenced SOP Instance UID	(0008,1155)	UI	Copied	ALWAYS	Referenced CT image set
>>RT Referenced Series Sequence	(3006,0014)	SQ		N/A	
>>>Series Instance UID	(0020,000E)	UI	Copied	ALWAYS	Referenced CT image set
>>>Contour Image Sequence	(3006,0016)	SQ		N/A	
>>>>Referenced SOP Class UID	(0008,1150)	UI	Copied	ALWAYS	Referenced CT image set
>>>>Referenced SOP Instance UID	(0008,1155)	UI	Copied	ALWAYS	Referenced CT 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 CT image set
>ROI Name	(3006,0026)	LO	Copied	ALWAYS	Input SOP instance or USER
>ROI Generation Algorithm	(3006,0036)	CS	“MANUAL”	ALWAYS	

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: Removed 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 CT image set
>>>Referenced SOP Instance UID	(0008,1155)	UI	Copied or SOP instance UID of image on which contour was drawn	ALWAYS	Referenced CT 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 Information Object Implementation

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 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.

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	(0070,030A)	DS	SRO 4x4 affine transformation	ALWAYS	USER

Transformation Matrix			matrix		
>>>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
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
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

				Value	
Number of Frames	(0028,0008)	IS	Derived	ALWAYS	Input SOP instance(s) or AUTO
Frame Increment Pointer	(0028,0009)	AT	"3004000C"	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 Referenced Instance	ALWAYS	AUTO
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

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	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
	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

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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 Information Sequence	(0054,0016)	2	
>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	
>Radionuclide Half Life	(0018,1075)	3	

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	Must be "GEMS_PETD_01"; indicates the present of GE (0009,1xxx) private tags
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	Must be "Philips PET Private Group"; indicates the present of Philips (7053,1xxx) private tags
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 Concentration Scale Factor	(7053,1009)	3	If present, enables recalculation of CNTS into BQML using this 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

Structure Set Module (C.8.8.5) Import

Attribute Name	Tag	Type	Notes
Structure Set Label	(3006,0002)	1	
Structure Set Date	(3006,0008)	2	
Structure Set Time	(3006,0009)	2	
Referenced Frame of Reference Sequence	(3006,0010)	3	
>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	
>ROI Generation Algorithm	(3006,0036)	2	

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	
>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	

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 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	
RT Plan Name	(300A,0003)	3	
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 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	

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	
>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	
>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
>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	
>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	
>>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	
>>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
>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	Spatial Registration	C.20.2	See Spatial Registration Module (C.20.2) Import
	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	
Patient ID	(0010,0020)	2	
Patient’s Birth Date	(0010,0030)	2	
Patient’s Birth Time	(0010,0032)	3	
Patient’s Sex	(0010,0040)	2	
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	
Study Time	(0008,0030)	2	
Study ID	(0020,0010)	2	
Study Description	(0008,1030)	3	

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	

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 Bits Allocated, inclusive

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)	SQ	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)	SQ	1C
>Study Instance UID	(0020,000E)	UI	1
>Referenced Series Sequence	(0008,1115)	SQ	1
>>Series Instance UID	(0020,000E)	UI	1
>>Referenced Instance Sequence	(0008,114A)	SQ	11
>>>Referenced SOP Class UID	(0008,1150)	UI	1
>>>Referenced SOP Instance UID	(0008,1155)	UI	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 does not export any private attributes.

9.3. Coded Terminology Templates

ProKnow DS does used not support coded terminology or 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.

ProKnow

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.

ProKnow

Defining Custom Metrics

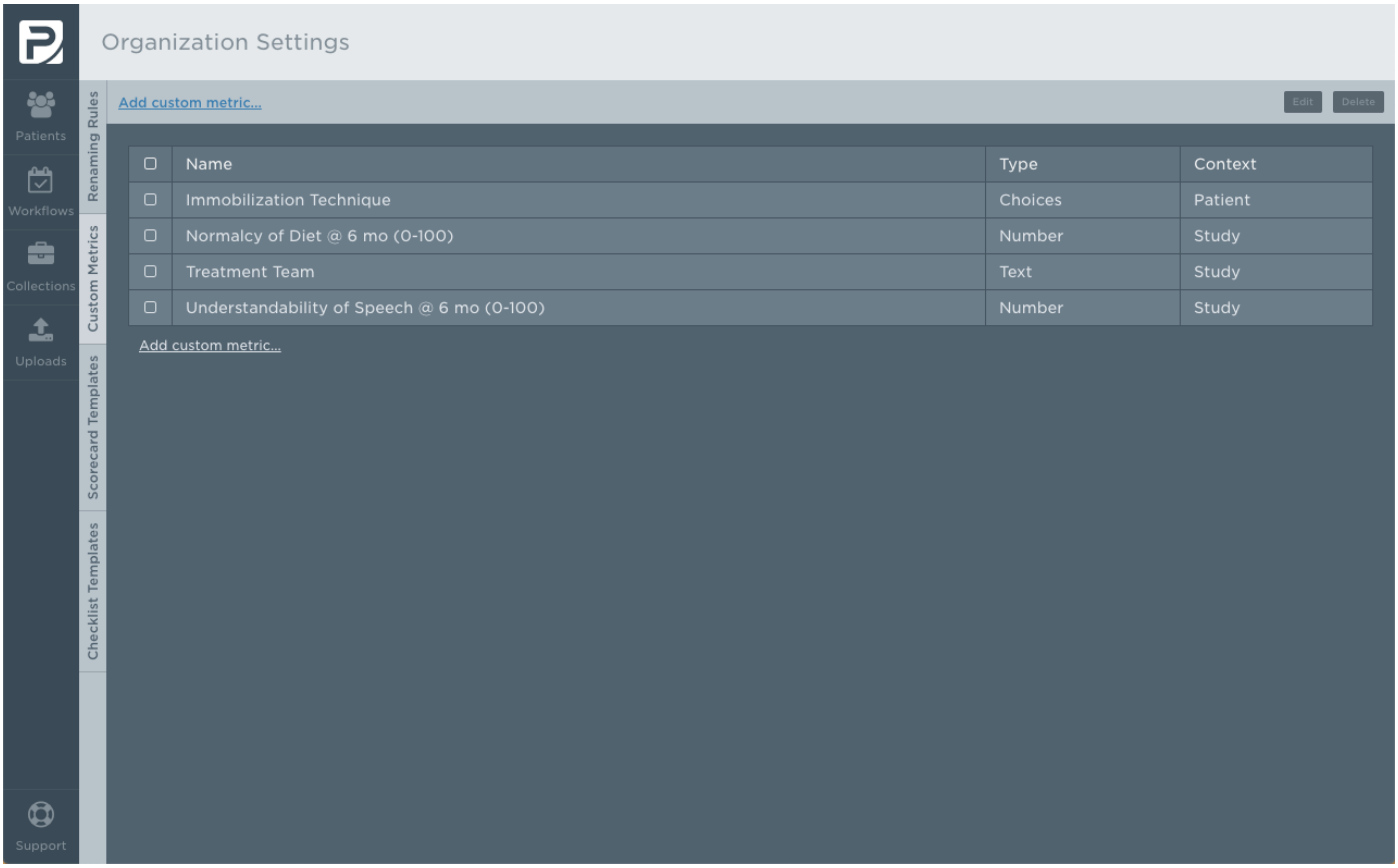
IN THIS ARTICLE

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.

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

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

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

> **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. At this time, the type of a custom metric cannot be changed.
3. Press the **Save** button to save your changes. 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, and press the **Yes** button.

Deleting Custom Metrics

> **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.

ProKnow

Defining Scorecard Templates

IN THIS ARTICLE

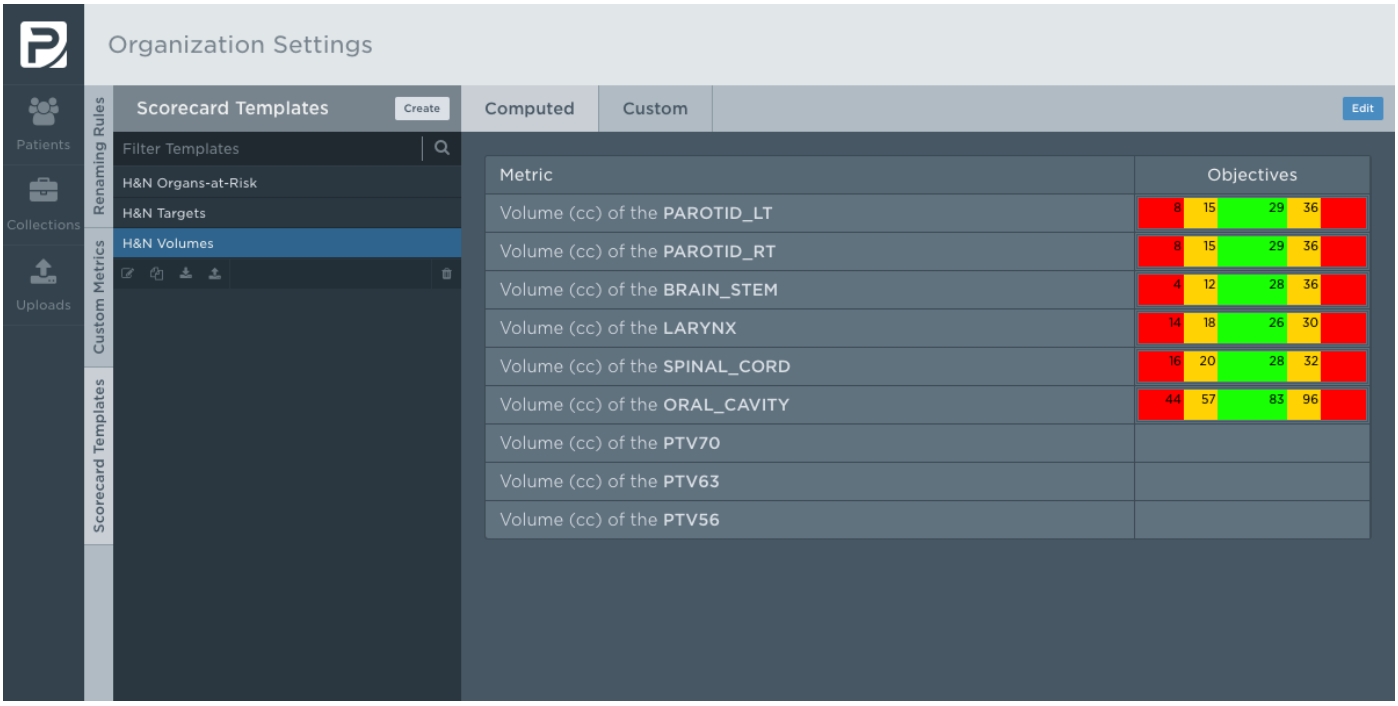
Define scorecard templates to standardize methods and implement robust measures to document plan quality across your organization.

Note: You must have the *Manage Scorecard Templates* permission to define scorecard templates for your organization.

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. Click on one of the templates to select it.

The main content area will update to display the details for the selected scorecard template. At the top of this space is a toolbar containing a set of tabs. The first tab is for computed metrics, and the second tab is for custom metrics. A button to edit the scorecard is available on the far right side of the toolbar.



Creating Scorecard Templates

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. 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.

Renaming Scorecard Templates

1. Choose the scorecard you wish you edit from the sidebar on the left.
2. Press the **Rename Template** button in the small ribbon of tools below the selected template in the sidebar.
3. Edit the **Name** in the field provided, and press **Save** to save your changes.

Editing Scorecard Templates

1. Choose the scorecard you wish you edit from the sidebar on the left.
2. Choose either the **Computed** or the **Custom** tab, and press the **Edit** button. You may only edit one type of metrics (custom or computed) at a time.
3. Add a new metric by pressing the **Add computed metric...** or **Add custom metric...** button. If you are adding a computed metric, a window will appear with a complete list of the computed metric types available. Fill in the required metric parameters. If you are adding a custom metric, a window will appear with items from the list of custom metrics defined in your ProKnow organization by a custom metric manager.

> For more information about computed metrics, visit our Computed Metric Library. To learn about how to create custom metrics, please visit the Defining Custom Metrics page.

4. 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:

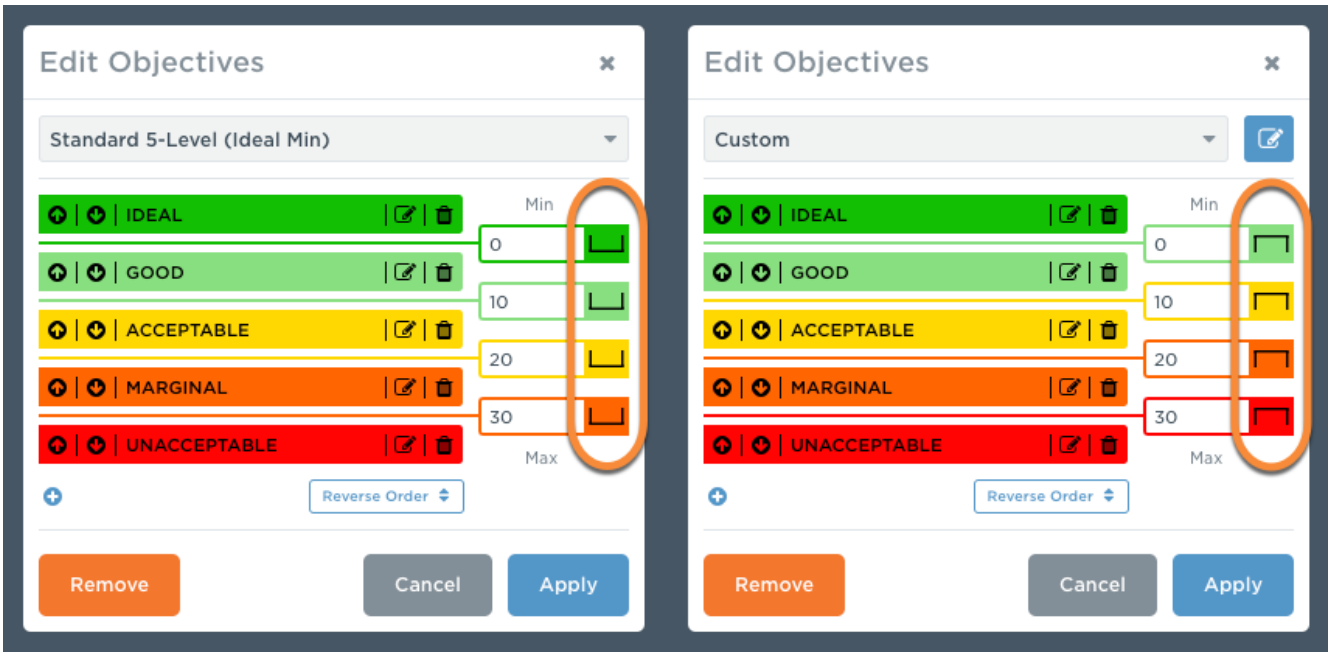
Objectives are completely customizable, allowing you to configure ranges for organs-at-risk metrics and target metrics, too.

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

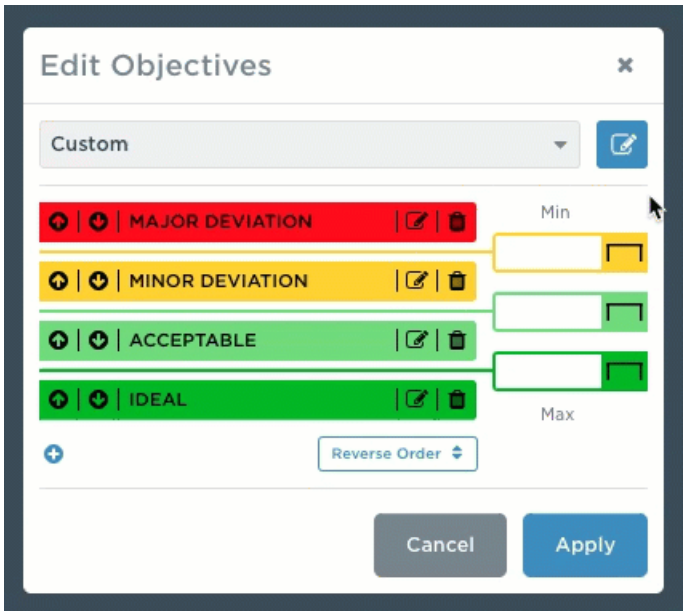
would produce the result MARGINAL. Compare that with the objectives on the right, where a value of 0 would now produce the result GOOD (not IDEAL), a value of 10 would now produce the result ACCEPTABLE (not

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

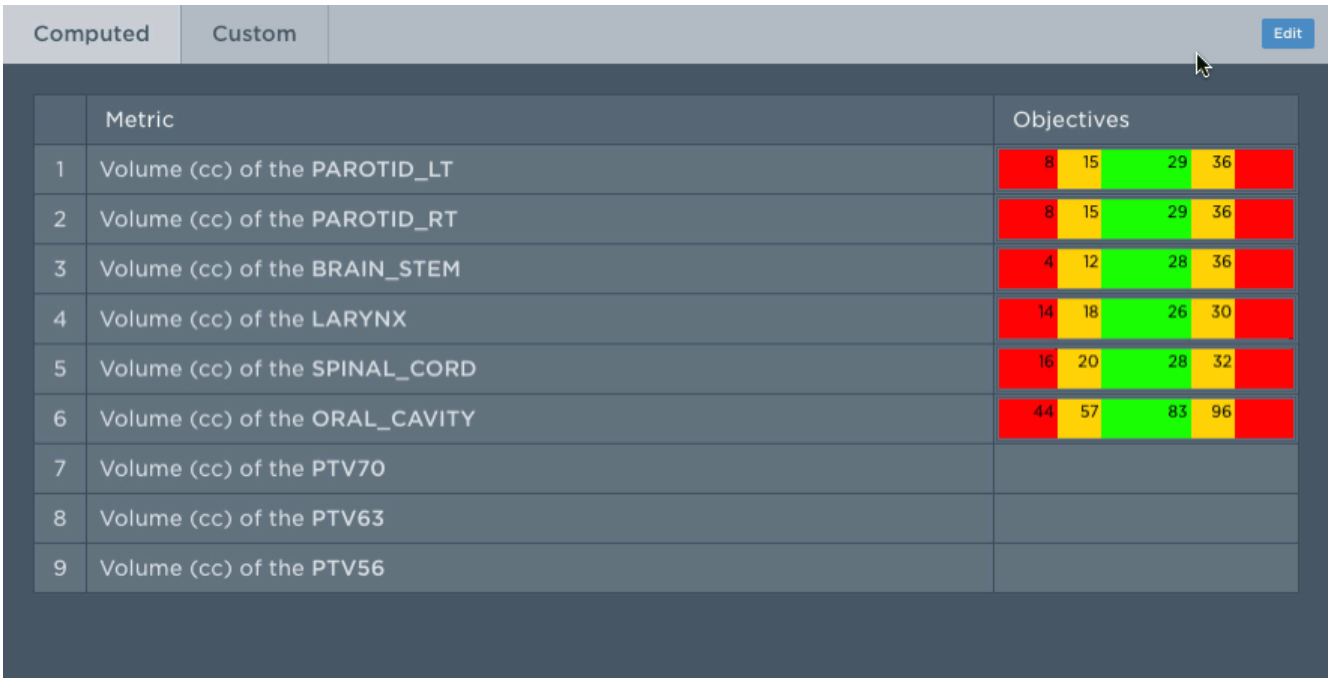
The labels, colors, and bracket direction may be customized and saved as a custom objective template. To accomplish this, first make your edits to the objective levels. The dropdown field should appear with the value *Custom*. Press the edit button next to the dropdown field, enter a name for your template,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

5 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:



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

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

Deleting Scorecard Templates

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.

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

ProKnow

Defining Renaming Rules

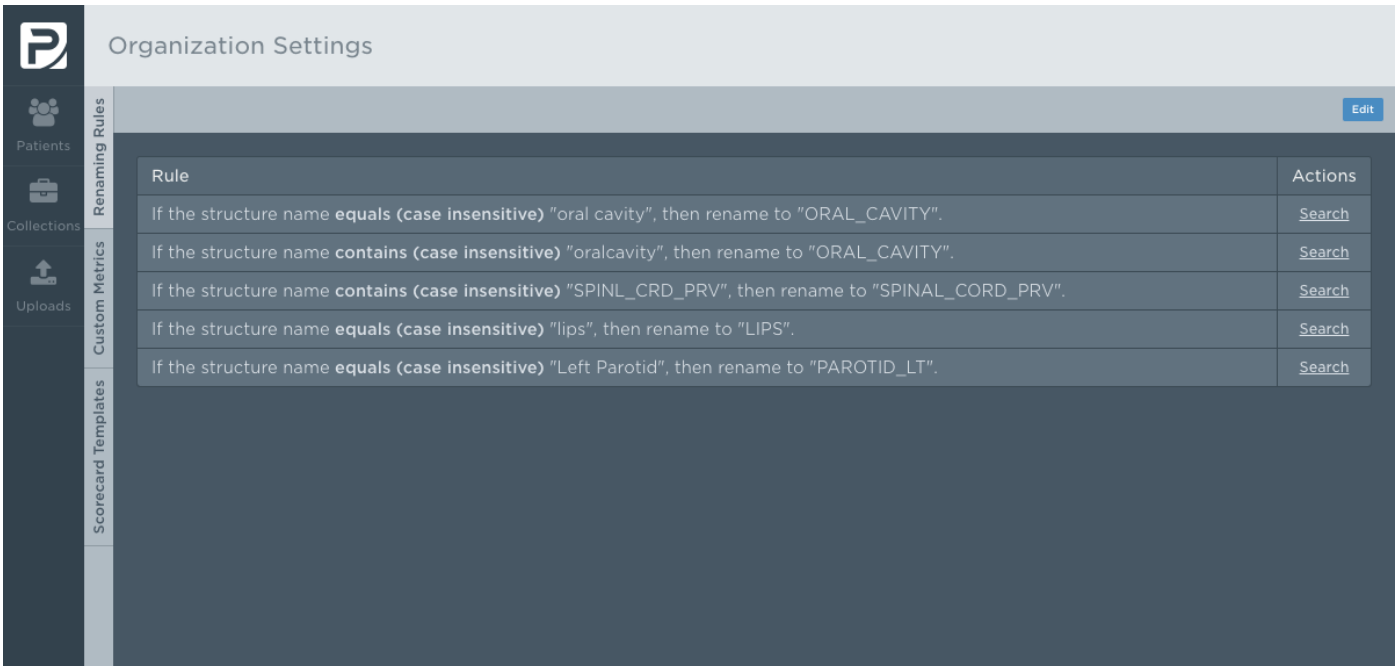
IN THIS ARTICLE

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.

> **Note**: You must have the *Manage Renaming Rules* permission to define renaming rules for your organization.

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

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 off...*** 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

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.

ProKnow

Defining Workflows and Checklist Templates

IN THIS ARTICLE

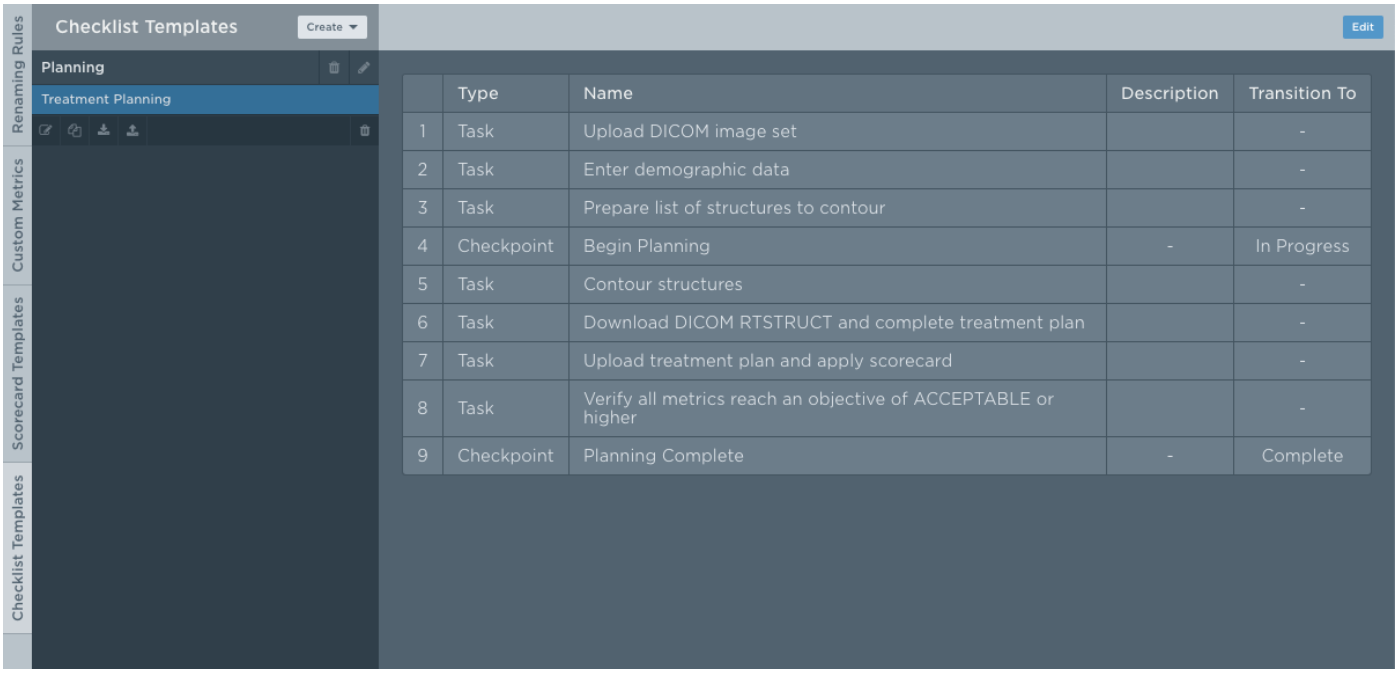
Workflows and checklist templates help you keep patient-related tasks organized and on schedule. Use this document to learn how to define workflows and checklist templates.

> **Note**: You must have the *Manage Checklist Templates* permission to define workflows and checklist templates for your organization.

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

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

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

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

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

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

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

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

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.

ProKnow

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.

Workspaces, Roles, and Users

A **workspace** is an abstract container 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.

A **role** is a set of access rules that define what actions may be performed on each of the various organization settings and system resources. Roles have the flexibility to permit unfettered access to all system resources or to define specific, limited access to certain workspaces.

A **user** is an entity (usually a person) who uses the system. A user must be assigned to exactly one role.

A user must have the *Manage Users, Roles, and Workspaces* permission to manage the workspaces, roles, and users for the organization (see Organization Management Permissions).

Permission Types

Advanced User Permissions

This is a group of permissions related to advanced user functionality. The *Create API Keys* permission grants access to create API keys that do not expire but can be revoked. These can be useful when interacting with the ProKnow API to perform automated tasks in a script or as a DICOM server.

Organization Management Permissions

These are the permissions related to managing the organization resources. Generally speaking, these permissions should be granted to administrative or management roles only. The *Manage Users, Roles, and Workspaces* permission grants the permission to add, update, and remove users, roles, and workspaces. The *Manage Custom Metrics* permission grants privileges to define, change, and delete custom metrics. The *Manage Renaming Rules* permission grants the ability to create and manage renaming rules, as well as the ability to execute renaming rules against existing datasets. The *Manage Scorecard Templates* permission grants the ability to create, update, and remove scorecard templates.

Organization Permissions

These are permissions that apply to all workspaces within the organization. Any role granted these permissions will be able to perform the indicated actions in every workspace. The possible organization level actions are *Read Patients*, *View PHI*, *Download DICOM*, *Write Patients*, *Contour Patients*, *Delete Patients*, *Read Collections*, *Write Collections*, *Delete Collections*, and *Collaborator*.

Workspace Permissions

These are permissions that apply to specific workspaces. Any role granted these permissions will only be able to perform the indicated actions in the specified workspace only. The possible workspace level actions are *Read Patients*, *View PHI*, *Download DICOM*, *Write Patients*, *Contour Patients*, *Delete Patients*, *Read Collections*, *Write Collections*, *Delete Collections,* and *Collaborator*.

Setting Up Your Organization

If you have the *Manage Users, Roles, and Workspaces* permission, you will want to think carefully about your particular use case to determine what workspaces, roles, and users to create. We recommend following this general procedure to determine your organization's needs.

Step 1: Determine Workspace Needs

The first thing you'll want to do is to determine how many workspaces you'll need and what these workspaces should be called. Your organization is already preconfigured with the "Clinical" workspace. This organization can be used to store clinical data or renamed and repurposed for something else. To determine the set of workspaces you should maintain, ask yourself whether certain groups of users should only be able to access a subset of the organization's data. If yes, you'll need to organize your data into multiple workspaces. For example, let's say that you have clinical data and research data. Suppose further that researchers should only be able to access research data while clinicians should be able to access both the research and clinical data. In this scenario, you should have two workspaces: Clinical and Research. If the answer to that question is no, just keep the Clinical workspace and rename

it to suit your situation. If your needs change, you can always add additional workspaces.

Step 2: Determine Role Needs

Next, you'll want to determine what roles are needed to support the kinds of users who will have accounts in your ProKnow organization. Begin by considering the workspace and organization level permissions, and consider the following questions:

- Who should have access to every workspace?
- Who should have access to only certain workspaces?
- Will read access suffice for certain users?
- Who will require the ability to delete data?
- Are there groups of two or more users who should have identical permission schemes?

Once you've determined the answers to these questions, think about which advanced user permissions and organization management permissions are appropriate for each of your users. When in doubt, it's best to assign permissions using the principle of least privilege. In other words, start by assigning only the permissions that are necessary, and modify the permissions later as needed. Remember that roles can be created, updated, and deleted as needed.

Step 3: Determine User Needs

Lastly, you'll want to compile a list of users who will be invited to join the organization. As you compile the list, make sure each user fits appropriately into the roles you've developed in step 2. If any do not, go back to step 2, and revise your roles.

Conclusion and Next Steps

Identity and Access Management is an important part of your ProKnow organization. Determining the needs of your organization in the way of workspaces, roles, and users goes a long way toward ensuring that your account remains secure and your team stays efficient. Once you've thought about these needs, you're ready dive into step-by-step guides for Managing Workspaces, Managing Roles, and Managing Users.

ProKnow

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.

Note: You must have the *Manage Users, Roles, and Workspaces* permission to manage workspaces for your organization.

Viewing Workspaces

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.

Creating Workspaces

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

> **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

> **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.

ProKnow

Managing Roles — Permissions & Access

IN THIS ARTICLE

A role is a set of access rules that define what actions may be performed on each of the various organization settings and system resources. A role can be shared by a group of users, and each user must be assigned exactly one role at all times. This article explains how to manage roles.

> **Note**: You must have the *Manage Users, Roles, and Workspaces* permission to manage roles for your organization.

Viewing Roles

To view your organization's roles, click on the ProKnow icon in the top left corner of the page, and select **Roles** 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 roles sidebar is to the right of the tabs. The sidebar holds a list of roles that belong to the organization with a button to create roles at the top. Click on one of the roles to select it.

The main content area will update to display the details for the selected role. You will notice a large grey bar at the top of this space. For the Admin role, this bar shows the name of the role on the left and a lock icon on the right. The lock icon signifies that the Admin role cannot be edited or deleted. For every other role, you will see the name of the role and a link to rename the role on the left. On the right, you will find buttons for editing and deleting the selected role.

Creating Roles

Creating Roles

1. Press the **Create** button at the top of the roles sidebar.
2. Enter a **Name** for your role. The name must be unique across all roles in your organization.
3. Press the **Create** button to create the role.

Renaming Roles

1. With a role selected from the sidebar, click the **Edit** button.
2. Enter a **Name** for your role. The name must be unique across all roles in your organization.
3. Press the **Save** button to save your changes to the role name.

Editing Roles

1. With a role selected from the sidebar, press the **Edit Permissions** button.
2. Check and uncheck the boxes for each of the Advanced Permissions and Organization Management Permissions to grant and revoke permissions as needed. Descriptions for these permissions are provided in those tables.
3. Check and uncheck the boxes under Organization Permissions to grant and revoke permissions as needed. Permissions granted at this level will apply to every workspace in the organization and will overwrite any permissions defined at the workspace level. These permissions are defined as follows.
   - **Read Patients**: This permission allows the user to read patient data across every workspace in the organization.
   - **View PHI**: This permission allows the user to view PHI (Protected Health Information) across every workspace in the organization.
   - **Download DICOM**: This permission allows the user to download DICOM files, including both the original uploaded files and new versions of the DICOM structure set.
   - **Write Patients**: This permission allows the user to create and modify patient data across every workspace in the organization. That includes uploading patient data, updating the patient fields and custom metrics for a patient, adding the patient to collections, modifying patient entities, and managing the patients' scorecards.
   - **Contour Patients**: This permission allows the user to modify patient contours for existing structure sets across every workspace in the organization.
   - **Delete Patients**: This permission allows the user to delete patients and patient entities across every workspace in the organization.
   - **Read Collections**: This permission allows the user to read collection data across every workspace in the organization.
   - **Write Collections**: This permission allows the user to create and edit collection data across every workspace in the organization. That includes creating both organization and workspace collections, editing

workspace in the organization. That includes creating both organization and workspace collections, editing organization and workspace collections, adding batches of patients to a collection, managing collection scorecards, and managing collection bookmarks.

- **Delete Collections**: This permission allows the user to delete organization and workspace collections across every workspace in the organization.
- **Collaborator:** The Collaborator permission is unique in that it does not grant any specific permissions. Instead, it modifies the other permissions to only apply to patients that the user has been explicitly granted access to via the Manage Patient Access dialog (users are automatically granted patient access if they create or upload new patient data). This means that a collaborator with *Read Patients*, *Write Patients*, and *Contour Patients* permissions may only view and edit patients that they have either (1) manually created, (2) uploaded, or (3) been granted access to via the Manage Patient Access dialog by a user with *Manage Users, Roles, and Workspaces* permission. Please note that collaborators may not view, edit, or delete collections (due to their limited patient access) and, as such, these permissions are disabled when the user is marked as a collaborator. In addition, due to the way workspaces inherit organization permissions, a role may not be marked as an organization collaborator and also have workspace-specific permissions (you may, however, mark a role as a collaborator in one workspace and have regular, non-collaborator access to other workspaces). Please refer to the Managing Access to Patients article for additional information about how the collaborator permission may be used to manage access within an organization.

4 To add a workspace level permission, scroll to the bottom of the Workspaces Permission section, select the workspace from the dropdown, and press the **Add** button. To remove an existing row of workspace permissions, press the orange **X** to remove the row. Check and uncheck the boxes under Workspace Permissions to grant and revoke permissions as needed. Permissions granted at this level will apply only to the corresponding workspace for that row. These permissions are defined as follows.

- **Read Patients**: This permission allows the user to read patient data across the workspace.
- **View PHI**: This permission allows the user to view PHI (Protected Health Information) across the workspace.
- **Download DICOM**: This permission allows the user to download DICOM files, including both the original uploaded files and new versions of the DICOM structure set.
- **Write Patients**: This permission allows the user to create and modify patient data across the workspace. That includes uploading patient data, updating the patient fields and custom metrics for a patient, adding the patient to collections, modifying patient entities, and managing the patients' scorecards.
- **Contour Patients**: This permission allows the user to modify patient contours for existing structure sets across the workspace.
- **Delete Patients**: This permission allows the user to delete patients and patient entities across the workspace.
- **Read Collections**: This permission allows the user to read collection data across the workspace.
- **Write Collections**: This permission allows the user to create and edit collection data across the workspace. That includes creating workspace collections, editing workspace collections, adding batches of patients to a collection, managing collection scorecards, and managing collection bookmarks.
- **Delete Collections**: This permission allows the user to delete workspace collections for the workspace.

- **Collaborator:** The Collaborator permission is unique in that it does not grant any specific permissions. Instead, it modifies the other permissions to only apply to patients that the user has been explicitly granted access to via the Manage Patient Access dialog (users are automatically granted patient access if they create or upload new patient data). This means that a collaborator with *Read Patients*, *Write Patients*, and *Contour Patients* permissions within a workspace may only view and edit patients within that workspace that they have either (1) manually created, (2) uploaded, or (3) been granted access to via the Manage Patient Access dialog by a user with *Manage Users, Roles, and Workspaces* permission. Please note that collaborators may not view, edit, or delete collections (due to their limited patient access) and, as such, these permissions are disabled when the user is marked as a collaborator. In addition, due to the way workspaces inherit organization permissions, a role may not be granted any organization-level permissions if marked as a collaborator within any workspaces (you may, however, mark a role as a collaborator in one workspace and have regular, non-collaborator access to other workspaces). Please refer to the Managing Access to Patients article for additional information about how the collaborator permission may be used to manage access within an organization.

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

Editing Role Permissions

Changes to a role will take effect immediately. However, in certain situations, the user interface may not be updated to reflect these changes until after the user refreshes the page or signs in again.

Deleting Roles

1. With a role selected from the sidebar, press the **Delete** button.
2. To confirm that you wish to delete the role, press the **Delete** button.

A Note About Deleting Roles

A role cannot be deleted if it is in use by one or more users.

ProKnow

Managing Users — Organization Personnel

IN THIS ARTICLE

A ProKnow user is an entity (usually a person) who uses the system. A user must be assigned to exactly one role. This article explains how to manage users.

Note: You must have the *Manage Users, Roles, and Workspaces* permission to manage users for your organization.

Viewing Users

To view your organization's users, click on the ProKnow icon in the top left corner of the page, and select **Users** 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 users sidebar is to the right of the tabs. The sidebar holds a list of users that belong to the organization with a button to create users at the top. Click on one of the users to select it.

The main content area will update to display the details for the selected user. You will notice a large grey bar at the top of this space. On the left is the name of the user with a link to the user's role and a link to send the user an email. On the right you will find buttons for editing and deleting the selected user.

Inactive Users

By default, only active users are shown in the list. To show inactive users, too, click on the filter dropdown and

> By default, only active users are shown in the list. To show inactive users, too, click on the filter dropdown and check the box next to **Show Inactive**.

Creating Users

1. Press the **Create** button at the top of the users sidebar.
2. Enter the user's **Name** and **Email** and assign a **Role** from the dropdown. The email must be unique across all users in your organization.
3. Press the **Create** button to create the user.

> ### What's next for your users?
>
> For every user you create, we recommend you point them to our article Logging In for the First Time and Beyond and our searchable help articles, which will help them get started in ProKnow.
>
> ### Roles as Templates
>
> The role assigned to a user may be used as a template to further customize the user's permissions according to their unique responsibilities within your organization. See Editing User Permissions for instructions on how to customize a user's permissions.

Editing Users

1. With a user selected from the sidebar, press the **Edit** button.
2. Modify the field values as needed. The **Email** must be unique across all users in your organization.
3. Press the **Save** button to save your changes to the user.

> ### Updating a User's Role
>
> Changes to a user's role will take effect immediately. However, in certain situations, the user interface may not be updated to reflect these changes until after the user refreshes the page or signs in again.

Editing User Permissions

> ### Private Roles
>
> Customizing a user's permissions using these instructions creates a "private role" that is disconnected from the formal role to which they were originally assigned. These special roles do not show up in the list of roles on the **Roles** tab.

the Roles tab.

You may change a user's role back to a formal role by following the instructions above for Editing Users.

1. With a user selected from the sidebar, press the **Edit Permissions** button.
2. Check and uncheck the boxes for each of the Advanced Permissions and Organization Management Permissions to grant and revoke permissions as needed. Descriptions for these permissions are provided in those tables.
3. Check and uncheck the boxes under Organization Permissions to grant and revoke permissions as needed. Permissions granted at this level will apply to every workspace in the organization and will overwrite any permissions defined at the workspace level. These permissions are defined as follows.
   - **Read Patients**: This permission allows the user to read patient data across every workspace in the organization.
   - **View PHI**: This permission allows the user to view PHI (Protected Health Information) across every workspace in the organization.
   - **Download DICOM**: This permission allows the user to download DICOM files, including both the original uploaded files and new versions of the DICOM structure set.
   - **Write Patients**: This permission allows the user to create and modify patient data across every workspace in the organization. That includes uploading patient data, updating the patient fields and custom metrics for a patient, adding the patient to collections, modifying patient entities, and managing the patients' scorecards.
   - **Contour Patients**: This permission allows the user to modify patient contours for existing structure sets across every workspace in the organization.
   - **Delete Patients**: This permission allows the user to delete patients and patient entities across every workspace in the organization.
   - **Read Collections**: This permission allows the user to read collection data across every workspace in the organization.
   - **Write Collections**: This permission allows the user to create and edit collection data across every workspace in the organization. That includes creating both organization and workspace collections, editing organization and workspace collections, adding batches of patients to a collection, managing collection scorecards, and managing collection bookmarks.
   - **Delete Collections**: This permission allows the user to delete organization and workspace collections across every workspace in the organization.

across every workspace in the organization.

- **Collaborator:** The Collaborator permission is unique in that it does not grant any specific permissions. Instead, it modifies the other permissions to only apply to patients that the user has been explicitly granted access to via the Manage Patient Access dialog (users are automatically granted patient access if they create or upload new patient data). This means that a collaborator with *Read Patients*, *Write Patients*, and *Contour Patients* permissions may only view and edit patients that they have either (1) manually created, (2) uploaded, or (3) been granted access to via the Manage Patient Access dialog by a user with *Manage Users, Roles, and Workspaces* permission. Please note that collaborators may not view, edit, or delete collections (due to their limited patient access) and, as such, these permissions are disabled when the user is marked as a collaborator. In addition, due to the way workspaces inherit organization permissions, a role may not be marked as an organization collaborator and also have workspace-specific permissions (you may, however, mark a role as a collaborator in one workspace and have regular, non-collaborator access to other workspaces). Please refer to the Managing Access to Patients article for additional information about how the collaborator permission may be used to manage access within an organization.

4 To add a workspace level permission, scroll to the bottom of the Workspaces Permission section, select the workspace from the dropdown, and press the **Add** button. To remove an existing row of workspace permissions, press the orange **X** to remove the row. Check and uncheck the boxes under Workspace Permissions to grant and revoke permissions as needed. Permissions granted at this level will apply only to the corresponding workspace for that row. These permissions are defined as follows.

- **Read Patients**: This permission allows the user to read patient data across the workspace.
- **View PHI**: This permission allows the user to view PHI (Protected Health Information) across the workspace.
- **Download DICOM**: This permission allows the user to download DICOM files, including both the original uploaded files and new versions of the DICOM structure set.
- **Write Patients**: This permission allows the user to create and modify patient data across the workspace. That includes uploading patient data, updating the patient fields and custom metrics for a patient, adding the patient to collections, modifying patient entities, and managing the patients' scorecards.
- **Contour Patients**: This permission allows the user to modify patient contours for existing structure sets across the workspace.
- **Delete Patients**: This permission allows the user to delete patients and patient entities across the workspace.
- **Read Collections**: This permission allows the user to read collection data across the workspace.
- **Write Collections**: This permission allows the user to create and edit collection data across the workspace. That includes creating workspace collections, editing workspace collections, adding batches of patients to a collection, managing collection scorecards, and managing collection bookmarks.
- **Delete Collections**: This permission allows the user to delete workspace collections for the workspace.
- **Collaborator:** The Collaborator permission is unique in that it does not grant any specific permissions. Instead, it modifies the other permissions to only apply to patients that the user has been explicitly granted access to via the Manage Patient Access dialog (users are automatically granted patient access if they create or upload new patient data). This means that a collaborator with *Read Patients*, *Write Patients*, and

Contour Patients permissions within a workspace may only view and edit patients within that workspace that they have either (1) manually created, (2) uploaded, or (3) been granted access to via the Manage Patient Access dialog by a user with *Manage Users, Roles, and Workspaces* permission. Please note that collaborators may not view, edit, or delete collections (due to their limited patient access) and, as such, these permissions are disabled when the user is marked as a collaborator. In addition, due to the way workspaces inherit organization permissions, a role may not be granted any organization-level permissions if marked as a collaborator within any workspaces (you may, however, mark a role as a collaborator in one workspace and have regular, non-collaborator access to other workspaces). Please refer to the Managing Access to Patients article for additional information about how the collaborator permission may be used to manage access within an organization.

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

Deleting Users

1. With a user selected from the sidebar, press the **Delete** button.
2. To confirm that you wish to delete the role, press the **Delete** button.

> ### A Note About Deleting Users
>
> Please note that you may not delete users once they have performed operations that have become part of historical records. In these cases, you may deactivate the user instead.

ProKnow

Importing and Exporting Users

IN THIS ARTICLE

Importing and exporting users from a CSV file is a convenient and quick way to manage a large cohort of users. Use this article to learn how to use this feature.

Exporting Users

1. Click on the ProKnow icon in the top left corner of the page, and select **Users** under **Identity and Access Management**.
2. Click on the **Actions** dropdown, and press **Export Users as CSV**.
3. Open the CSV, which will contain the name, email, role, and active state for each user in your organization.

The Role Column

For users assigned to standard roles, the name of the role will be supplied in the Role column. For users assigned to private roles, the Role column will contain the special value [Private Role].

Importing Users

Before you begin, you must construct your CSV. Your CSV must, at minimum, contain columns for the email, name, role, and active status for the users you wish to import. The user email field provided in the spreadsheet will be cross-referenced against the current list of users to determine whether to create a new user with the provided values or update an existing user with the provided values.

1. Click on the ProKnow icon in the top left corner of the page, and select **Users** under **Identity and Access Management**.
2. Click on the **Actions** dropdown, and press **Import Users from CSV**.
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

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.

ProKnow

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

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

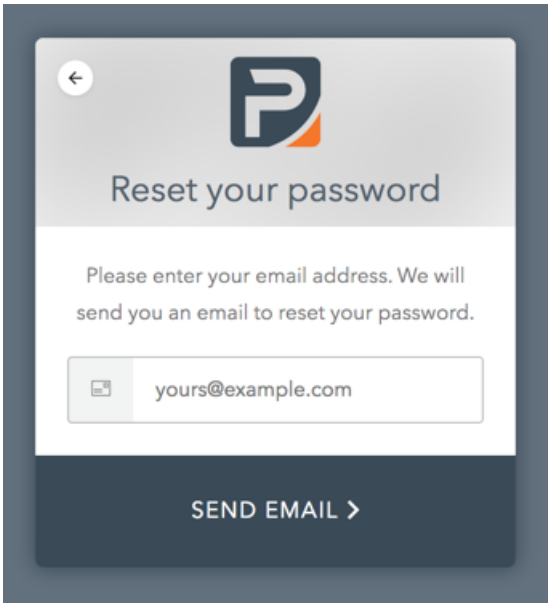
1. Find your organization's custom subdomain. If you're not sure what this is, please contact your organization's administrator.

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.

6 Enter and confirm a new password, and press the submit button.

Not receiving a reset password email?

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.

ProKnow

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

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 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).

ProKnow

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

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.

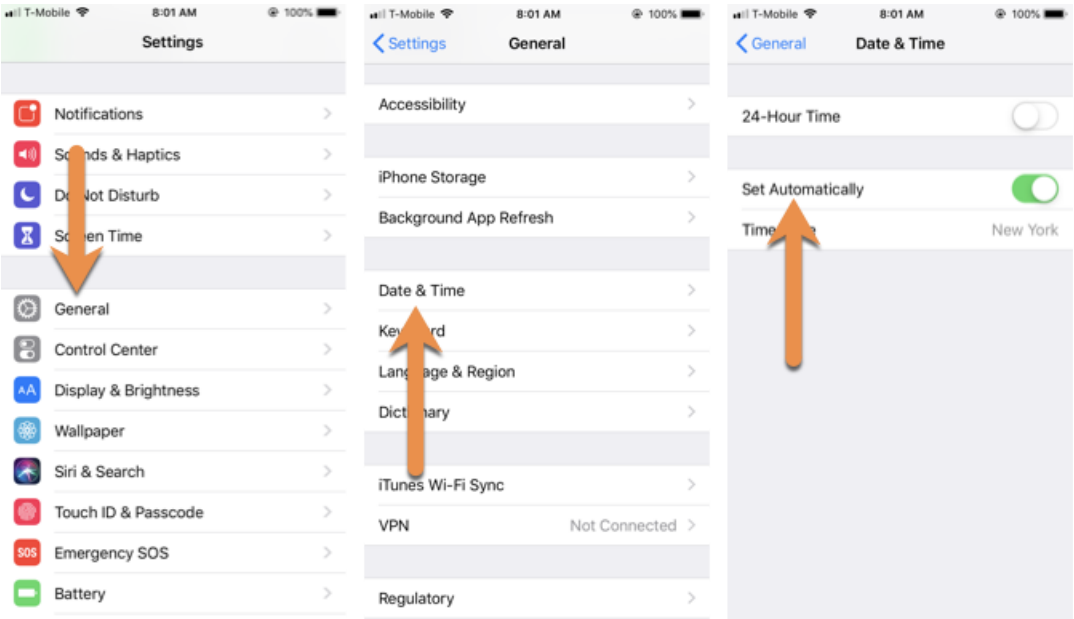
ProKnow

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.

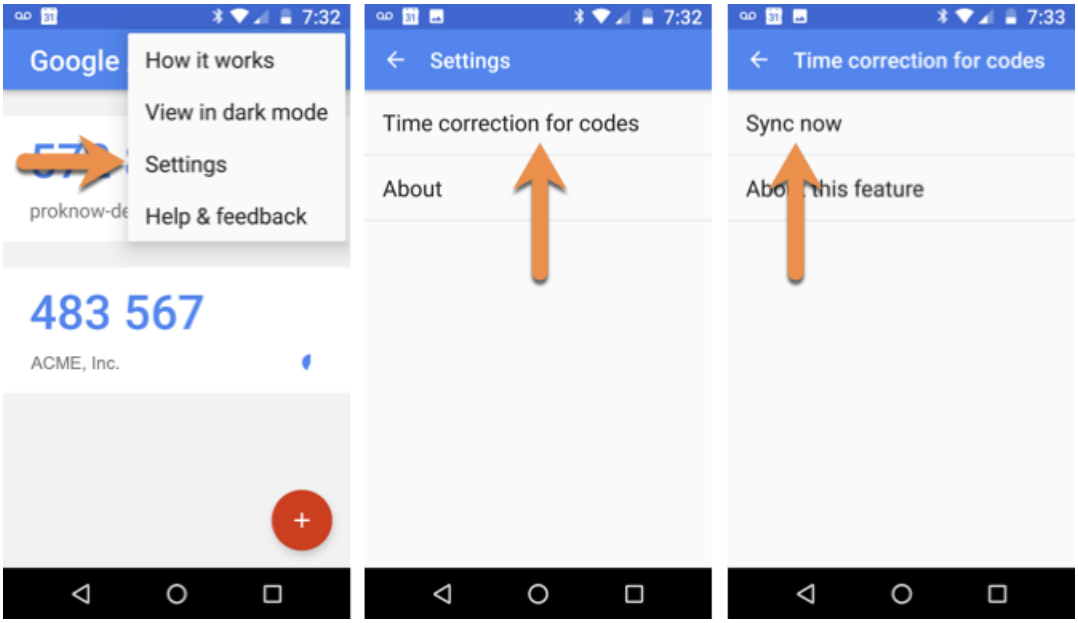
iOS

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?

Currently, only edits to the name and context of a custom metric are supported. Adding the ability to edit the type of a custom metric is on our roadmap. Stay tuned!

ProKnow

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

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 *Write Patients* and *View PHI* permissions for a workspace to upload files to patients in that 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 *Write Patients* and *View PHI* permissions for a workspace to upload files to patients in that workspace.

ProKnow

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

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 *Write Patients* and *View PHI* permissions for a workspace to create patients in that 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 *Write Patients* and *View PHI* permissions for a workspace to upload files to patients in that workspace.

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 *Write Patients* and *View PHI* permission for a workspace to upload files to patients in that workspace.

ProKnow

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.

Note: You must have *View PHI* permission for a workspace to view "Needs Attention" uploads for that workspace.

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 *Write Patients* permission for a workspace to resolve "Needs Attention" uploads in that

> **Note:** You must have *Write Patients* permission for a workspace to resolve "Needs Attention" uploads in that workspace.

ProKnow

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

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.

ProKnow

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.

Note: You must have *Write Patients* and *View PHI* permission for a workspace to import custom metric data for patients in that workspace.

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

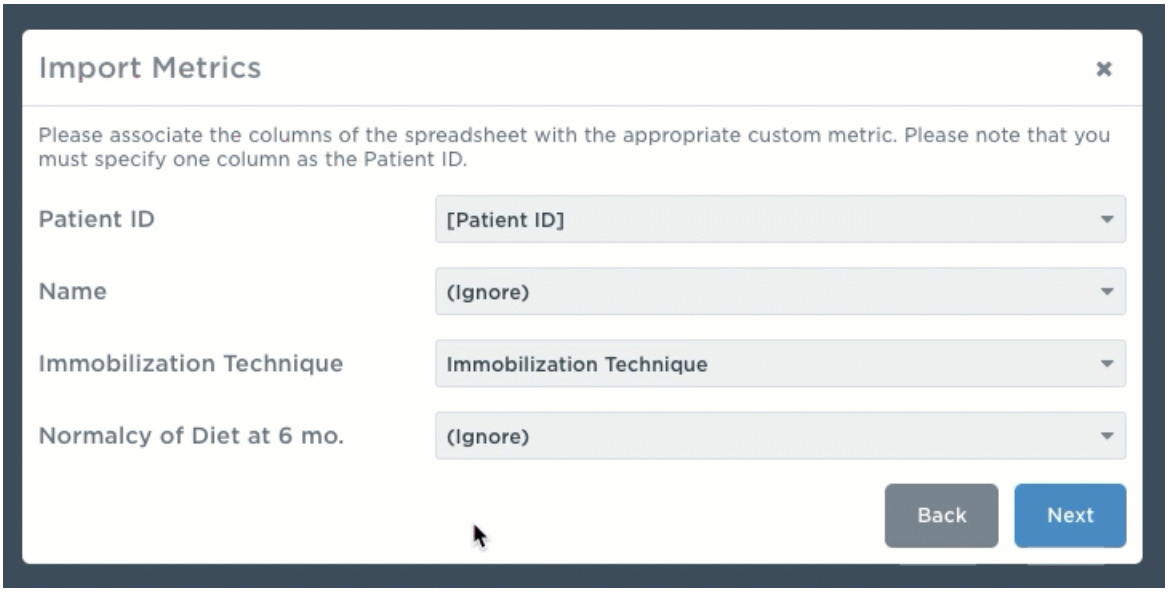
> ### Defining Custom Metrics
>
> To learn more about setting up custom metrics for your organization, visit our Defining Custom Metrics article.

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 DS: Instructions for Use

Indications for Use

DICOM DS is a locally installed, cross-platform application which facilitates transfer of patient data from on-premise clinical systems to the cloud-based ProKnow DS RT-PACS.

Users of DICOM DS 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 DICOM DS are summarized below.

1. DICOM DS facilitates the transfer of patient data from on-premise clinical systems to the cloud-based ProKnow DS RT-PACS.

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.

System Requirements

- Windows 7 or later (preferably Windows 10) or Windows Server
- Java - For a free version of Java, visit https://java.com/download, and click on the Free Java Download button to install it.

Cybersecurity Requirements

Shared Responsibility

DICOM DS is built to interface with ProKnow DS, 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 DS), 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 DICOM DS to ensure a safe and secure environment. By extension, the Cybersecurity Requirements for ProKnow DS have a great amount of relevance to the Cybersecurity Requirements for DICOM DS and can be found here.

Principal 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 DICOM DS requires a credentials.json file, which is obtained by creating an API key in ProKnow DS. 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 DICOM DS have the ability to configure services and options within the DICOM DS Management Console. It is the responsibility of the organization administrator to limit access to the Management Console of DICOM DS 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 personnel using DICOM DS should be aware of and abide by the following guidelines and best-practices:

- Do not open, browse, or compose content in DICOM DS in public areas where it would be easy for others to

eavesdrop.

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

- All computing devices used to access DICOM 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 DICOM 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.

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:

- All timestamps are presented in UTC (Coordinated Universal Time) and denoted with Z at the end of the timestamp string.

Known Limitations

- DICOM DS only accepts DICOM objects with the following modalities: CT, MR, RTSTRUCT, RTPLAN, RTDOSE

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

products and services. Generally with phone support, only a limited number of notes are available.

About

DICOM DS is developed by ProKnow, LLC.

ProKnow

DICOM DS: Release Notes

DICOM DS v2.1.0 (ed65703)

Aug 20, 2019

Bug Fixes

- Added missing LICENSE and NOTICE files to installation package.

Downloads

- DICOM DS v2.1.0 Windows Installer
- DICOM DS v2.1.0

DICOM DS v2.0.1 (6568ce4)

May 22, 2019

Bug Fixes

- Fixed a bug where the DICOM DS could not be started as a service in certain situations.

Downloads

- DICOM DS v2.0.1 Windows Installer
- DICOM DS v2.0.1 JAR File

DICOM DS v2.0.0 (5f9022d)

April 24, 2019

What's New

- Added support for running DICOM DS as a Windows service.
- We've completely redesigned the user interface to be web-based, allowing local and remote management of DICOM services.
- Removed the ability to configure anonymization rules. A more robust version of this feature will be added back in a future version.

Downloads

- DICOM DS v2.0.0 Windows Installer
- DICOM DS v2.0.0 JAR File

DICOM DS v1.0.0

Version 1.0.0 of DICOM DS has been deprecated. You can find legacy documentation for this version here.

ProKnow

Installing DICOM DS

Downloading the Installer

DICOM DS is designed to run on Windows, as a Windows service. The following links allow you to download the latest Windows installer (recommended) and jar for DICOM DS.

- DICOM DS v2.1.0 Windows Installer
- DICOM DS v2.1.0

For previous versions of DICOM DS, please see the Release Notes.

Using the Installer

1. Download and run the installer as an administrator. Please note that you may receive a message asking you to confirm whether you wish to allow the installer executable to run. In order to use the installer, you will need to press **Yes**.
2. Once the installer starts, you will be brought to a welcome screen reminding you that a recent version of the Java is required. Once you're ready to continue, press the **Next** button.
3. The next screen allows you to choose which components to install. **DICOM DS Core** component consists of the entire application package and is required. **Install as a Service** is an optional component. When checked, the installer will install DICOM DS Core and then install and run DICOM DS as a Windows Service.

   Once you've made your selections, press the **Install** button.
4. The installation page will show the progress of the install for the components selected in step 3. Once complete, the installation will automatically progress to the next page.
5. The last page will confirm that the install is complete. Click on the **Configure DICOM DS** link to open the DICOM Management Console in your default web browser.

   Press **Finish** to close the installer.

What is the installer actually doing during the install phase?

- Installs the application JAR file, the uninstaller, and YAJSW library files in the DICOM DS directory in your program files directory (e.g., **C:\Program Files (x86)\DICOM DS**)
- Sets up supporting application directories for storing your service configurations and logs (e.g. **C:\Program Data\DICOM DS**).

- Registers the uninstaller so that the application may be located and uninstalled from your Control Panel.

Command Line Options

The recommended way to run DICOM DS is as a service and installed using the method described above. Alternatively, you may download the jar file and provide customized options to start DICOM DS.

```
java -Dhttp.port=<port> -DLOGS_DIR=<log_directory> -DCONFIGS_DIR=<configuration_directory>
```

Argument	Required	Default	Description
-Dhttp.port	yes		The port number that the application listens on for HTTP requests from the user interface.
-DLOGS_DIR	no	${user.home}/.proknow/dicom-ds/logs where ${user.home} is the user's home directory and is system dependent	The directory in which to store the application logs. We recommend this to be a subdirectory of the -DCONFIGS_DIR.
-DCONFIGS_DIR	no	${user.home}/.proknow/dicom-ds where ${user.home} is the user's home directory and is system dependent	The directory in which to store the application configurations.
-DLOG_MAX_HISTORY	no	30	The maximum number of days for which to retain log files. Fewer days of log files may be retained, if necessary, to respect the LOG_TOTAL_SIZE_CAP.
-DLOG_MAX_FILE_SIZE	no	10MB	The maximum log file size, e.g. 10MB or 1GB. Note that there is no space between the integer scalar and the units. This is an approximation +/- 10% due to buffering and threading. Once the application logfile (app.log) reaches this size, it will be renamed to app-yyyy-MM-dd.i.log where yyyy-MM-dd is the current date and i is an index that increments from 0. A new app.log file will then be created and become the current logfile.

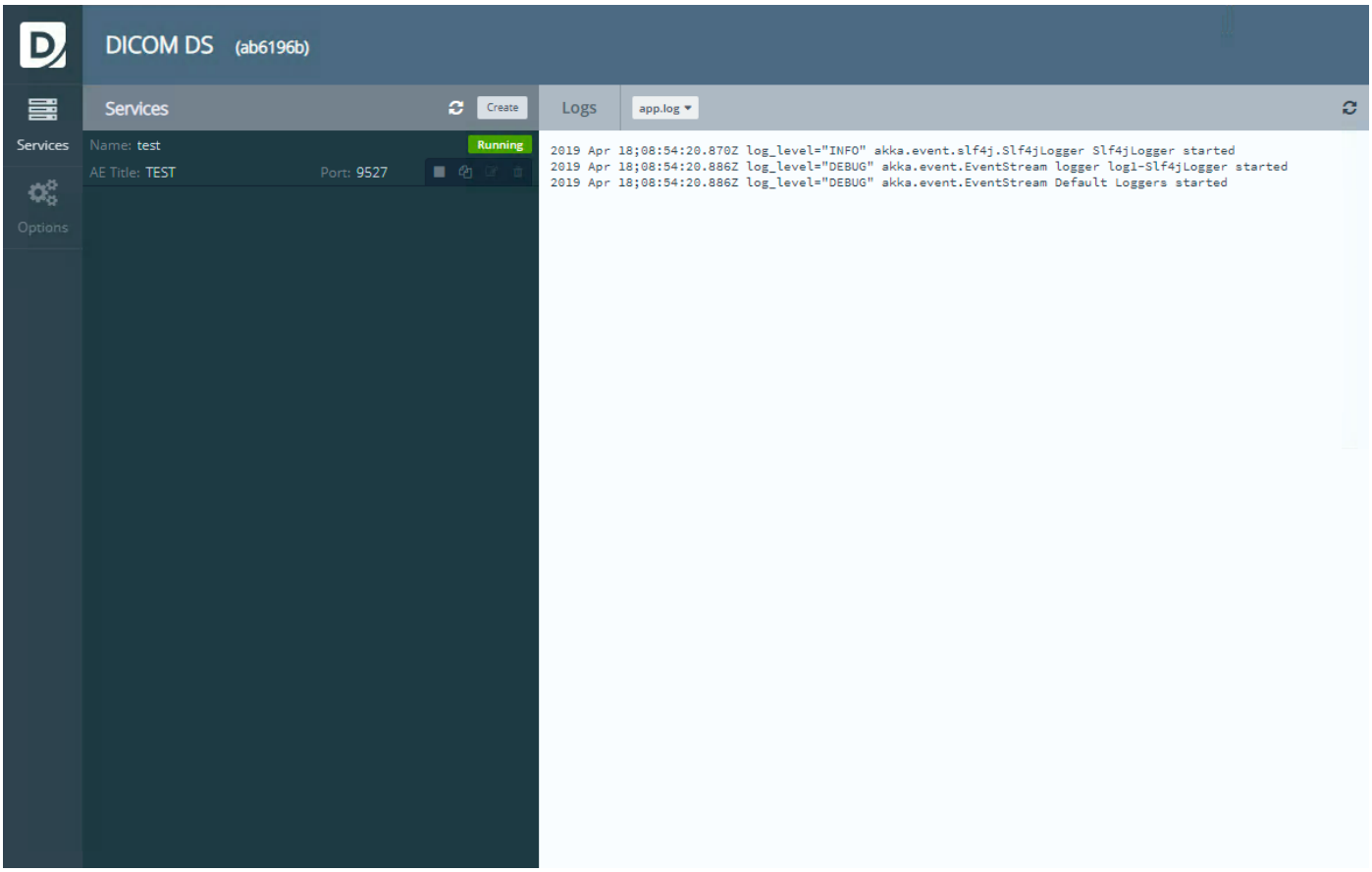
Argument	Required	Default	Description
-DLOG_TOTAL_SIZE_CAP	no	1GB	The maximum total size of all log files, e.g., 512MB or 2GB. Note that there is no space between the integer scalar and the unit. Older log files will be deleted to prevent exceeding this size.
-Djava.net.useSystemProxies	yes		The flag indicating whether the application should use system proxies. Please set this value to true.
-Dpidfile.path	yes		The path for the application process ID (PID) file. Please set this value to Nul so that no process ID file is created.
-Dplay.http.secret.key	yes		A secret key that is used for signing session cookies and CSRF tokens as well as for built-in encryption utilities. The key needs to be at least 32 bytes of random input and can be generated with a command such as: > *head -c 32 /dev/urandom | base64*
-jar	yes		The file path to the DICOM DS jar file

ProKnow

Configuring DICOM DS Services

Viewing Configured Services

To view your service configurations, point your browser to http://localhost:9526 to open the Management Console. If you're attempting to access the Management Console from a different machine, replace "localhost" with the IP address of the machine on which DICOM DS is running. If you are running the JAR file manually using a port other than 9526, replace 9526 with that port. If DICOM DS is running, you should see a page that looks like this.



Select the Service 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, copying the service, editing the service, and deleting the service.

Creating a Service

1. Press the **Create** button in the Services sidebar header.

2 Please enter values for the fields in the **Configuration** and **ProKnow Credentials** section.

- 3 **Name**: The name of the new service.
- 4 **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.
- 5 **Port**: A number between 1 to 65535. It is recommended that you choose a port value of 3000 and above.
- 6 **Base URL**: The base URL for your ProKnow DS 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 DS).
- 7 **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 DS. See Managing API Keys for more information.

Enable either the **ProKnow DS Cloud Storage** section or the **Local Storage** section or both. At least one section must be enabled. If the ProKnow DS Cloud Storage section is enabled, you must provide a value for Workspace Unique URL ID corresponding to a valid workspace in your ProKnow DS organization. Services configured with this option will store DICOM objects in ProKnow DS within the specified workspace. If the Local Storage 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 DICOM objects locally (in the Root Folder location).

> ### Permissions and the Credentials File
>
> The API key that you create and download from ProKnow DS inherits the permissions of the user who created it. This user must be active for the credentials.json to be valid. In addition, to use the ProKnow DS Cloud Storage option, the user must have Write Patients and View PHI permission on the specified workspace.

8 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 start stop a running service, press the **Stop** button from the service toolbar.

Copying a Service

To copy a service configuration to a new service, press the **Copy** button. Then follow the instructions for Creating a Service above.

Editing a Service

To edit a service, the service must be stopped. Once it has been stopped press the **Edit** button, make changes to the service, and then press **Save**.

Deleting a Service

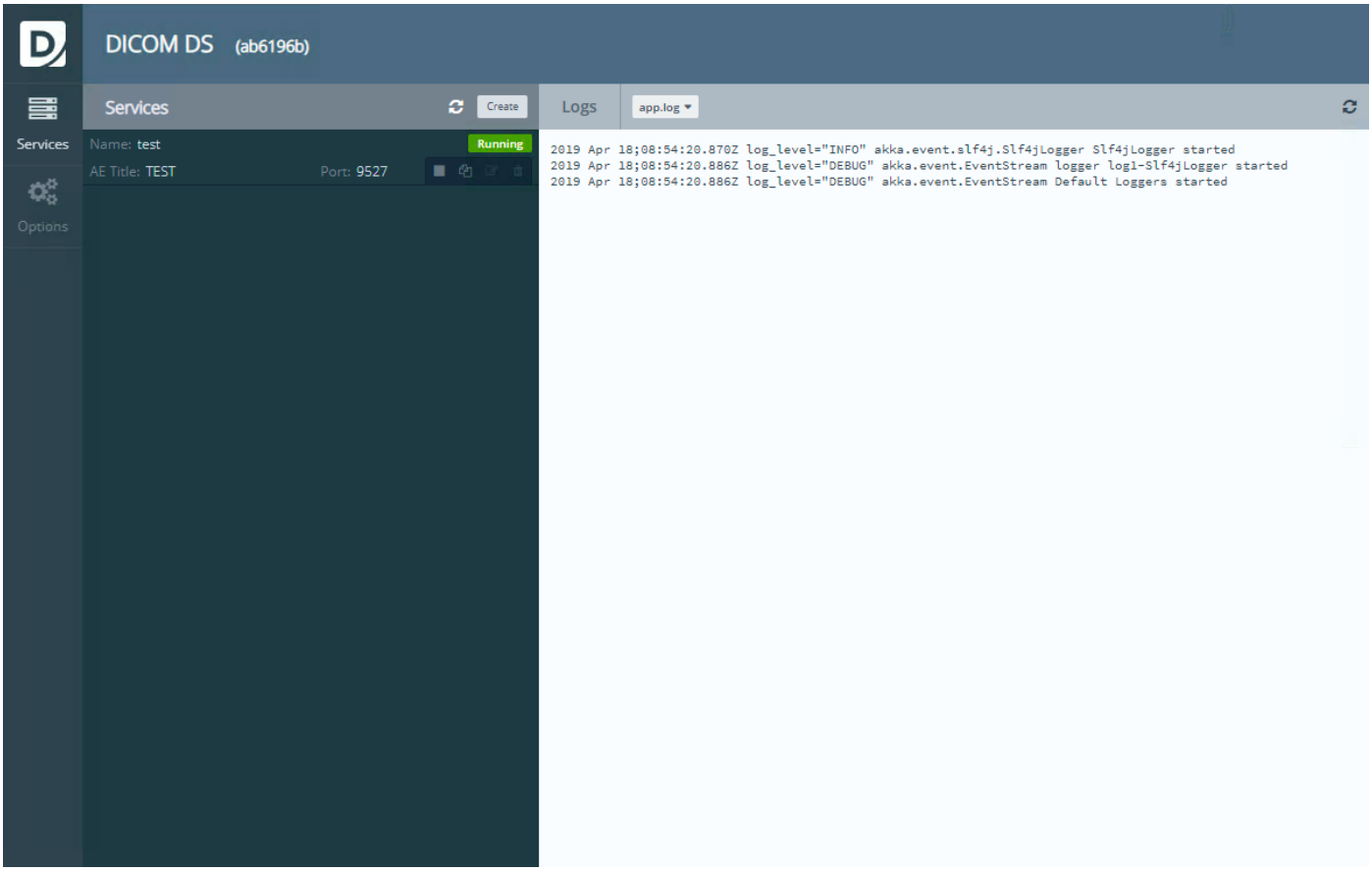
To delete a service, the service must be stopped. Once it has been stopped press the **Delete** button, and use the Delete Service dialog to confirm the operation.

ProKnow

Configuring DICOM DS Options

Accessing DICOM DS Options

To access the configuration options for DICOM DS, point your browser to http://localhost:9526 to open the Management Console. If you're attempting to access the Management Console from a different machine, replace "localhost" with the IP address of the machine on which DICOM DS is running. If you are running the JAR file manually using a port other than 9526, replace 9526 with that port. If DICOM DS 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 DICOM DS.

Configuring the Log Level

1. 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 *Warnings* level is recommended, however, a ProKnow

support engineer may recommend another level while attempting to diagnose a problem with DICOM DS.

3 Press **Save** to save your configuration options.

ProKnow

Is there a way to export files directly from my TPS?

Yes! DICOM DS is a complementary software to ProKnow DS 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 DS cloud storage and/or (2) to local storage repositories. Below is a summary of key features of DICOM DS.

- DICOM storage "service class provider" (SCP) that can run on any operating system
- Run different services in parallel
- Optional and automatic anonymization of key DICOM tags before upload/store
- Ability to auto-run service(s) on system startup and keep running
- Monitor and manage all services from a Windows application (DICOM DS Manager)

Head over to our DICOM DS Local Data Services page for information on how to use DICOM DS.

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.

ProKnow

Managing Patients in a Workspace

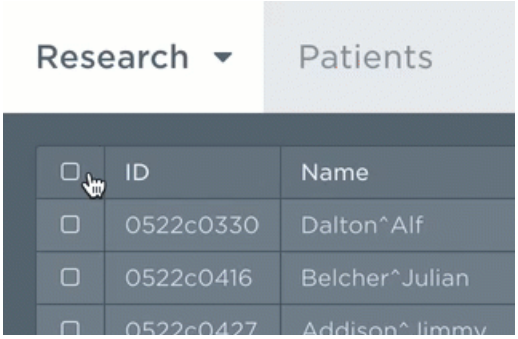
IN THIS ARTICLE

Once you have uploaded patients using either the Uploads module or the DICOM DS Local Data Services, 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.

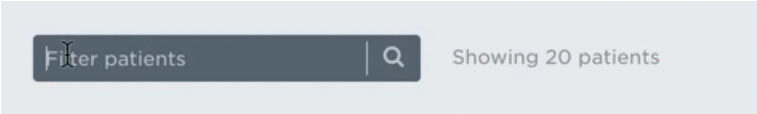
> **Note**: You must have *Read Patients* permission to view the list of a patients for a particular workspace.

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 *Write Patients* and *View PHI* permissions to create patients in a 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.

Adding Patient Doses to a New or Existing Collection

Collections may only reference one dose distribution per patient. Patients containing multiple dose

> distributions will be skipped. To add patients with multiple doses distributions to the collection, activate the dose you wish to add on the Patient Browse tab, and add it to one or more collections on the Patient Collections tab.

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.

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.

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 *Download DICOM* and *Delete Patients* permissions for a workspace to move patients from that workspace and *Write Patients* and *View PHI* permissions 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 *Download DICOM* permission for a workspace to copy patients from that workspace and *Write Patients* and *View PHI* permissions 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.

ProKnow

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

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 *Write Patients* and *View PHI* permissions for a workspace to edit patients in that workspace.

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.

Locate the file in your downloads folder.

3

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 DICOM* permission for a workspace to download DICOM data for patients in that workspace.

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 *Download DICOM* and *Delete Patients* permissions for a workspace to move patients from that workspace and *Write Patients* and *View PHI* permissions 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 *Download DICOM* permission for a workspace to copy patients from that workspace and *Write Patients* and *View PHI* permissions 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 *Write Patients* and *View PHI* permissions for a workspace to upload files to patients in that

> workspace.

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 *Write Patients* and *View PHI* permissions for a workspace to upload files to patients in that workspace.

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.

ProKnow

Managing Access to Patients

IN THIS ARTICLE

This article describes how patient access is controlled within ProKnow DS, including how you can manage access to individual patients using the Collaborator permission.

Understanding Patient Access

All access and permissions within ProKnow DS are controlled by assigning roles to users. Generally speaking, once a user is granted *Read Patients* permission (either at the organization level or within a particular workspace) they are able to see all related patients. Specifically, if *Read Patients* is granted at the organization level, they are able to see ALL patients within ALL workspaces. If *Read Patients* is only granted for specific workspaces then they are able to see ALL patients within those specific workspaces. The same logic also applies to the other patient permissions (i.e., *View PHI*, *Download DICOM*, *Write Patients*, *Contour Patients*, and *Delete Patients*); once a user has been granted a particular permission, that permission applies to ALL patients in either ALL workspaces, if the permission is granted at the organization level, or in a specific workspace, if the permission is granted at the workspace level.

The above logic applies to all normal (i.e., non-collaborator) users. However, the rules governing patient access changes once a user has been designated as a collaborator. 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 user may obtain explicit access to patients in two ways:

1. A user is 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). Please note that in order to create or upload patient data, the user must also have the *View PHI* and *Write Patients* permission.
2. A user may be granted access from the Manage Patient Access dialog by another user with *Manage Users, Roles, and Workspaces* permission (described below).

Please note that in either case, the Manage Patient Access dialog may be used to later grant or revoke access to any collaborator within the current workspace.

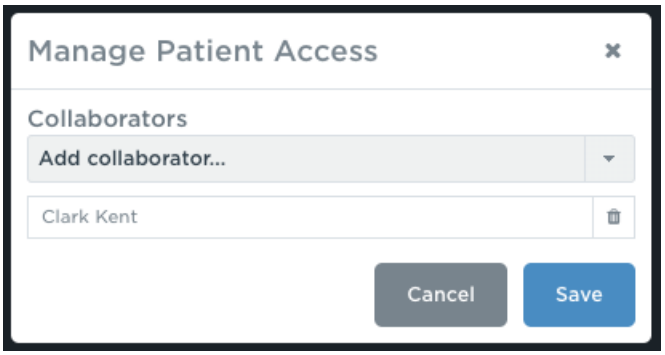
As an example, let's assume that a particular workspace has 3 patients: Patient A, Patient B, and Patient C. If a normal user (i.e., non-collaborator) with *Read Patients* access visits the Patients page, they will see all three patients. However, if a collaborator user with *Read Patients*, *View PHI*, *Write Patients,* and *Collaborator* permissions visits the Patients page, they would, by default, see no patients (assuming they did not upload nor have been granted explicit access any of the patients). They could, however, upload a fourth patient, Patient D, and if they visited the Patients page, they would only see Patient D in the list. A manager could also open a particular patient, say, Patient B, and

grant the user access using the Manage Patient Access dialog. The user would now see both Patient B and Patient D. In this regard, the collaborator permission is a useful tool for selectively granting access to particular patients in a workspace (for example, in the case of peer review) as well as for allowing multiple users to upload into a single workspace while only seeing patients they have uploaded (for example, in the case of data collection).

Managing Patient Access

Access to particular patients may be controlled via the Manage Patient Access dialog. The following steps outline this process.

1. With a patient opened, click on the Actions menu in the top right corner of the page and select **Manage Access**.
2. You may grant access to the current patient by selecting a collaborator from the dropdown. Once selected, they will be added to the list of collaborators that have access to the patient (see screenshot below).
3. You may revoke access to a particular collaborator by clicking the trash icon to the right of their name in the list of collaborators that have been granted access to the patient (see screenshot below)
4. Click the **Save** button to save the changes.



> **Note**: You must have the *Manage Users, Roles, and Workspaces* permission in order to manage patient access.

ProKnow

ProKnow › Patient Module › General

Managing Patient Checklists within Workflows

IN THIS ARTICLE

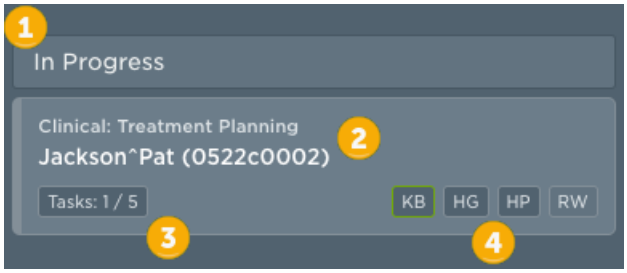
Patient checklists that belong to a workflow may be viewed from the Workflows page. Use this article to learn how to view and manage patient checklists within workflows.

Accessing Patient Checklists

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: With a particular workspace selected, you must have *Write Patients* permission for a workspace to update the state of patient checklists in that workspace. With "All Workspaces" selected, you must have *Write Patients* permission at the organization level.

ProKnow

Patient — Browse

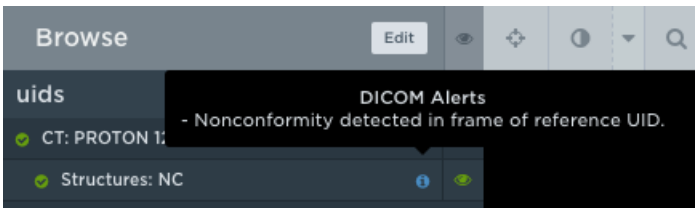
IN THIS ARTICLE

The patient browse tab is useful for managing the patient object hierarchy. You can perform various actions on patient objects by editing and selecting them in the Browse tab.

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

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

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.

Creating a Structure Set

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, and enter a name for the new

3 In the Available Actions menu, choose the **Create Structure Set...** option, and enter a name for the new structure set.

4 Press the **Create** button to create the structure set.

Composite Dose Objects

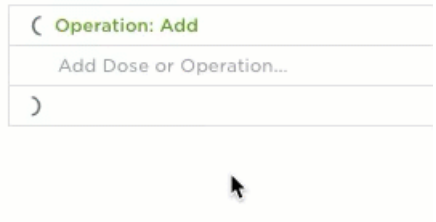
1 With the Browse tab activated, press the **Edit** button at the top of the sidebar.

2 Select one or more dose objects to composite.

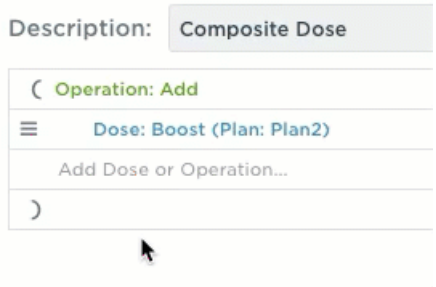
3 In the Available Actions menu, choose the **Composite Dose Objects...** option, and enter a name for the new dose.

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.

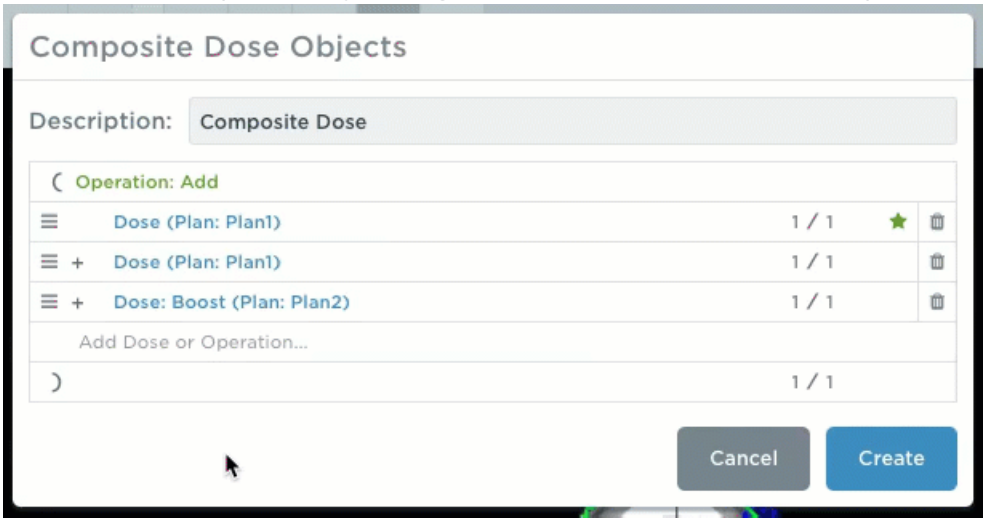
1 Add a new dose or operation by selecting one from the **Add dose or operation...** select box.



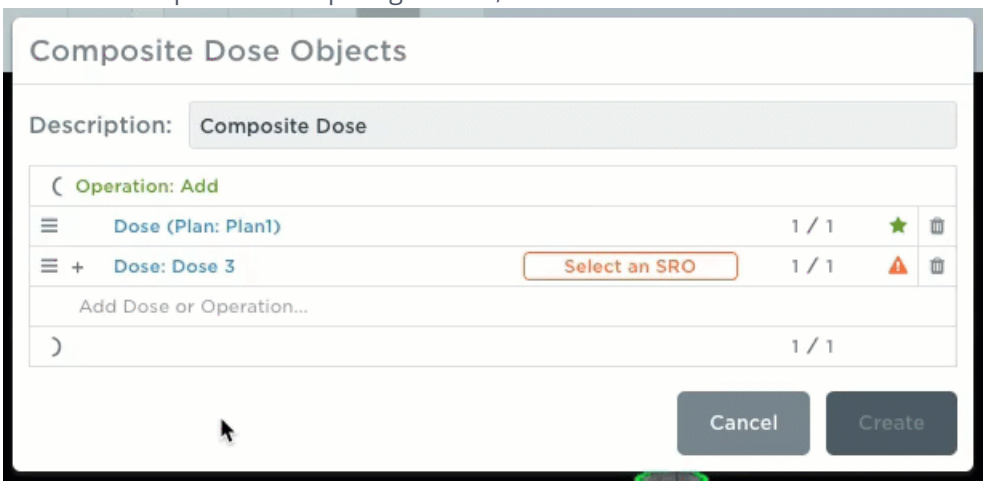
2 Change a dose or operation by clicking on the name of the dose or operation and making a selection from the select box.



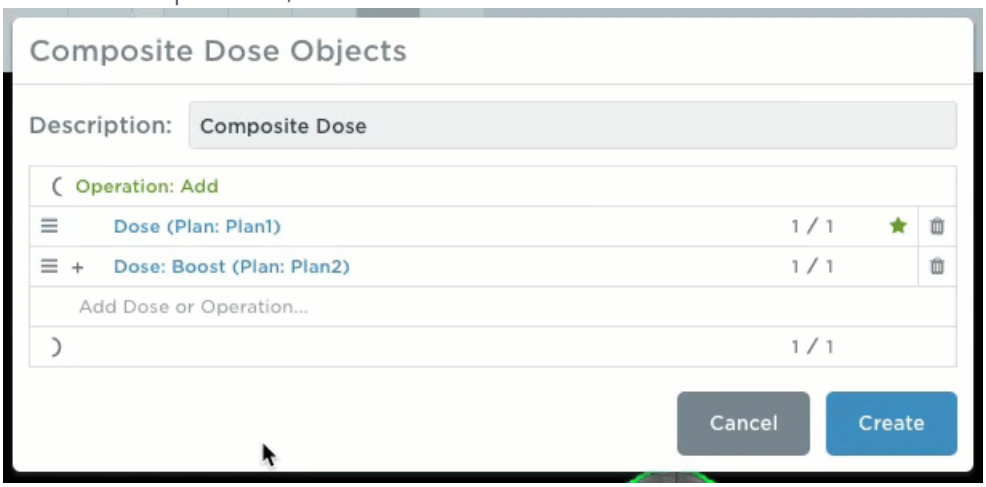
3 Delete a dose or operation by clicking on the trash icon for the dose or operation.



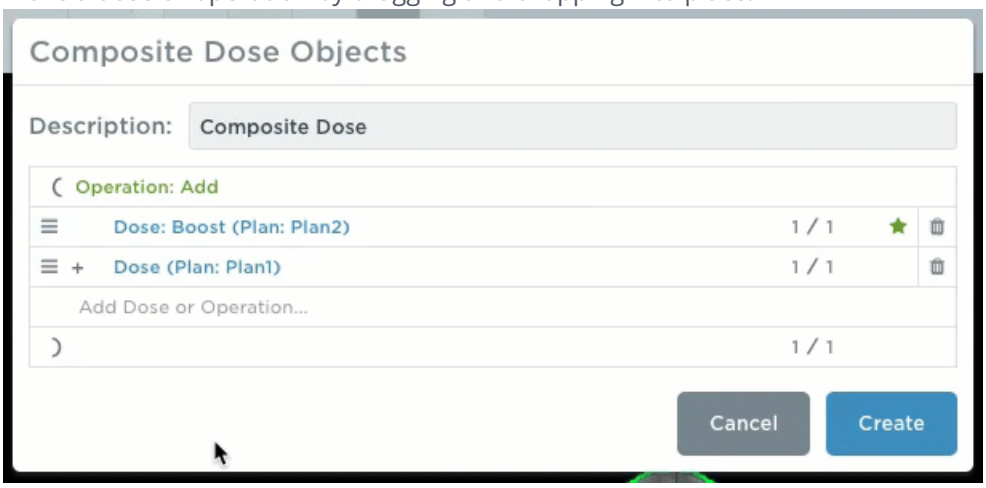
4 For doses or operations requiring an SRO, select an SRO from the select box.



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.

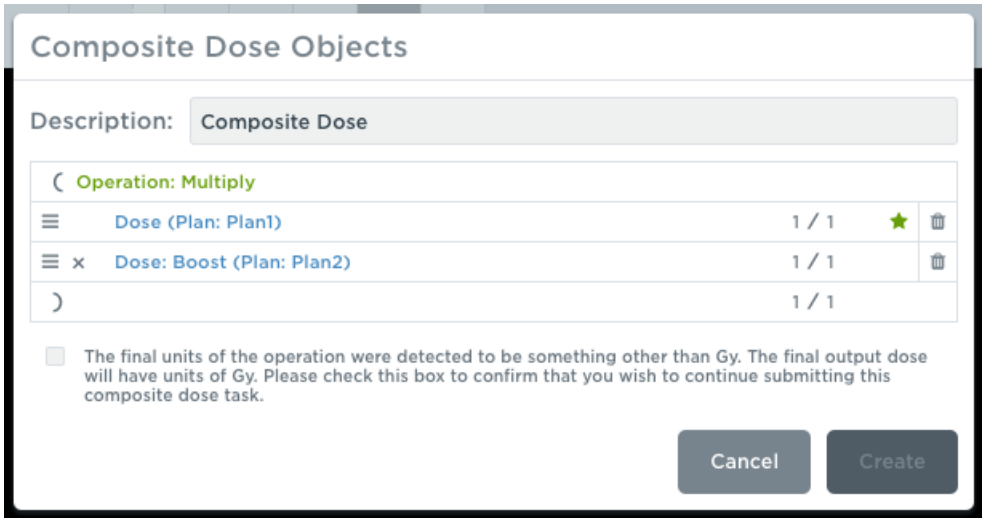
The result dose grid geometry and resolution will also be based on the reference dose grid. The composition process begins with a dose grid that is aligned with, and has the same resolution as, the reference dose grid. It then grows or shrinks the dose grid geometry to ensure that all dose grids are 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 centers). This process occurs locally within each mathematical operation based on the first operand, and then overall based on the reference dose grid.

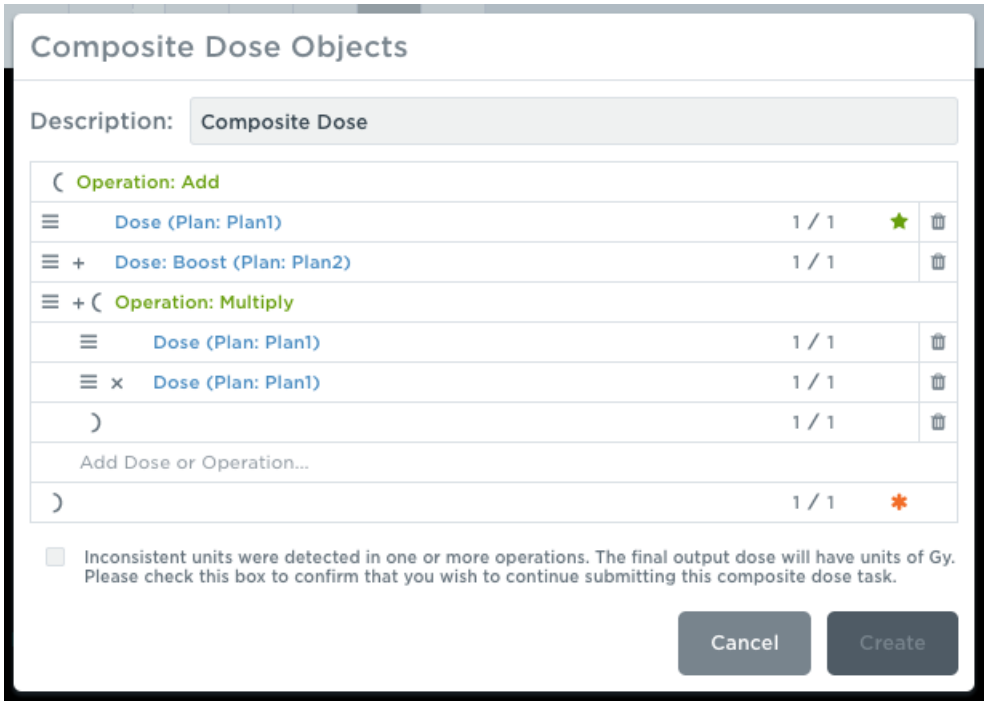
0 Gy

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

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.

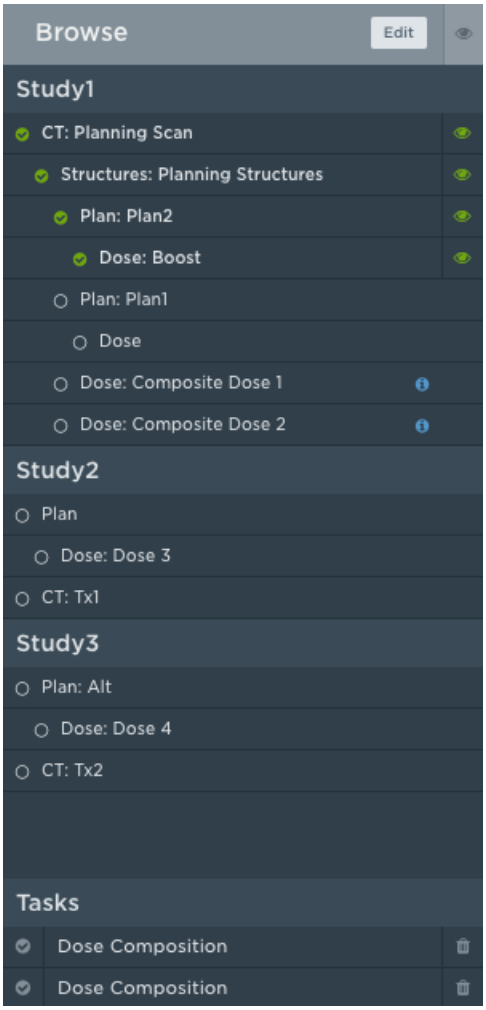
Forcing a Frame of Reference

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

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.



ProKnow

Patient — Structures

IN THIS ARTICLE

Use this article to learn about viewing patient structures.

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 that particular structure is active.

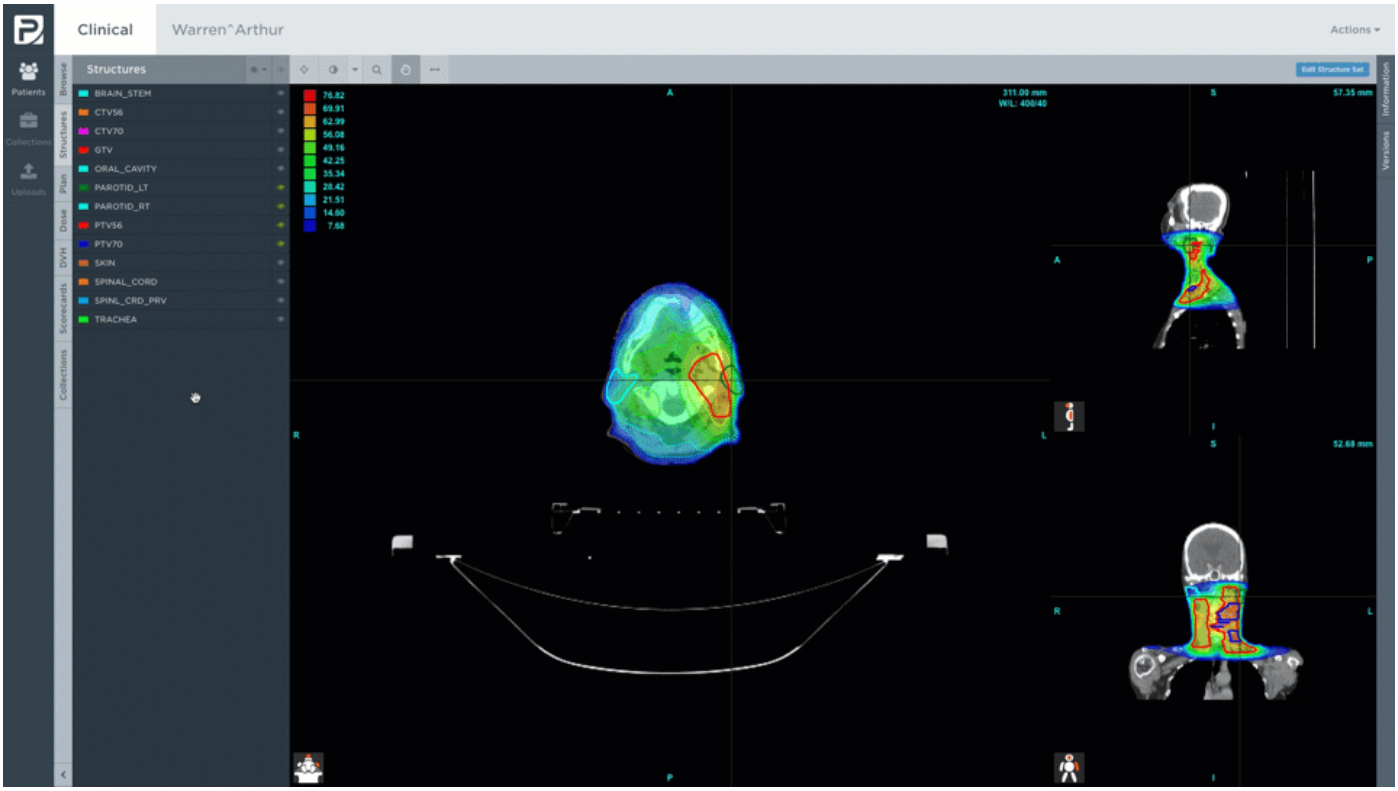
> ### Using the Go to Structure Feature
>
> You can quickly jump to the central slice of a structure in the patient viewer by double-clicking the structure row.

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.

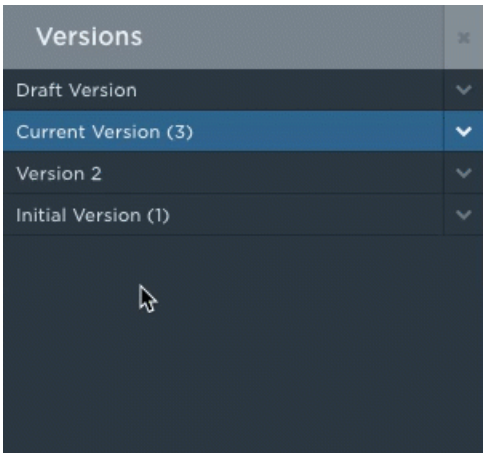


Creating a New Structure Set

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 *Download 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 *Contour Patients* permission for a workspace to commit previous structure set version for patients in that workspace.

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 *Contour Patients* permission for a workspace to edit structure set versions for patients in that workspace. 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 *Contour Patients* permission for a workspace to delete draft structure set versions and *Delete Patients* permission for a workspace to delete archived structure set versions. The currently approved structure set version cannot be deleted (delete the structure set instead).

ProKnow

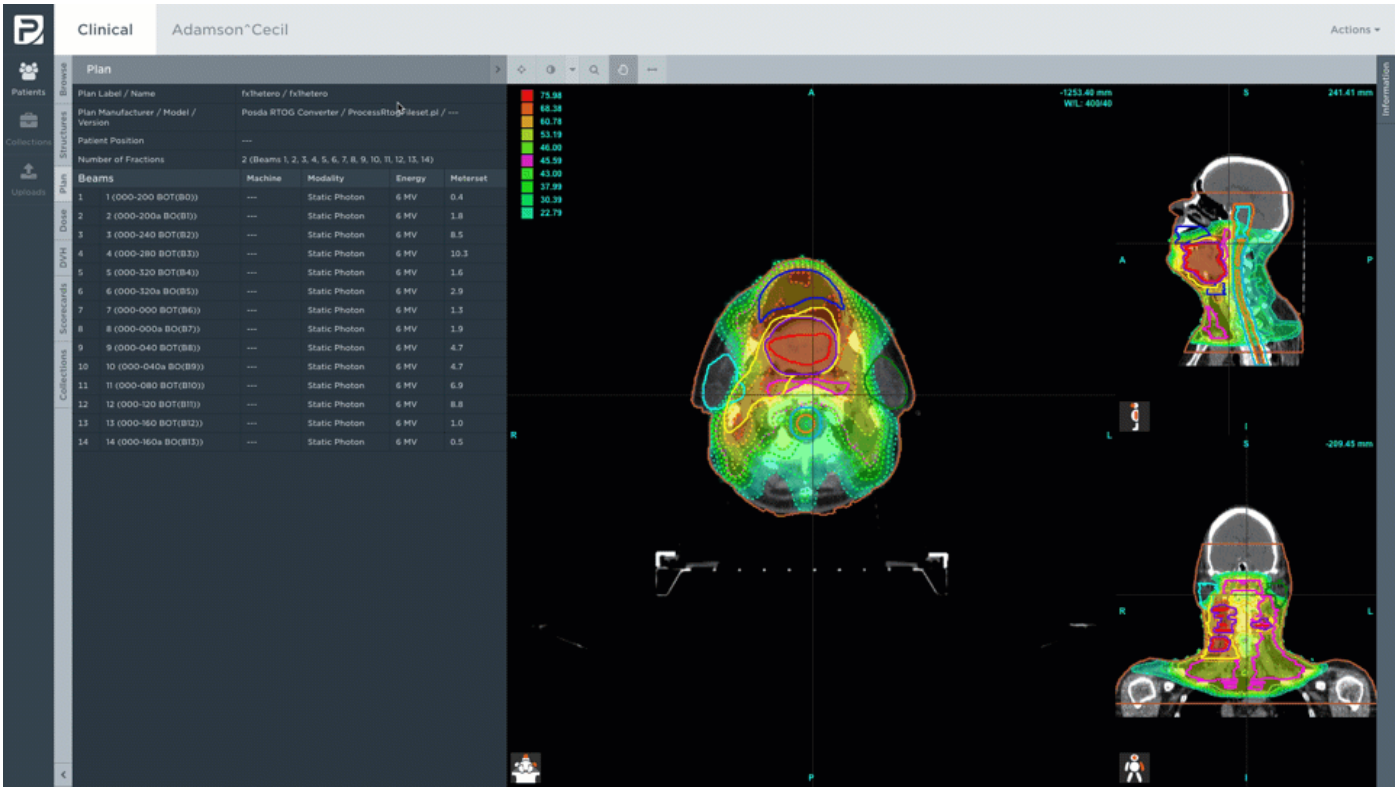
Patient — Plan

IN THIS ARTICLE

Use this article to learn about viewing patient plan information.

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.

ProKnow

Patient — Dose

IN THIS ARTICLE

Use this article to learn about configuring dose levels and dose visibility settings.

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.

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. Specify a **Normalization Dose** in Gy and an **Increment** percentage.

3. 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 Write Patients permissions within the current workspace. If the current user does not have Write Patients permissions, they can still modify the dose visibility settings and levels, but any changes will not be saved.

ProKnow

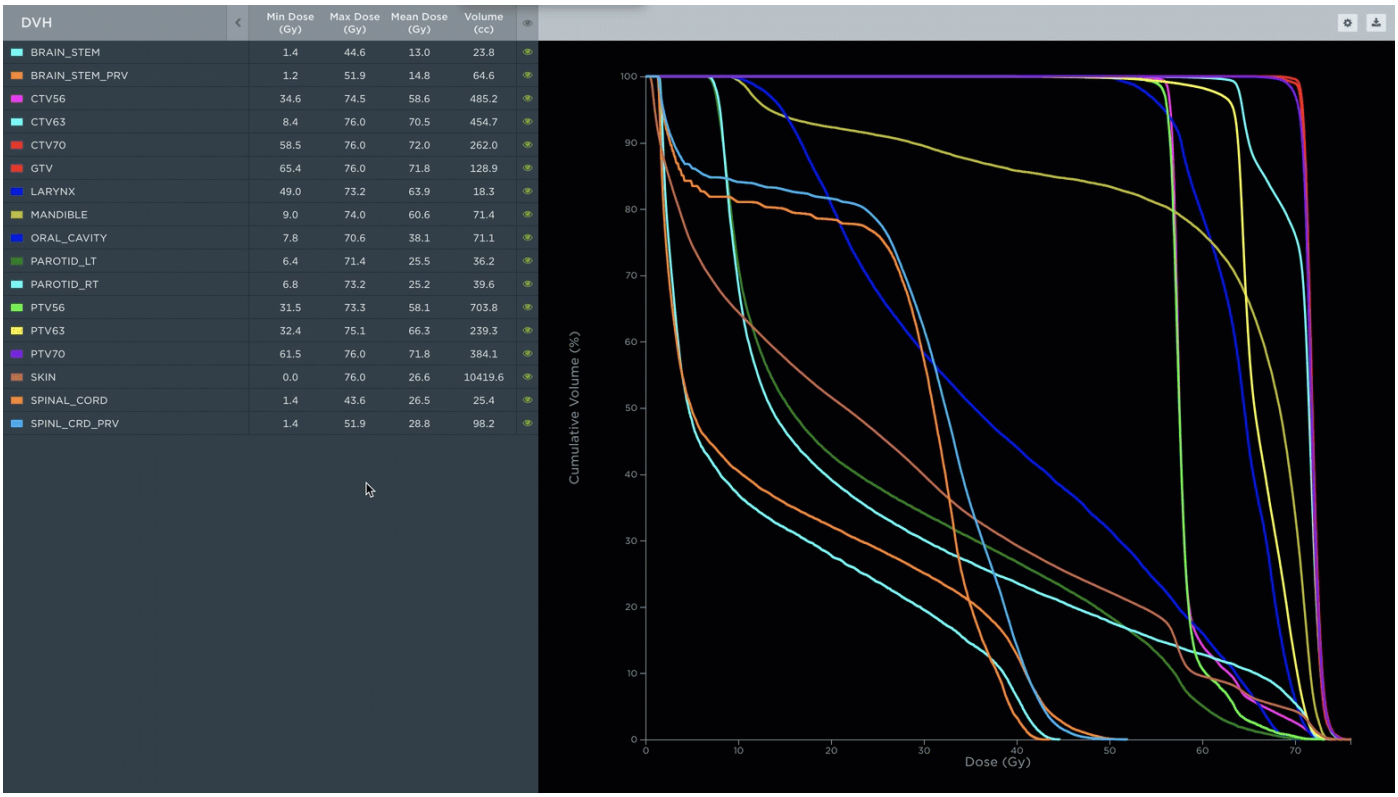
Patient — DVH

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 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

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.

ProKnow

Patient — Scorecards

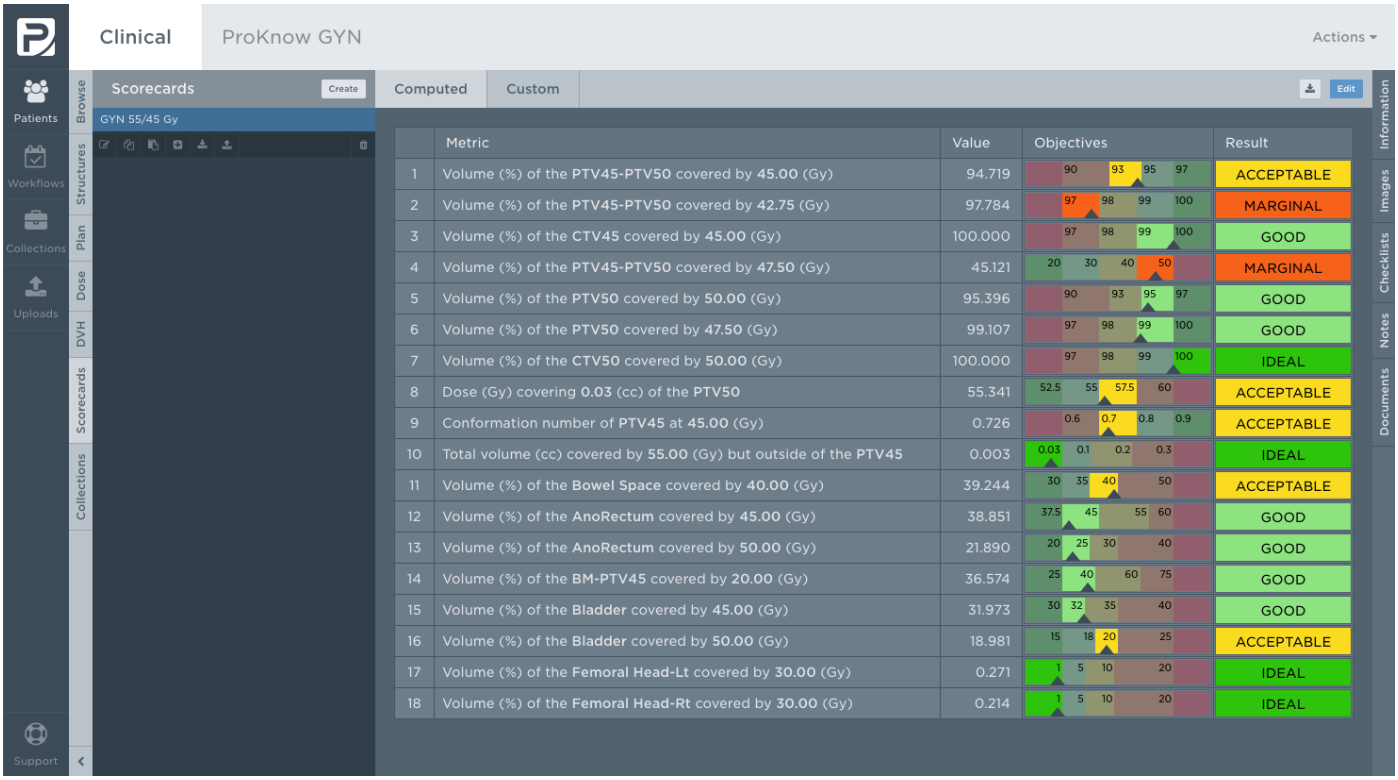
IN THIS ARTICLE

Define scorecards for patients to standardize methods and implement robust measures to document plan quality across your organization.

Accessing Patient Scorecards

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. At the top of this space is a toolbar containing a set of tabs. The first tab is for computed metrics, and the second tab is for custom metrics. A button to edit the scorecard is available on the far right side of the toolbar.



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 *Write Patients* permission for a workspace to create scorecards for patients in that workspace.

> ## 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.

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 *Write Patients* permission for a workspace to rename scorecards for patients in that workspace.

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 *Manage Scorecard Templates* permission to define scorecard templates for your organization.

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 *Write Patients* permission for a workspace to import a scorecard template for patients in that workspace.

Editing Patient Scorecards

1. Choose the scorecard you wish you edit from the sidebar on the left.
2. Choose either the **Computed** or the **Custom** tab, and press the **Edit** button. You may only edit one type of metrics (custom or computed) at a time.
3. Add a new metric by pressing the **Add computed metric** or **Add custom metric** button. If you are adding a

Add a new metric by pressing the **Add computed metric...** or **Add custom metric...** button. If you are adding a computed metric, a window will appear with a complete list of the computed metric types available. Fill in the required metric parameters. If you are adding a custom metric, a window will appear with items from the list of custom metrics defined in your ProKnow organization by a custom metric manager.

> For more information about computed metrics, visit our Computed Metric Library. To learn about how to create custom metrics, please visit the Defining Custom Metrics page.

4 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).

5 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

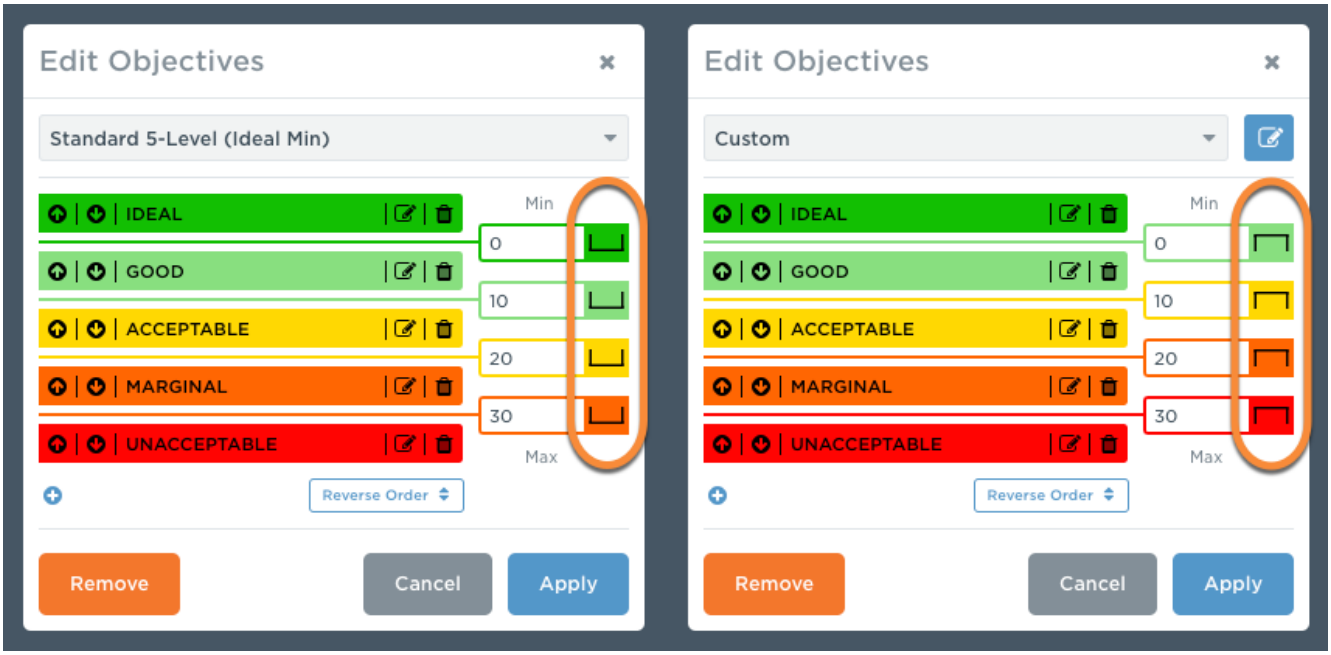
These ranges can be assigned a color and displayed end-to-end as follows.

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.

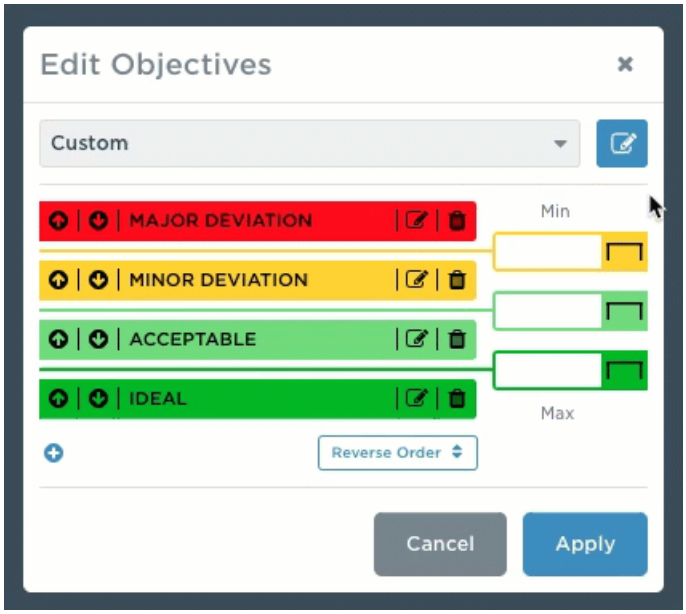
In the following example, you'll notice that the two objective sets vary only in the direction of the brackets (see orange outlined region). For the objectives on the left, a value of 0 would produce a result of IDEAL, a value of 10 would produce the result GOOD, a value of 20 would produce the result 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 *Manage Scorecard Templates* permission to manage custom 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?

6 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:

	Metric	Value	Objectives	Result
1	Volume (%) of the **PTV45-PTV50** covered by **45.00** (Gy)	94.719	90 93 95 97	ACCEPTABLE
2	Volume (%) of the **PTV45-PTV50** covered by **42.75** (Gy)	97.784	97 98 99 100	MARGINAL
3	Volume (%) of the **CTV45** covered by **45.00** (Gy)	100.000	97 98 99 100	GOOD
4	Volume (%) of the **PTV45-PTV50** covered by **47.50** (Gy)	45.121	20 30 40 50	MARGINAL
5	Volume (%) of the **PTV50** covered by **50.00** (Gy)	95.396	90 93 95 97	GOOD
6	Volume (%) of the **PTV50** covered by **47.50** (Gy)	99.107	97 98 99 100	GOOD
7	Volume (%) of the **CTV50** covered by **50.00** (Gy)	100.000	97 98 99 100	IDEAL
8	Dose (Gy) covering **0.03** (cc) of the **PTV50**	55.341	52.5 55 57.5 60	ACCEPTABLE
9	Conformation number of **PTV45** at **45.00** (Gy)	0.726	0.6 0.7 0.8 0.9	ACCEPTABLE
10	Total volume (cc) covered by **55.00** (Gy) but outside of the **PTV45**	0.003	0.03 0.1 0.2 0.3	IDEAL
11	Volume (%) of the **Bowel Space** covered by **40.00** (Gy)	39.244	30 35 40 50	ACCEPTABLE
12	Volume (%) of the **AnoRectum** covered by **45.00** (Gy)	38.851	37.5 45 55 60	GOOD
13	Volume (%) of the **AnoRectum** covered by **50.00** (Gy)	21.890	20 25 30 40	GOOD
14	Volume (%) of the **BM-PTV45** covered by **20.00** (Gy)	36.574	25 40 60 75	GOOD
15	Volume (%) of the **Bladder** covered by **45.00** (Gy)	31.973	30 32 35 40	GOOD
16	Volume (%) of the **Bladder** covered by **50.00** (Gy)	18.981	15 18 20 25	ACCEPTABLE
17	Volume (%) of the **Femoral Head-Lt** covered by **30.00** (Gy)	0.271	1 5 10 20	IDEAL
18	Volume (%) of the **Femoral Head-Rt** covered by **30.00** (Gy)	0.214	1 5 10 20	IDEAL

7 Delete metrics from your scorecard by pressing the trash icon.

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

> **Note**: You must have *Write Patients* permission for a workspace to edit scorecards for patients in that workspace.

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 *Write Patients* permission for a workspace to upload scorecards for patients in that workspace.

> ### 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 *Write Patients* permission for a workspace to delete scorecards from patients in that workspace.

ProKnow

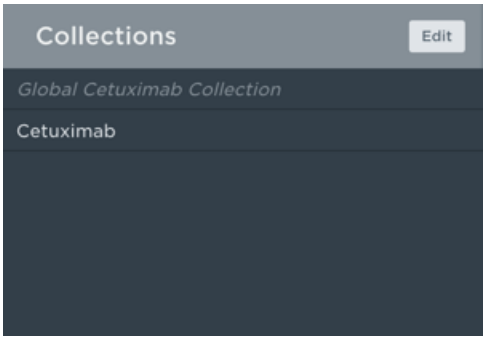
Patient — Collections

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

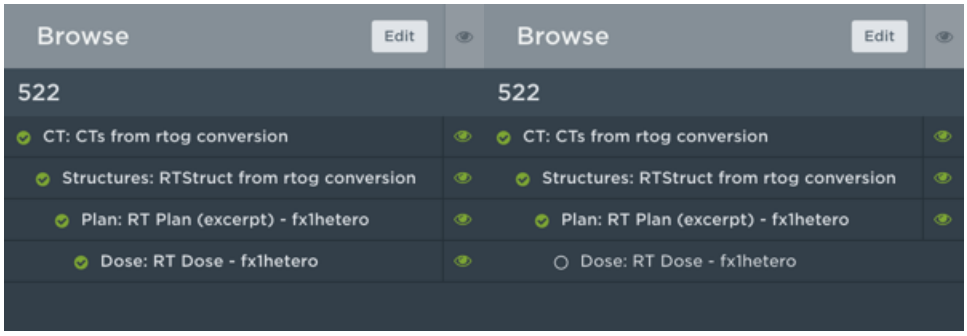
When you access a patient, click on the Collections tab to view the patient collections. The main content area is blank and is reserved for future patient collection content. On the left is the collections sidebar, which contains a list of the collections to which the patient belongs. A patient can be 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.

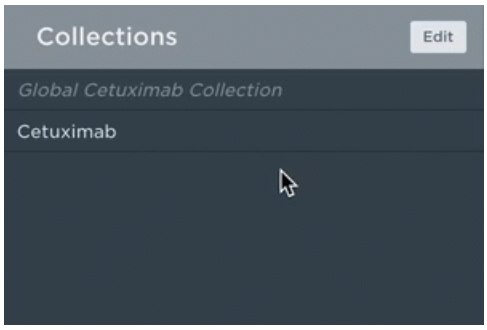
The Primary Patient Object from the Patient Hierarchy

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

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.

ProKnow

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.

> **Note**: You must have *Write Patients* permissions for a workspace to edit custom metrics for a patient in that workspace.

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.

ProKnow

Multiple Image Set Display (Images Tab)

IN THIS ARTICLE

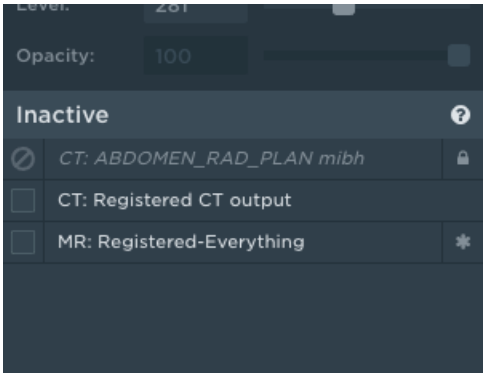
The Images sidebar allows you to simultaneously display multiple image sets that have been uploaded to the patient. This is especially useful while contouring to be able to view information from multiple image modalities (e.g., CT and MR). To view the available images for the selected patient, click the Images tab located in the right sidebar.

Displaying Multiple Image Sets

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).

ProKnow

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.

> **Note**: You must have *Write Patients* permission for a workspace to modify checklists for patients in that workspace.

Creating Patient Checklists

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

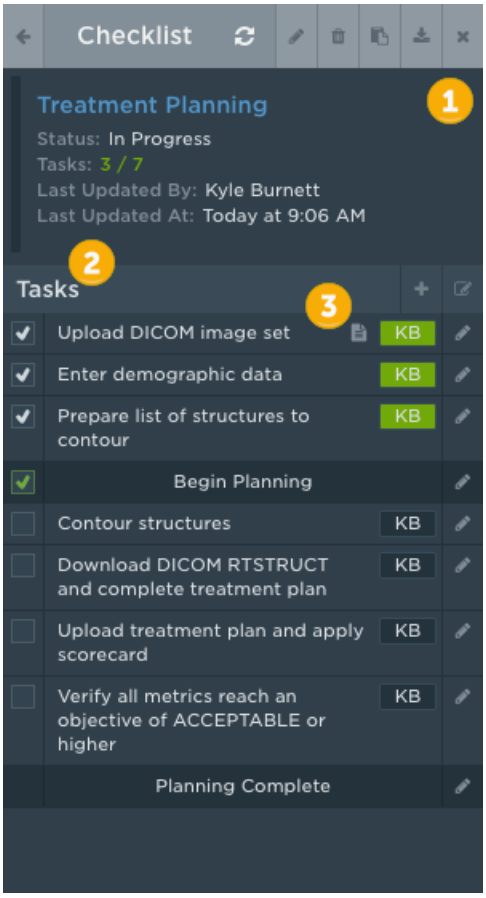
1. From the list of checklists, click on the checklist you wish to edit.
2. Press the **Edit Checklist** button (pencil icon) in the Details sidebar header.
3. Update the **Name**, **Description**, and **Workflow** as needed, and press the **Save** button to save you changes.

Deleting Patient Checklists

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

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

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

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.

ProKnow

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.

Note: You must have *Write Patients* permission for a workspace to add notes for patients in that workspace. To delete notes for patients, you must be the user who originally authored that note or have *Delete Patients* permission for a workspace to which the patient belongs. Patient notes may only be edited by the user who originally authored that note.

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.

ProKnow

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.

Note: You must have *Write Patients* permission for a workspace to add documents for patients in that workspace. To delete documents for patients, you must be the user who originally uploaded the document or have *Delete Patients* permission for the workspace in which the patient belongs. The name and category of documents may be edited by any user who has *Write Patients* permission for the current workspace.

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

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.

ProKnow

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.

> **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.

ProKnow

Keyboard Shortcuts

IN THIS ARTICLE

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`

ProKnow

Editing Structures

IN THIS ARTICLE

Use this article to learn how to edit the patient structure set.

> **Note**: You must have *Contour Patients* permission for a workspace to edit structures for patients in that workspace.

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.

Exporting and Importing 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.

1. While editing a structure set, press the import structure template button (denoted by the upload symbol) located in the toolbar at the top of the left sidebar.
2. Use the **Select File** button to select a structure template file. Then use the radio buttons to select how structures with the same case-insensitive name should be handled.
3. Press the **Import** button to import the structure templates.

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**, and **Color** for the structure. Structure names must be 80 characters or less.
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**, 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.

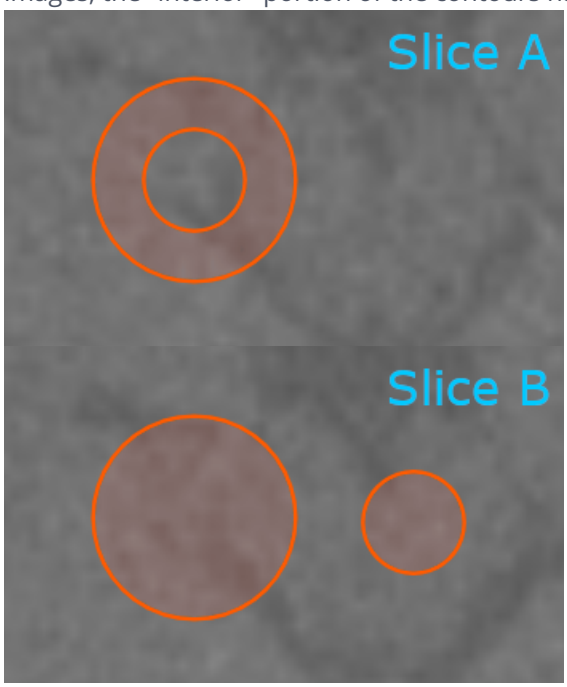
> ### Paintbrush Options
>
> To access the available paintbrush options, press the dropdown arrow next to the paint tool. Adjust the brush

> 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

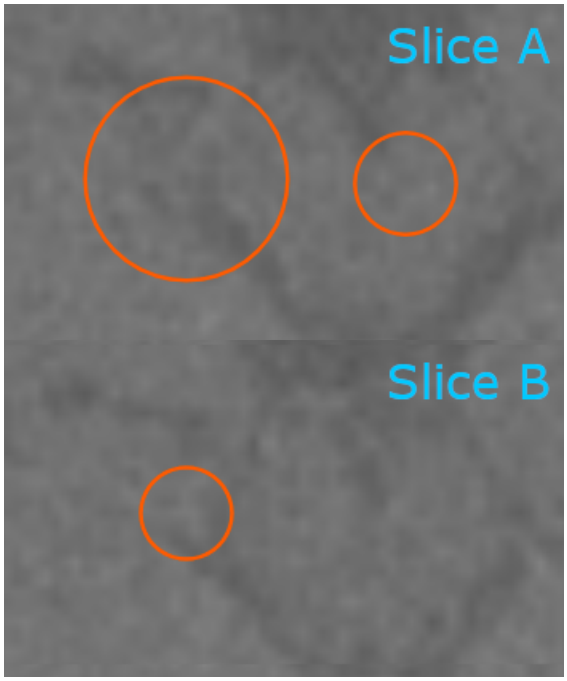
To interpolate between slices, click on the **Interpolate** button. Once clicked, ProKnow DS will attempt to generate contours for the current structure on all empty slices between slices containing contours. There are several situations in which warnings will be reported after the interpolation has 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.

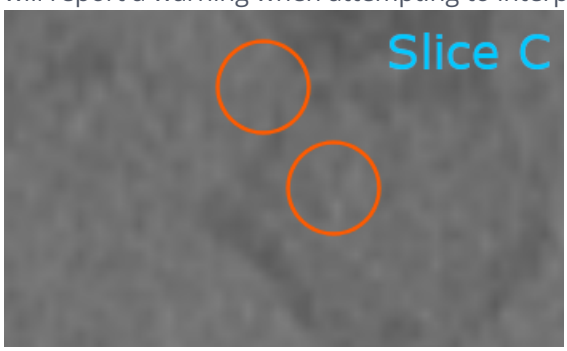
  

  In this case, the contour orientations between the two slices (1 CCW and 1 CW in Slice A and 2 CCW in Slice B) do not match, and indeed, there is no obvious solution for how to interpolate between these two slices.

- **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.



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 previous slice, press the **Copy from Previous Slice** button. To copy from the next slice, press the **Copy from Next 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 you the option to either close the draft or continue contouring.

ProKnow

Dose Levels

IN THIS ARTICLE

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.

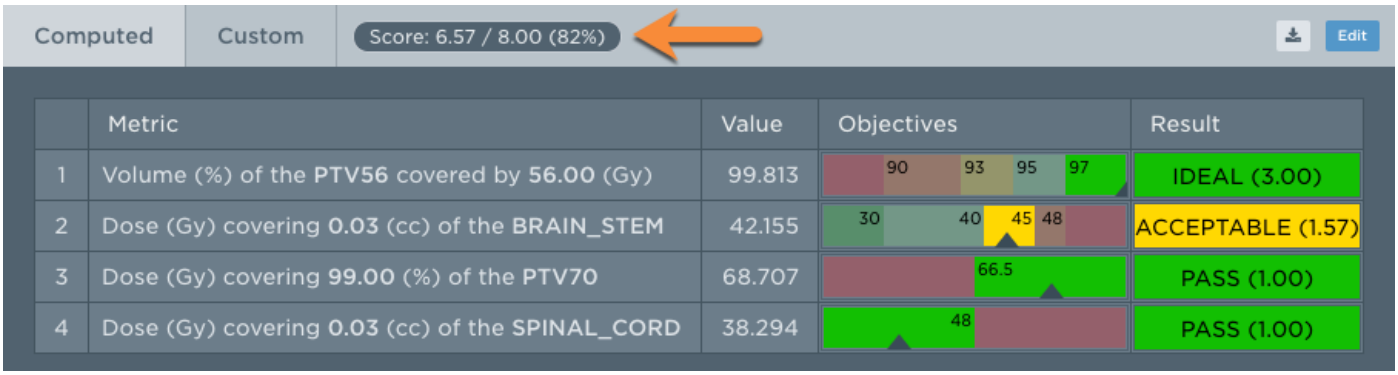
To learn how to configure custom dose levels, please visit the Patient - Dose article.

> **NOTE**: ProKnow automatically saves the configured dose visibility settings and levels for each patient if the current user has Write Patients permissions within the current workspace. If the current user does not have Write Patients permissions, they can still modify the dose visibility settings and levels, but any changes will not be saved.

ProKnow

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.



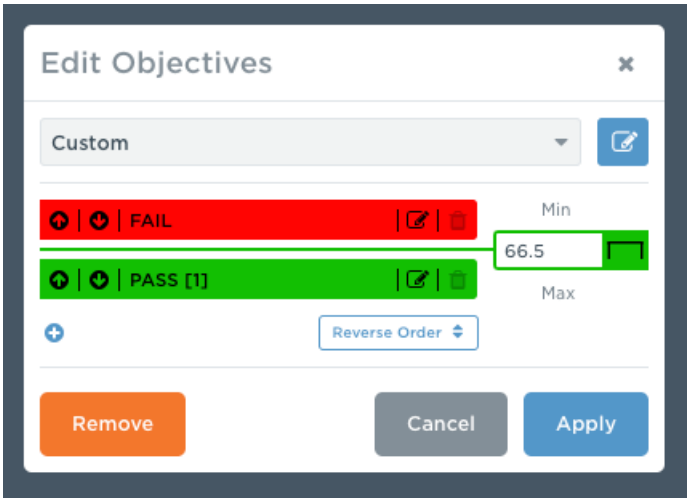
There are two different configurations for objectives that support scoring functions. The first is the Pass/Fail configuration, and the second the Performance Bin configuration. For each configuration, this article will explain how to define a valid scoring configuration and how the scores will be computed.

Pass/Fail

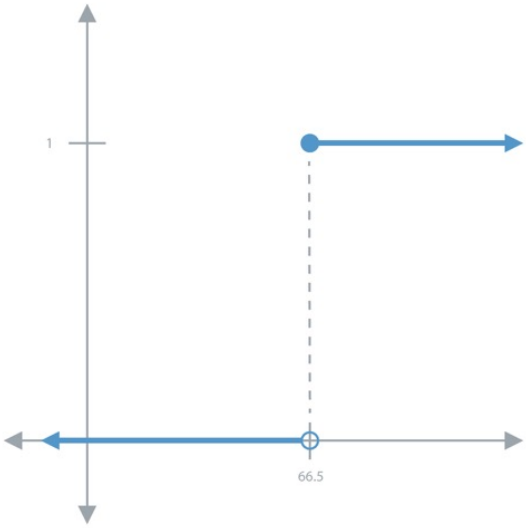
A Pass/Fail scoring configuration consists of two objectives. One objective must be labeled `PASS [N1]` (case insensitive), where N1 is any number, and the other must be labeled `FAIL` (case insensitive) or `FAIL [N2]` (case insensitive), where N2 is any number.

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

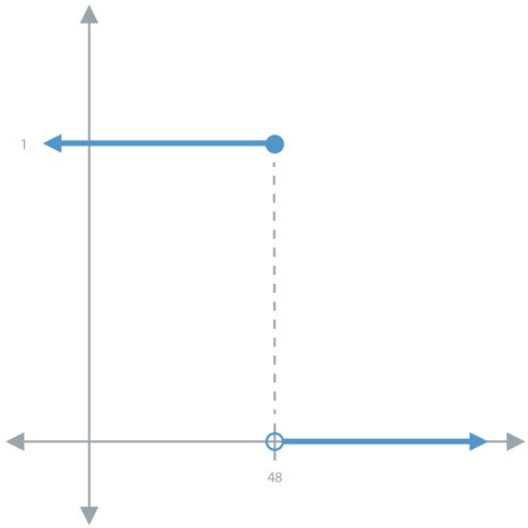


In this Pass/Fail example, any value less than 66.5 will be assigned the default score of 0, whereas any value greater than or equal to 66.5 will be assigned the score of 1.



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.



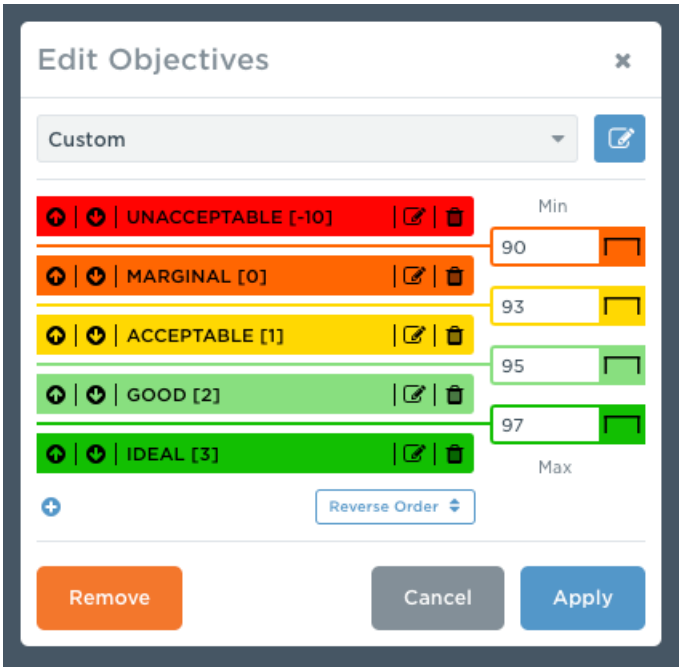
Performance Bin

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:

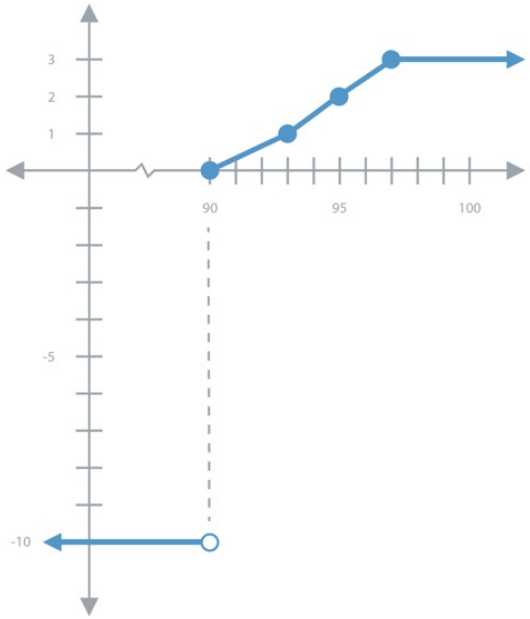
- Valid: UNACCEPTABLE, ACCEPTABLE, IDEAL
- Valid: IDEAL, GOOD, ACCEPTABLE, MARGINAL, UNACCEPTABLE
- Invalid: IDEAL, ACCEPTABLE, GOOD, MARGINAL, UNACCEPTABLE
- Invalid: UNACCEPTABLE, IDEAL, MARGINAL

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.

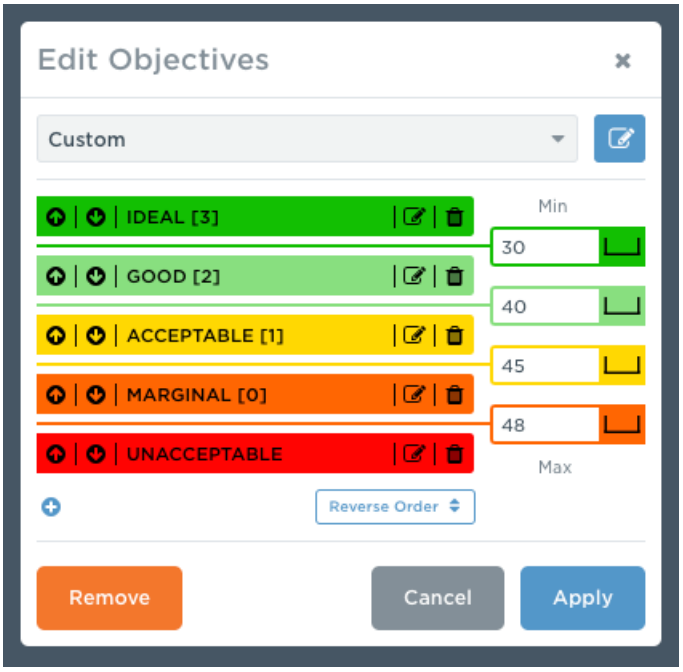
Example 1



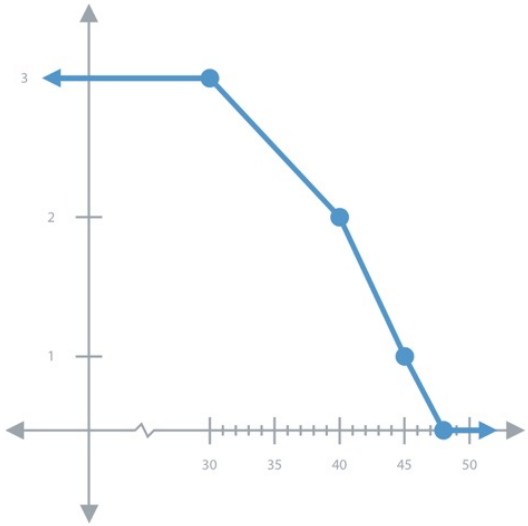
In this performance bin example, any value less than 90 will be assigned a score of -10. A score of 0 will be assigned for a metric value equal to 90. As the metric value increases, the score will linearly increase from 0 to 1 between 90 and 93, from 1 to 2 between 93 and 95, and from 2 to 3 between 95 and 97. Any metric value greater than 97 will be assigned a score of 3.



Example 2



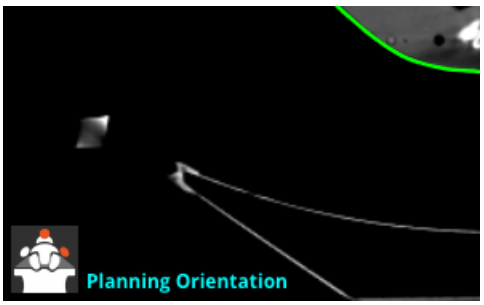
In this performance bin example, any value greater than 48 will be assigned a score of 0 (the default for UNACCEPTABLE). A score of 0 will also be assigned for a metric value equal to 48. As the metric value decreases, the score will linearly increase from 0 to 1 between 48 and 45, from 1 to 2 between 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.



ProKnow

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.

ProKnow

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.

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.

ProKnow

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.

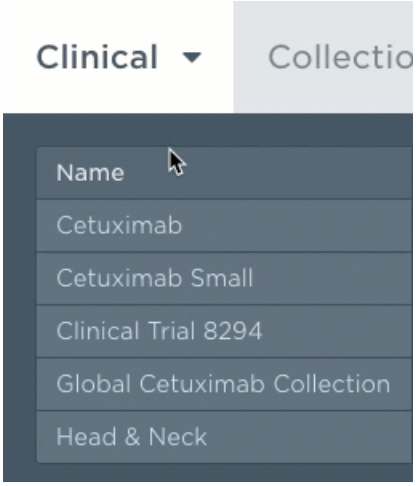
What's the difference between an organization collection and a workspace collection?

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.

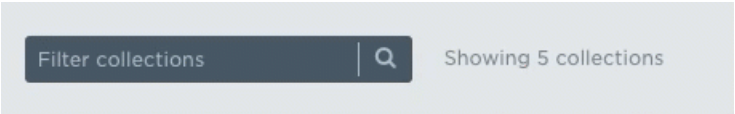
Read more about the differences and when to use each type in our Organization Versus Workspace Collections guide.

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 *Collections Write* permission for a workspace to create workspace collections for that workspace. You must have the *Collections Write* permission at the organization level to create organization collections.

ProKnow

Managing the Current Collection

IN THIS ARTICLE

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 *Collections Write* permission for a workspace to edit workspace collections for that workspace. You must have the *Collections Write* permission at the organization level to edit organization collections.

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 *Collections Write* permission for a workspace to edit workspace collections for that workspace. You must have the *Collections Write* permission at the organization level to edit organization collections.

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 *Collections Write* permission for a workspace to add patients to collections that belong to that workspace.

ProKnow

Organization Versus Workspace Collections

IN THIS ARTICLE

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.

ProKnow

Collection — Browse

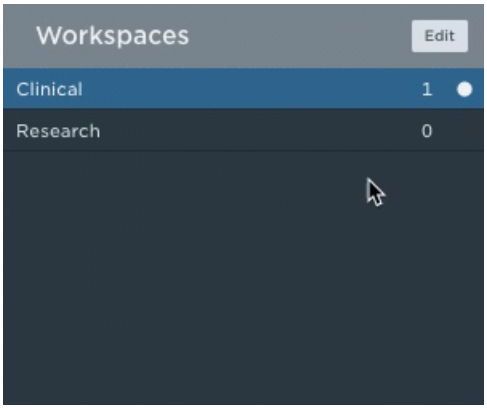
IN THIS ARTICLE

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.



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 *Write Collections* permission at the organization level to manage to the workspace representations for your account.

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 *Write Collections* permission for a workspace to remove patients that belong to that workspace from the current 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 *Write Collections* permission for a workspace to create collections in 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

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 *Write Collections* permission for a workspace to add selected patients to collections in that workspace.

ProKnow

Collection — Structures

IN THIS ARTICLE

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.

With *Write Patients* permission, the **Rename** button will become available when one or more structures are selected, and the **Merge** button will become available when two or more structures are selected.

> ### 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 to rename or merge structures.

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.

ProKnow

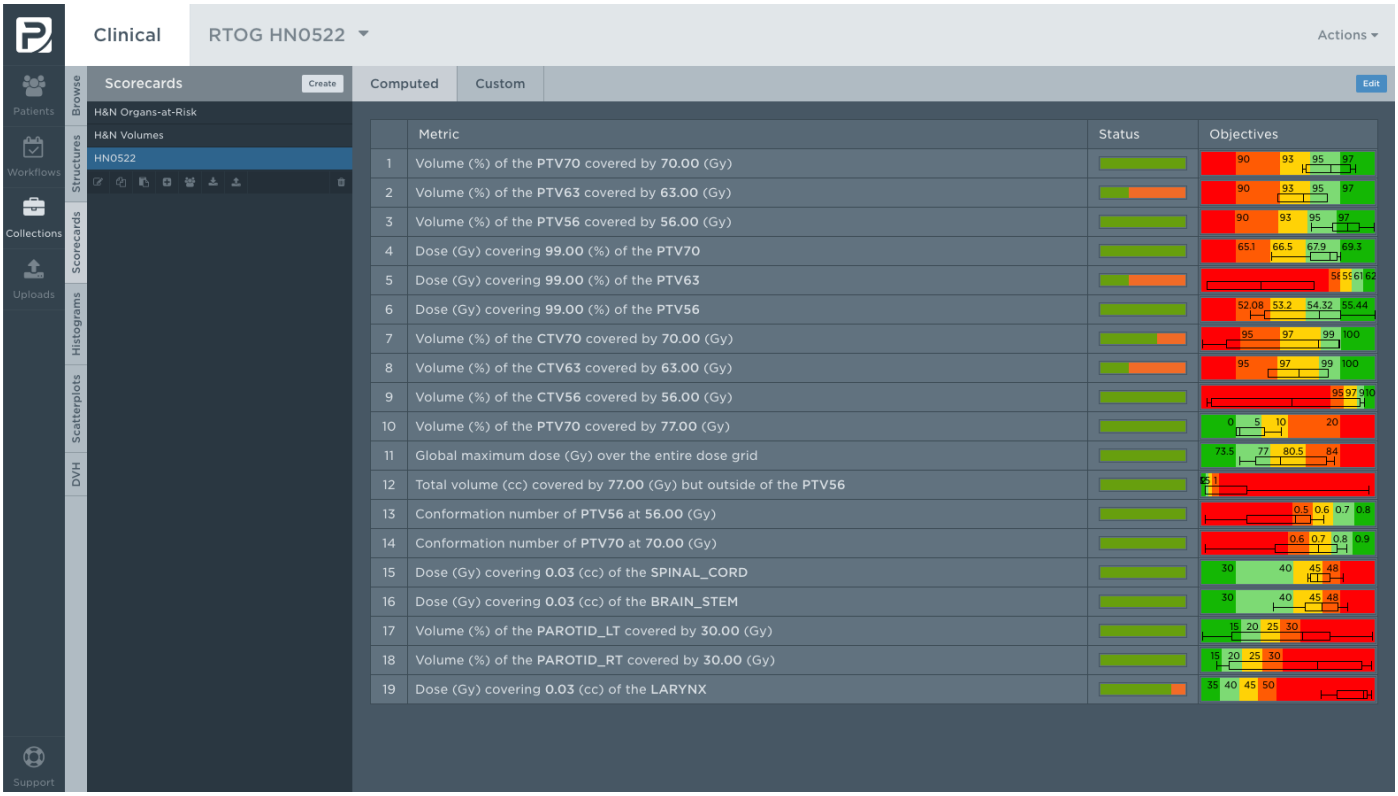
Collection — Scorecards

IN THIS ARTICLE

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. At the top of this space is a toolbar containing a set of tabs. The first tab is for computed metrics, and the second tab is for custom metrics. A button to edit the scorecard is available on the far right side of the toolbar.



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 *Write Collections* permission at the organization level to create scorecards for an organization collection. You must have *Write Collections* permission for a workspace to create scorecards for a workspace collection in the given workspace.

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.

Renaming Collection Scorecards

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 *Write Collections* permission at the organization level to rename scorecards for an organization collection. You must have *Write Collections* permission for a workspace to rename scorecards for a workspace collection in the given workspace.

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 *Manage Scorecard Templates* permission to define scorecard templates for your organization.

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 *Write Collections* permission at the organization level to import scorecard templates into an organization collection. You must have *Write Collections* permission for a workspace to import scorecard templates into a workspace collection in the given workspace.

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 *Write Patients* permission at the organization level to add a scorecard to all patients across all collection workspaces. You must have *Write Patients* permission for a workspace to add a scorecard to patients in the given workspace.

Editing Collection Scorecards

1. Choose the scorecard you wish you edit from the sidebar on the left.
2. Choose either the **Computed** or the **Custom** tab, and press the **Edit** button. You may only edit one type of metrics (custom or computed) at a time.
3. Add a new metric by pressing the **Add computed metric...** or **Add custom metric...** button. If you are adding a computed metric, a window will appear with a complete list of the computed metric types available. Fill in the required metric parameters. If you are adding a custom metric, a window will appear with items from the list of custom metrics defined in your ProKnow organization by a custom metric manager.

   > For more information about computed metrics, visit our Computed Metric Library. To learn about how to create custom metrics, please visit the Defining Custom Metrics page.

4. 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:

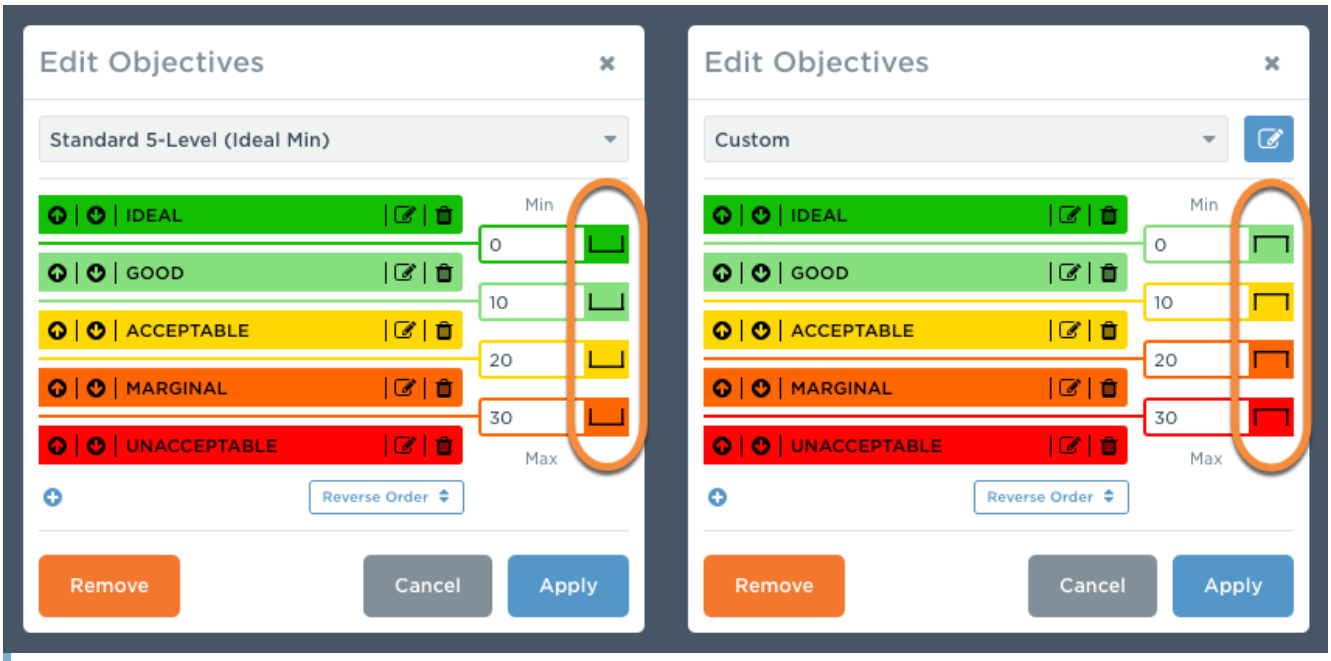
   - VERY SMALL: less than 8 cc
   - SMALL: 8 cc to 15 cc
   - NORMAL: 15 cc to 29 cc
   - LARGE: 29 cc to 36 cc
   - VERY LARGE: greater than 36 cc

   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.

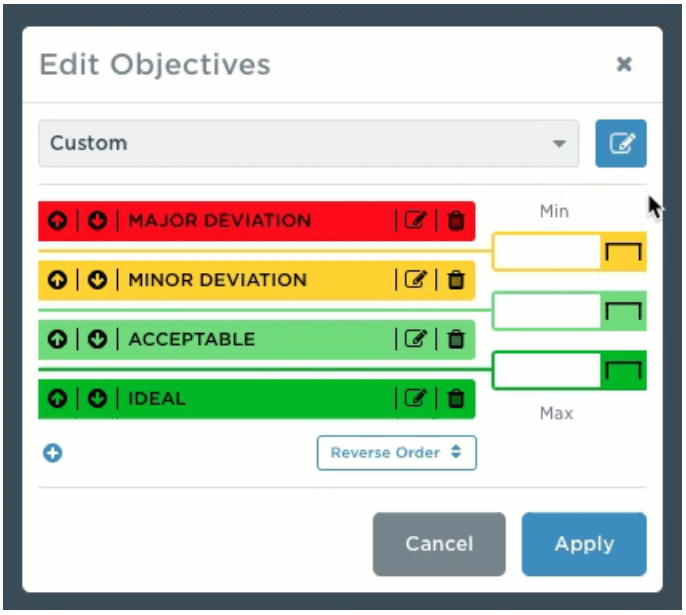
Sometimes, a computed metric value or custom metric value may equal the threshold value for an objective level. You can customize which objective level should be assigned in those cases by clicking the bracket indicators to toggle the level. A bracket that opens upward indicates that the objective level 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

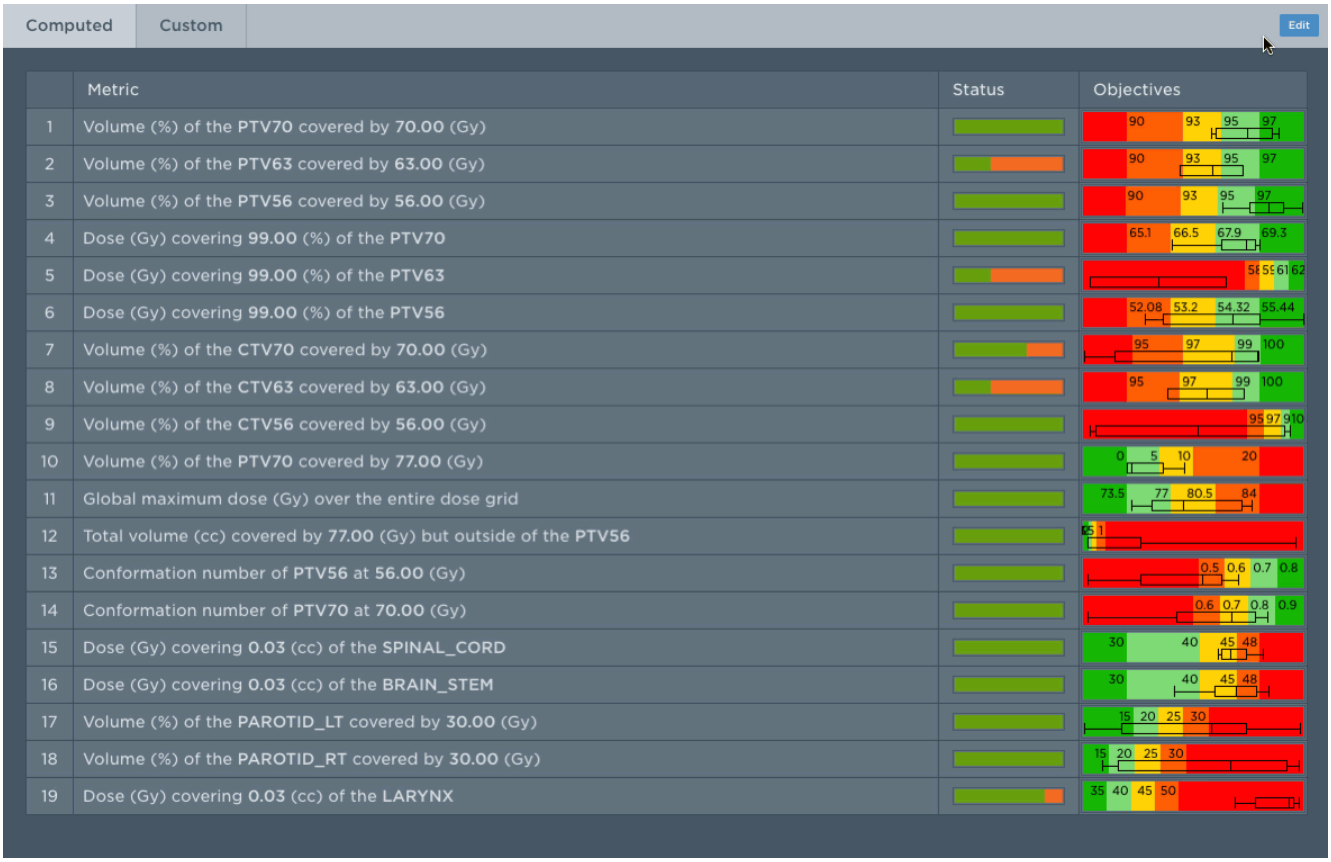
The labels, colors, and bracket direction may be customized and saved as a custom objective template. To accomplish this, first make your edits to the objective levels. The dropdown field should appear with the value *Custom*. Press the edit button next to the dropdown field, enter a name for your template,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

5 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:



6 Delete metrics from your scorecard by pressing the trash icon.

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

> **Note**: You must have *Write Collections* permission at the organization level to edit collection scorecards for an organization collection. You must have *Write Collections* permission for a workspace to edit collection scorecards for a workspace collection in the given workspace.

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 *Write Collections* permission at the organization level to delete collection scorecards for an organization collection. You must have *Write Collections* permission for a workspace to delete collection scorecards for a workspace collection in the given workspace.

ProKnow

Collection — Histograms

IN THIS ARTICLE

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.

3. Press the **Remove** button to confirm.

> **Note**: You must have the *Write Collections* permission for a workspace to remove patients that belong to that workspace from the current 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 *Write Collections* permission for a workspace to create collections in 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 *Write Collections* permission for a workspace to add selected patients to collections in that workspace.

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 *Write Collections* permission at the organization level to create, rename, and delete bookmarks for an organization collection. You must have *Write Collections* permission for a workspace to create, rename, and delete bookmarks for a workspace collection in the given workspace.

Creating Histogram Bookmarks

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

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

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.

ProKnow

Collection — Scatterplots

IN THIS ARTICLE

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 *Write Collections* permission for a workspace to remove patients that belong to that workspace from the current 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 *Write Collections* permission for a workspace to create collections in 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 *Write Collections* permission for a workspace to add selected patients to collections in that workspace.

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 *Write Collections* permission at the organization level to create, rename, and delete bookmarks for an organization collection. You must have *Write Collections* permission for a workspace to create, rename, and delete bookmarks for a workspace collection in the given workspace.

Creating Scatterplot Bookmarks

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

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

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.

ProKnow

Collection — DVH

IN THIS ARTICLE

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 *Write Collections* permission at the organization level to edit analysis structures for an organization collection. You must have *Write Collections* permission for a workspace to edit analysis structures for a workspace collection in the given workspace.

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.

ProKnow

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.