Instructions for Use

English

Xper Information Management System 2.3

PHILIPS

Contents

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1 Introduction

1.1 About the Xper Information Management System

The Xper Information Management System is used for acquiring, displaying, trending, storing and transmitting various types of data such as physiologic/hemodynamic, clinical, medical image and other related data. Its users, responsible to interpret the data provided, will be professional health care providers, such as physicians, registered nurses, cardiovascular technicians, radiology technicians, and other clinical health care providers. The system is capable of processing/analyzing information such as multi-channel ECG signals, displaying a graphical ST segment map and performing other data management functions such as creating reports. Data may be acquired from and/or sent to other devices such as physiological monitoring systems, information management systems, image acquisition/storage devices and other medical devices.

The Xper Information Management System also provides optional ancillary functions, such as scheduling, inventory control, patient billing, statistical reporting, and other non-clinical modules. Users of the ancillary functions may be health care providers, but may also be nonclinical users authorized by the facility.

NOTE
When this instructions for use refers to “Xper Information Management System”, it refers to the software only (which is a medical device in its own right). When this *instructions for use* refers to “Xper Information Management System Workstation”, it refers to a computer on which the Xper Information Management System software is installed together with a flat panel display.

1.2 About the Instructions for Use

This *Instructions for Use* is intended to assist users in the safe and effective use of the Philips software product described. The “user” is considered to be not only the body with authority over the software product but also those persons who use the software product.

This *Instructions for Use* does not describe the use of the IT equipment on which the Philips software product is installed. Refer to the documentation of the IT equipment concerned.

Before attempting to use this software product, you must read this *Instructions for Use* thoroughly, paying particular attention to all **WARNINGS**, **Cautions**, and **Notes** it contains. You must pay special attention to all the information given, and procedures described, in the chapter “Safety”. In addition you must pay special attention to On-screen Messages and ONLINE HELP information containing **WARNINGS**, **Cautions**, and **Notes** that may be related to the function being executed.

WARNING
WARNINGS are directions which if not followed could cause fatal or serious injury to a user, patient or other person, or could lead to clinical misdiagnosis, misinterpretation, and/or loss or damage of patient-related data.

CAUTION

Cautions are directions which if not followed could cause damage to the IT equipment on which the software product is installed and/or other equipment or goods, and/or cause environmental pollution.

NOTE
Notes are intended to highlight points of attention as an aid to users.

This *Instructions for Use* and the ONLINE HELP describe the most extensive configuration of the software product, with the maximum number of options. Not every function described may be available.

WARNING
The chapter “Safety” deals with safety aspects and should be read first, before operating this software product.

NOTE
The screen shots in the *Instructions for Use* can differ from the user interface screens on details.

1.3 Usage of the Product

This Philips software product is intended to be installed and used only in accordance with the safety procedures and instructions given in this *Instructions for Use* and for the purpose for which it was designed.

The purpose for which the software product is intended is given below. However, nothing stated in this *Instructions for Use* reduces users' responsibilities for sound clinical judgment and best clinical procedure.

Installation and use of this software product is subject to the law in the jurisdiction in which it is being used. Users must **only** install and/or use the software product in such ways as do not conflict with applicable laws, or regulations which have the force of law.

Use of the software product for purposes other than those intended and expressly stated by the Manufacturer, as well as incorrect use, may relieve the Manufacturer (or his agent) from all or some responsibility for resultant non-compliance, damage or injury.

1.4 Intended Use/Indications for Use

The Xper Information Management System is intended for use under the direct supervision of a healthcare practitioner for acquiring, displaying, trending, storing and transmitting various types of data, such as physiologic/hemodynamic, clinical, medical image and other related data. The system is capable of processing/analyzing information, such as multi-channel ECG signals, and performing other data management functions, such as creating reports. Data may be acquired from and/or sent to other devices, such as physiological monitoring systems, information management systems, image acquisition/storage devices, and other medical devices.

The system is indicated for use in the following areas: cardiology, cardiac catheterization, electrophysiology, radiology, invasive radiology, and surrounding areas where access to the information is needed.

The system consists of modules and may be entirely a software offering or a hardware/ software offering. It is intended for use on standard computer systems and does not require proprietary hardware. The solution is available as a single module or combination of modules, or may function as a standalone system.

The system is capable of receiving and displaying user-adjustable alarms (both visual and audible) available in the system, which alert the operator to anomalous occurrences and facilitate timely responses. Use of the system is not intended where unattended patient monitoring is desired, or in situations where arrhythmia detection is required.

The system provides the ability to transmit patient data files for storage, viewing and analysis at distributed locations via the intranet or Internet, or may function as a stand-alone device.

1.5 Contraindications

This software product should not be used if any of the following contraindications exist or are thought to exist: use of the Xper Information Management System is not intended where unattended patient monitoring is desired, or in situations where arrhythmia detection is required.

1.6 Limitations of Use

WARNING
Xper Information Management System must be operated in an environment where the minimum specified requirements for hardware and network performance are met.

1.7 Compatibility

The software product described in this *Instructions for Use* should not be used in combination with other software, equipment or components unless such other software, equipment or components are expressly recognized as compatible by Philips Healthcare. A list of such

software, equipment and components is available on request from your local Philips Healthcare Representative, or the Manufacturer. Philips Healthcare is not responsible for running compatibility validation of non-supported third-party software.

Changes and/or additions to the software product should only be carried out by Philips Healthcare or by third parties expressly authorized by Philips Healthcare to do so. Such changes and/or additions must comply with all applicable laws and regulations which have the force of law within the jurisdictions concerned, and with best engineering practice.

Changes and/or additions to the software product that are carried out by persons without the appropriate training may lead to the Philips Healthcare warranty being voided.

Philips is not responsible for any malfunction of Xper Information Management System if Xper Information Management System runs on hardware that is not according to hardware specification.

If not supplied by Philips with the Xper Information Management System software, Philips is not responsible for any malfunction of the hardware used.

1.8 Compliance

This software product complies with relevant international and national standards and laws. Information on compliance will be supplied on request by your local Philips Healthcare Representative, or by the Manufacturer.

This software product must be installed on appropriate IT equipment that complies with relevant international and national laws and standards on EMC (Electro-Magnetic Compatibility) and Electrical Safety. Such laws and standards define both the permissible electromagnetic emission levels from equipment and its required immunity to electromagnetic interference from external sources.

1.9 Symbols Glossary

The following symbols may appear in the product documentation or on the labels attached to the product.

Symbol	Symbol Name	Symbol Description	Standard Number & Name	Symbol Reference Number
	Manufacturer	Indicates the name and address of the Manufacturer.	ISO 15223-1:2012[1] EN 980:2008[2]	5.1.1 5.12

Symbol	Symbol Name	Symbol Description	Standard Number & Name	Symbol Reference Number
	Authorized Representative in the European Economic Area (EEA).	Indicates the Authorized Representative, responsible for the device in the European Economic Area (EEA).	ISO 15223-1:2012[1] EN 980:2008[2]	5.1.2 5.13
	Date of manufacture	Indicates the date when the device was manufactured.	ISO 15223-1:2012[1] EN 980:2008[2]	5.1.3 5.6
	Batch code	Indicates the full Software Release/ Version number.	ISO 15223-1:2012[1] EN 980:2008[2]	5.1.5 5.4
	Catalogue number	Indicates the manufacturer's catalogue number so that the device can be identified.	ISO 15223-1:2012[1] EN 980:2008[2]	5.1.6 5.10
	Consult instructions for use	Indicates the need for the user to consult the instructions for use.	ISO 15223-1:2012[1] EN 980:2008[2]	5.4.3 5.18
	Caution and/or Warning	WARNINGS are directions which if not followed could cause fatal or serious injury to a user, patient or other person, or could lead to clinical misdiagnosis, and/or loss or damage of patient-related data. **Also:** This symbol is used on the device label to highlight the fact that there are specific warnings or precautions associated with the device, which are not otherwise found on the label.	ISO 15223-1:2012[1] EN 980:2008[2]	5.4.4 5.11

Symbol	Symbol Name	Symbol Description	Standard Number & Name	Symbol Reference Number
CE	CE Marking of Conformity	Product meets the requirements of 93/42/EEC for Medical Devices distributed in the European Economic Area (EEA).	(European) COUNCIL DIRECTIVE 93/42/EEC of 14 June 1993 concerning medical devices	Annex XII
Rx ONLY	Prescription Device in USA	Caution: Federal law restricts this device to sale by or on the order of a licensed healthcare practitioner.	21 CFR 801.109(b)(1) Prescription Devices	Not applicable

1. ISO 15223-1:2012 Medical devices - Symbols to be used with medical devices labels, labeling, and information to be supplied - Part 1: General requirements.
2. EN 980:2008 Symbols for use in the labeling of medical devices.

1.10 Training

Users of this software product must have received adequate training on its safe and effective use before attempting to use the software product described in this *Instructions for Use*.

Training requirements for this type of software product will vary from country to country. It is for users to make sure that they receive adequate training in accordance with local laws or regulations which have the force of law. If you require further information about training in the use of this software product, please contact your local Philips Healthcare representative, or the Manufacturer.

1.11 Power Supply

It is advised to use an uninterruptible power supply (UPS), for example, to continue to provide power to the Xper Information Management System for a specified time after a power outage, and to allow automatic and controlled shutdown.

1.12 Workplace Design

To minimize the risk of computer-related disorders, ensure the workplace is properly designed and provides a good ergonomic working position (e.g., proper working height of chair and desk; screen setup). Observe good working practices; for example, take regular breaks and perform exercises. Alternate work periods at the computer with other kinds of work.

1.13 Other Instructions for Use

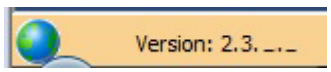
This *Instructions for Use* relates to the software product Xper Information Management System. However, if other software and/or equipment may be used with the software product, each will have its own Instructions for Use.

1.14 Errors in the information supplied with the product

If you suspect an error in the information supplied with the software product, for example, in this Instructions for Use, you should report the error to your local Philips Healthcare Representative or the Manufacturer, for analysis and, if applicable, for correction.

1.15 About Screen

To display the About Screen that displays labeling and product information, open the application, and click on the version number in the lower left corner of the home portal:



To close the About Screen, click anywhere on the About Screen.

NOTE
You can only open the About Screen from the home portal, and not from within a case.

1.16 Software Updates

Updates for this Philips software product can become available. Such updates are essential to keep the software product operating safely, effectively, and reliably.

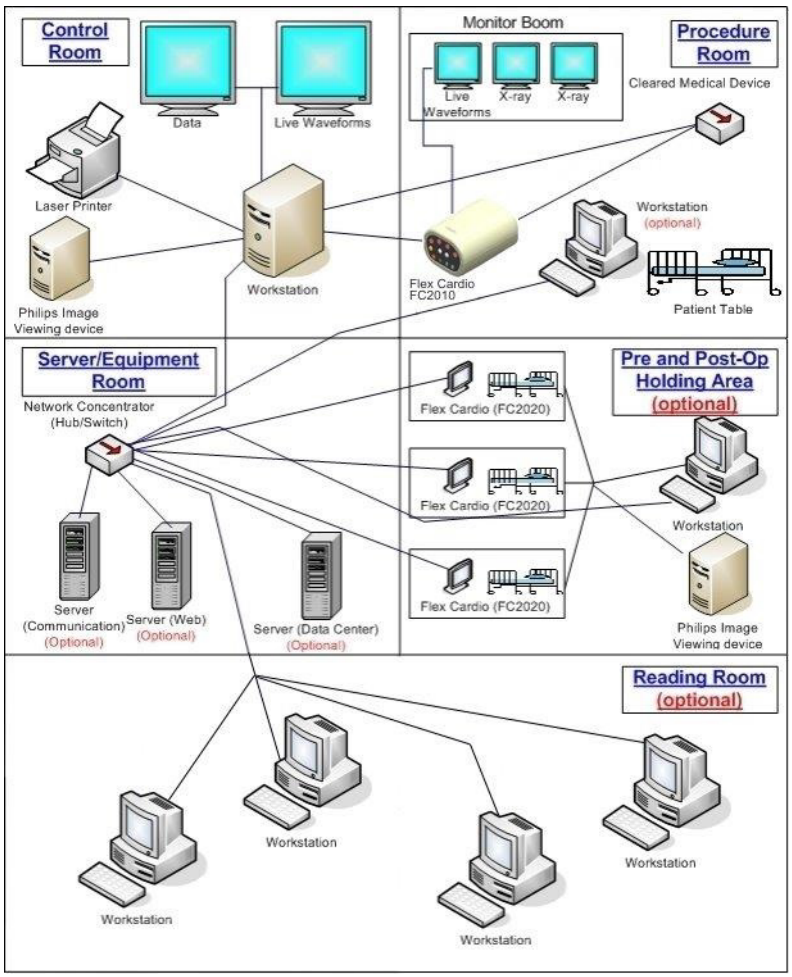
1.17 Installation

Installation of the Xper Information Management System may be performed on site or remotely by Philips Healthcare Service Technicians.

1.18 General System Overview

The Xper Information Management System Workstation consists of Xper Information Management System software installed on a computer workstation with a flat panel monitor. Based on the specific configuration, the system could include an additional flat panel monitor, a printer, and a battery backup. Optional equipment includes an Xper Flex Cardio Physiomonitoring System in a procedure room or holding area, a Datacenter, and/or hospital

interface broker. The system could be networked through a hub, switch, or router to the file server.



2 Safety

2.1 Important Safety Directions

All Philips Healthcare products are designed to meet stringent safety standards. To safeguard human safety, this software product requires proper installation, use and maintenance.

It is vital that you read, note, and where applicable, strictly observe all DANGER notices and safety markings on the outside of the IT equipment on which this software product has been installed. To help ensure the safety of both patients and users, it is vital that you strictly follow all directions under the heading SAFETY and all WARNINGS and Cautions given throughout this *Instructions for Use* and/or displayed on the user interface.

You must also note the following information.

2.1.1 Safety Awareness

WARNING
Do not use this software product for any application until you have read, understood and known all the safety information and safety procedures contained in this SAFETY chapter. Use of this software product without a proper awareness of how to use it safely could lead to fatal or serious injury, clinical misdiagnosis, misinterpretation and/or loss/damage of patient-related data.

2.1.2 Adequate Training

WARNING
Do not use this software product for any application until you have received adequate and proper training in its safe and effective use. If you are unsure of your ability to use this software product safely and effectively DO NOT USE IT. Use without proper and adequate training could lead to fatal or serious personal injury, clinical misdiagnosis, misinterpretation and/or loss/damage of patient-related data.

For information about training, please refer to Training in the chapter “Introduction” in this *Instructions for Use*.

2.1.3 Usage & Compatibility

WARNING
Do not use this software product for any purpose other than that for which it is intended.

Do not use this software product with any equipment or software other than that which Philips Healthcare recognizes as compatible. Use of this software product for unintended purposes, or with incompatible software and/or equipment, could lead to fatal or serious

personal injury, clinical misdiagnosis, misinterpretation and/or loss/damage of patient-related data.

For information about intended use and compatibility, refer to the Intended Use and Compatibility sections in the chapter ‘Introduction” in this *Instructions for Use*.

2.1.4 Data Security

WARNING
For information about Data Security, please refer to *“Network Safety, Security, and Privacy” on page 155*.

2.1.5 Power Off

WARNING
Never switch the IT equipment off using the POWER ON/OFF switch while the software product is still running, as this may damage data integrity, which can lead to loss/damage of patient-related data. Always exit the software product before switching off the IT equipment.

2.1.6 Unsupported Software

WARNING
Do not install unsupported software on the Xper Information Management System Workstation as this could interfere with diagnosis, interpretation and/or cause loss of or damage to patient-related data, and/or introduce computer viruses.

2.2 Specific Safety Information

2.2.1 Hardware used together with the Xper Information Management System

Xper Information Management System may only be used with hardware that meets the minimum system requirements and also the requirements for the environment in which it is to be used.

2.2.2 Data Accuracy Responsibility

WARNING
Entering data into the wrong screen may result in erroneous displays.

The Xper Information Management System is comprised of multiple data entry and system action screens. Many screens support multiple data input methods via mouse, keyboard and/or bar-code reader. Individual keyboard keys often support different system functions in different screens. So as to assure that desired and appropriate system functions are carried

out, operators are responsible to be aware of which system screen is active before performing keyboard data entry. Likewise, patient diagnosis should not be based solely on results provided by Xper Information Management System. Clinical correlation is advised.

2.2.3 Computer Virus Protection

The Xper Information Management System is a software product and is therefore subject to attack by computer viruses. The threat of a computer virus is ever expanding as new viruses are introduced almost daily. The software required to prevent attack by a computer virus must therefore be constantly monitored and updated. McAfee VirusScan Enterprise antivirus software is installed on all Philips-provided Xper Information Management System Workstations. After installation, it is the responsibility of your biomedical department or hospital information systems staff to update virus definitions regularly and provide upgrades.

2.2.4 Off the Shelf Software

The Xper Information Management System Workstation may utilize the following off-the-shelf software products:

- Microsoft® SQL Server® 2014 Enterprise / Express
- Microsoft® Windows® 7 Pro Service Pack 1
- Microsoft® Windows® 10 Enterprise
- Microsoft® Windows® Server 2012 Service Pack 3
- VMware, Inc. VMWare Workstation
- VMware ESXi
- McAfee VirusScan Enterprise
- UltraVNC© Server and UltraVNC© Viewer

These tested and approved third-party software products or off-the-shelf software products are installed and configured by factory trained technicians on all computers provided by Philips Healthcare. Each software product is installed and configured using the “typical” installation method as specified by its manufacturer. Configuration and setup of these off-the-shelf software products should not be altered except to install periodic software patches as provided by their manufacturer.

With the exception of the abovementioned off-the-shelf products and third-party software products that have been explicitly tested and validated by Philips Healthcare, Xper Information Management System has not been tested for proper and safe operation in combination with any other off-the-shelf software products. Do not load any off-the-shelf software onto the hard drive. Loading any unauthorized off-the-shelf software products onto the hard drive may affect the safety and efficiency of the device, may lead to increased risk to users and patients, and will void any or all warranties and maintenance plans.

Licensed copies of all off-the-shelf software products used with the Xper Information Management System are provided to the end user during shipping and installation. It is the end user’s responsibility to maintain and protect this licensed software in a safe location.

Customers may provide their own personal computer hardware for Xper Information Management products that do not have direct patient contact, such as control room workstations, review stations and file servers. This hardware must meet or exceed Philips Healthcare's minimum published specifications. Off-the-shelf software should be installed and configured using the manufacturer's "typical" installation method.

2.2.5 Back-up for Disaster Recovery

Philips Healthcare recommends that the following directories on your server be backed up nightly to a separate device, to ensure quick recovery from a disaster, such as the loss of your server hard drive:

- \DATACENTER
- \DCCASES
- \MSSQLBACKUPS
- \XPERSHARE

2.2.6 Alternate Monitoring Source

The ACC/AHA Guidelines for Cardiac Catheterization Labs (JACC volume 18, No. 5) emphasize the importance of patient monitoring during cardiac catheterization procedures. In view of this, Philips Healthcare strongly recommends that redundant monitoring capabilities be available. When monitoring a patient attached to the Xper Flex Cardio Physiomonitoring System that is connected to the Xper Information Management System, the combined systems should not be the sole means of monitoring patients during cardiac catheterization procedures. Please refer to the Xper Flex Cardio Physiomonitoring System Instructions for Use for more information on patient monitoring.

2.3 Network Safety, Security and Privacy

2.3.1 Customer Role in the Product Security Partnership

We recognize that the security of Philips Healthcare products is an important part of your facility's security-indepth strategy. However, these benefits can only be realized if you implement a comprehensive, multi-layered strategy (including policies, processes and technologies) to protect information and systems from external and internal threats.

Following industry-standard practice, your strategy should address physical security, operational security, procedural security, risk management, security policies, and contingency planning. The practical implementation of technical security elements varies by site and may employ a number of technologies, including firewalls, virus-scanning software, authentication technologies, etc.

As with any computer-based system, protection must be provided such that firewalls and/or other security devices are in place between the medical system and any externally accessible systems. The USA Veterans Administration has developed a widely used Medical Device

Isolation Architecture for this purpose. Such perimeter and network defenses are essential elements in a comprehensive medical device security strategy.

For our product security policy statement and additional information, see the Philips Healthcare product security website at:

http://www.philips.com/security

2.4 Getting More Information

2.4.1 Information you need

More information about using the Xper Information Management System is available from the following sources:

- Documentation
- Technical support

Documentation

Consult the following documentation for additional information about using the Xper Information Management System:

- Xper Information Management System - System Administrator Guide. This manual describes activities that system administrators must complete to maintain the Xper Information Management System, including the assignment of users and permissions to workgroups. IMPORTANT: This guide is only available to system administrators (not all users).
- Xper Information Management System - Release Notes. This document provides an overview of the system new features, improvements, and/or resolved issues. IMPORTANT: it does not replace this *Instructions for Use*.
- Xper Information Management System - Quick Reference Guides. These guides provide overview of Xper Information Management System menus and modules. IMPORTANT: they do not replace this *Instructions for Use*.

Technical Support

Should you encounter difficulty using the Xper Information Management System, refer to *"Specifications" on page 153* for basic information about the system and follow the guidelines below to locate the relevant source for information and assistance.

- Configuration Settings—Configuration includes the assignment of user permissions and the content of various lists used in the applications. For questions in these areas, consult a hospital Xper Information Management System system administrator or refer to the Xper Information Management System - System Administrator Guide.
- Technical Issues—These issues include backup schedules, network connectivity, and workstation operation. Start by contacting a hospital Xper Information Management

System system administrator or refer to the Xper Information Management System - System Administrator Guide.

If you cannot resolve your problem, contact the Philips technical support group serving your area. To obtain contact information for this group, ask your local Philips Healthcare representative.

When contacting Philips technical support, please have the following information available:

- Caller name, customer organization name, and location.
- Site number, if applicable.
- Detailed description of the problem, including any history of troubleshooting efforts completed before or after the problem first occurred.

3 Operation

3.1 Admitting Patients

3.1.1 Admitting a Patient Manually

1 To admit a patient, click **ADMIT**, then click **MANUAL ADMIT**. A new Case Details screen opens. You can begin filling in the patient's demographic, procedure, and lab data. Last Name, First Name, and Medical Record Number are required.

2 When you are ready to begin recording hemodynamic data, click **Start Case.**

Click the **SWITCH** button to be able to view the monitoring screen.

3.1.2 The Case Details Screen

The Case Details screen contains a patient's demographic data, information about the staff and procedural data, and lab values. The data may be entered manually, or the fields may be completed by the ADT interface admission process. You may also build data scrapers to complete some fields. The following tables list the fields and descriptions of their functions.

Patient Information.

Field	Description
Last Name	Patient's last name (required)
First Name	Patient's first name (required)
MI	Patient's middle initial
Suffix	Indicates whether patient is a Jr., III, IV, etc.
Height (cm)	Patient's height in centimeters
Height (In.)	Patient's height in inches
Weight (Kg)	Patient's weight in kilograms
Weight (Lb.)	Patient's weight in pounds
BSA	Patient's body surface area in square meters
BMI	Body Mass Index in kilograms/square meter
Date of Birth	Patient's date of birth
Age	Patient's current age
Gender	Patient's gender
Nationality/Ethnicity	Patient's nationality or ethnicity
Allergies	Patient's allergies
Medical Record Number	Patient medical record number (required)

Case Information

Field	Description
Procedure Date	Date procedure was performed
Admit Date	Date of patient's admission or registration to the facility
Pre-Admit Date	Date the patient was pre-admitted
Finalized Date	Date the study was finalized
Patient In	Time the patient arrived in the procedure room
Setup Done	Time the patient was ready to undergo a procedure
Phys Paged	Time the attending physician was paged
Phys Arrived	Time the attending physician arrived in the lab
Begin Time	Time the procedure began
End Time	Time the procedure ended
Patient Out	Time the patient left the procedure room
Room	Procedure room

Demographics

Field	Description
Account Number	Patient's account number
Case Number	A system-generated index number
EMPI	Enterprise Master Patient Index (US only)
Accession Number	A unique procedure identifier
Social Security Number	Patient's social security number
Patient ID	Optional ID number for internal departmental use
Legacy Name	Combination of patient's Last Name, First Name and MI (middle initial). Used in Query and Transcription. Example: Doe, John A.
Address 1	Address field
Address 2	Additional address data
City	City in which the patient lives
State	State in which the patient lives
Zip Code	Zip or postal code
Country	Country in which the patient lives
Phone 1	Patient's phone number
Phone 2	Additional contact number
Insurance Name	Patient's insurance
Insurance Group Number	Patient's insurance group number
Ins Subscriber ID	Patient's insurance ID number
Ordered Reason for Study Code	Code for reason the study was ordered

Field	Description
Ordered Reason for Study Description	Description of reason the study was ordered
Non-Finalized	Indicates the study has not been finalized
Legacy Case	Combination of Station ID and Case Number. Used in Query and Transcription.
Case Finalized	Indicates the study has been finalized
Hidden	Indicates that the study is hidden
On Waiting List	Checked when a pre-admitted case is opened

Resources and Procedures

Field	Description
Resources	List of staff, physicians, fellows and referring physicians associated with the procedure
Procedure(s)	List of procedure(s) performed

You can add, delete, or change resources and procedures.

To add resources to a procedure:

1 Click **Add** above the Resources list to open the list of staff.

You may sort the list alphabetically or by staff role (e.g., Circulate, Physician, Scrub, etc.).

2 Click the **+** (plus symbol) beside any name to display a list of sub-specialties for that resource (e.g., Diagnostic Physician, Interventionalist, Certified Registered Anesthetist, etc.).

3 Double-click any resource to add it to the Resources list.

4 Select the **Show with access** check box to display only users who have access to the repository in which you've admitted the case.

5 Close the Resources list.

To add procedures:

1 Click **Add** above the Procedures list.

2 Double-click the procedures you want to add.

You may sort the list alphabetically.

3 Close the Procedures list.

To delete resources or procedures:

1 Click on a resource or procedure in the list to select it.

2 Click **Delete** above the resources window.

The procedure is deleted from the Procedures list.

To change the order of resources or procedures lists on the Case Details screen:

1 Click on a resource or procedure to select it.

2 Use the UP or DOWN arrows to change the order.

Resource Specialties

Resources may have one or more specialty associated (e.g., Diagnostic Physician, Interventional Physician, Holding Area Nurse, etc.).

1 To assign a resource with a specialty, click the **+** (plus symbol) next to the resource you want to add.

This will expand the list.

2 Double-click the specialty you want to assign (see *"Resource Types" on page 136*).

Assigning procedures to multiple physicians

If you have assigned more than one physician to a case, any procedures you assign will be automatically attributed to the first physician.

To attribute a procedure to a different physician:

1 Click on the physician name next to the procedure to highlight it.

2 Click on the end of the field to the right of the physician name.

This will open a drop-down list containing all the physicians assigned to the case (there will be a short delay before the list displays).

3 Select a different physician to assign to the procedure.

3.1.3 Labs/Procedure Data

In Xper Information Management System 2.3, labs and procedure data can be configured by station in the system configuration in two ways: legacy labs and lab series. If you admit a new case, the lab configuration determines how the labs will be saved. For example, if the system configuration is set for legacy labs, you will see the legacy labs (historical labs) screen. If a case is admitted on a station with the lab series system configuration, the station will show the lab series screen whenever the case is opened.

NOTE
Lab series configuration is only available for Xper Information Management System 2.1 and higher.

Legacy Labs (Historical labs view)

The Labs/Procedure Data tab with legacy labs contains lab results for the patient, including procedure information displayed in the historical view. Lab values are expressed in standard US units and, where appropriate, in international standard units. All results are available in case details and transcription reports.

If values are entered in either field (US or international), Xper Information Management System will convert the data and automatically populate the corresponding fields. For

example, if you enter a value in HGB (g/dl), Xper will automatically calculate and populate the HGB (g/l) field with the correct value.

The data may be entered manually, or the fields may be completed by the ADT interface process. You may also build data scrapers to complete some fields (see “*Data Scrapers” on page 63*). The specific fields and their functions are listed in the following table:

Field	Description
HGB (g/dl)	Hemoglobin (standard US units)
HGB Date	Date of HGB lab result
PTT	Partial Thromboplastin Time (standard US units)
PTT Date	Date of PTT lab result
HCT	Hematocrit (standard US units)
HCT Date	Date of HCT lab result
GLU	Glucose (standard US units)
GLU Date	Date of GLU lab result
WBC	White Blood Cells (standard US units)
WBC Date	Date of WBC lab result
K+	Potassium (standard US units)
K+ Date	Date of K+ lab result
PLT	Platelets (standard US units)
PLT Date	Date of PLT lab result
NA+	Sodium (standard US units)
NA+ Date	Date of NA+ lab result
PT	Prothrombin Time (standard US units)
PT Date	Date of PT lab result
BUN	Blood Urea Nitrogen (standard US units)
BUN Date	Date of BUN lab result
INR	International Normalized Ratio (standard US units)
INR Date	Date of INR lab result
CREAT	Creatinine (standard US units)
CREAT Date	Date of CREAT lab result
HGB (g/l)	Hemoglobin (international standard units)
HGB (mmol/l)	Hemoglobin (international standard units)
HCT (SI)	Hematocrit (international standard units)
GLU (mmol/l)	Glucose (international standard units)
K+ (mmol/l)	Potassium (international standard units)
NA+ (mmol/l)	Sodium (international standard units)
BUN (mmol/l)	Blood Urea Nitrogen (international standard units)

Field	Description
CREAT (umol/l)	Creatinine (international standard units)

Lab Series

The lab series screen displays lab results and lab ranges. All legacy lab values and procedures are available for each patient, including imported data from external sources, and multiple values are allowed for each lab result. The lab series grid displays normal ranges and highlights abnormal values with yellow to alert the clinician of an abnormal lab result.

The lab series screen can be refreshed to bring in new updates. Otherwise, refresh occurs automatically at a specified interval set in the system configuration for lab series. The grid can be configured to display either US or international values. Once a case is admitted with lab series system configuration, the case will start polling the interface for lab results. The values received are related to the period of 30 days before the current date. Clinicians can select the Hgb or Creatinine value to be used in calculations. For accounts that do not have a lab interface, or in the event of network failure, clinicians can enter lab results manually.

To view a lab series for a specific patient:

1 Open a patient case.

2 Click on the **Labs/Procedure Data** tab.

NOTE
Incoming labs which are not recognized by the system or labs which contain invalid characters will be displayed in a grid below the lab series results.

NOTE
Labs highlighted in yellow indicate results that are out of the normal range.

To add a new lab series:

1 Click **New**.

2 Select the **date** and **time**.

3 Select the **Lab Label**.

4 Type a **Value** in the text box and click **OK**.

To edit a lab series:

1 Click on a Lab to select it and click **Edit**.

2 Type the new value in the text box and click **OK**.

NOTE
Only manually entered lab values can be changed. A lock icon will indicate values which were imported via the interface. These values cannot be changed, only deleted.

NOTE
When the End Time on the Case Details tab is filled in, the study does not receive more Lab Series information performed after the time set.

Other functions:

- **Refresh**—Updates labs on demand, rather than at the automatic polling interval.
- **Select**—Used to select values for calculations (HGB and CREAT only).
- **Delete**—Deletes the selected lab result.

NOTE
All changes are tracked and shown on the Audit tab.

NOTE
To set lab ranges, see *"Lab Ranges" on page 132*. A case cannot be open while setting lab ranges.

NOTE
Lab ranges are optional. Unless lab ranges are configured for the repository, notification of abnormal values will not display in the lab series list in a study.

Procedure Data

Field	Function
Contrast Type 1	First type of contrast used during procedure
Contrast Type 2	Second type of contrast used during procedure (optional)
Patient Class	Indicates whether a patient's status is Inpatient or Outpatient
Contrast Total Max	Total maximum contrast that may be administered to the patient
Contrast Limit	Manufacturer's suggested contrast limit per kg of body weight
Used #1 (ml)	Total amount of first contrast used
Used #2 (ml)	Total amount of second contrast used
Total (ml)	Total of Used #1 and Used #2
Creat Clearance (ml/min)	Indicator of patient's kidney function (standard US units)
Creat Clearance (ml/s)	Indicator of patient's kidney function (international standard units)
Fluoro (min)	Fluoro time
Fluoro Dose (Gycm2)	Fluoro dose

Status

The Status tab is used to send messages to the Patient Status Viewer. See *"Patient Status Viewer" on page 27* for more information.

History

The History tab contains a list of all of a patient's previous Xper Information Management System studies. From the History tab, you can double-click to open a previous study in read-only mode. When you close the historical case, the current case will still be open. For information on establishing historical links, see *"Patient Historical Links" on page 142*

The Links section of the History tab will display links to a patient's previous ECG studies when you have an interface with the Philips TraceMasterVue system. For more information, see *"Philips TraceMaster Interface" on page 60*.

Documents

The Documents tab contains a list of signed transcription documents and case reports that were created during the study. Any scanned documents saved as a PDF will also be included. You can print a single document from this screen, or use standard Microsoft Windows keyboard functionality to select multiple documents to be printed. To Print, do one of the following:

- To print a single document, click on the document to highlight it and then click **Print Docs**. To select documents throughout the list, hold down the **Ctrl** key while clicking on documents.

Or:

- To print a range of documents, click on the first document in the range, hold down **Shift**, and click on the last document in the desired range, then click **Print Docs**. To remove individual documents from the range, or to add documents, use the **Ctrl** key.

Additional Data

The Additional Data tab contains several fields in which users can enter information. The fields and descriptions of their definitions are listed below:.

Field	Description
Reason for Study	Automatically added, but may be manually populated from the list or edited.
Description	Automatically populates based on the reason for study selected.
Coding System	Identifies the coding system, version, Catalog year, and activation date.
Diagnosis Codes	Physicians will be able to assign diagnosis codes based on the procedures performed.
FFR	Allows a user to enter a Fractional Flow Reserve value.
Elapsed Time	Displays the amount of time elapsed between Start and End times of a procedure.
Completion (days)	The number of days elapsed between the date on which a case was added to the Waiting List and the date on which the procedure was performed.
Date Signed	The date on which the most recent electronic signature was applied to a transcription document.
Signed By	The person who last applied an electronic signature to a transcription document.
Health Insurance	Allows user to select an insurance provider, which will generate patient charges based on information entered in the Procedures table and in Inventory for that provider. For more information, see ***"Insurance Providers" on page 138***.

Field	Description
Referred for Surgery	Can be checked by a user to indicate that the patient was referred for open heart surgery.
Date Referred	Enter the date on which a patient was referred for open heart surgery.

MPPS

The MPPS (Modality Performed Procedure Step) tab displays information from an MPPS interface with your DICOM x-ray system, if available. MPPS requires an Xper Connect or IntelliBridge Enterprise interface. For information on configuring MPPS, see *"Modality Performed Procedure Step (MPPS)" on page 142.*

If MPPS data has been transferred during a study, you can import the data into a charting menu. This will enable the data to be scraped to other fields or to transcription reports.

To import the data into a charting menu:

1 Click **Transfer to Menu**.

2 You may then scrape or query the data as you would any other menu.

NOTE
Data can be transferred to a charting menu one time only. Do not perform this operation until you are sure the data is complete.

Audit

The Audit tab displays events, User ID, date, and details of changes of additions.

3.1.4 Admitting a Patient through an ADT interface

If you have an Xper Connect or IntelliBridge Enterprise interface to your facility's ADT system, you can admit patients through this interface. To admit a patient using the interface:

1 From the **Admit** menu, click **ADT ADMIT**.

This will open the Patient Admit Search window. You have the option to search for patients based on MRN (medical record number), SSN (social security number), Account Number, Accession Number, Last Name, or DOB (date of birth).

2 Select the search method; then enter the data to search for in the Input Patient Identifier field.

3 Click **Search** to begin searching through the current hospital admissions for your patient.

The application will return a list of matching patients.

4 Highlight the patient and double-click **Admit**.

This will open a Case Details screen that will contain as much information as is available from the ADT interface. You may then complete the remaining fields manually or by using data scrapers.

5 Click **Start Case** to begin recording hemodynamic data.

Click the **SWITCH** button to be able to view the monitoring screen.

If your system is configured for a DICOM Worklist, you may admit patients from this list. To admit a patient from the DICOM Worklist:

1 Click **ADMIT** > **WORKLIST ADMIT**.

This will open the Worklist Manager screen. You have the option to search for patients based on name, patient ID, accession number, scheduled station, station AE title, modality, or start and end date.

2 Type the data to search for in the appropriate field.

3 Click **Query** to begin searching the worklist for your patient.

The application will return a list of matching patients.

4 Double-click the patient.

This will open a Case Details screen that will contain as much information as is available from the worklist.

5 Complete the remaining fields manually or by using data scrapers.

6 Click **Start Case** to begin recording hemodynamic data.

Click the **SWITCH** button to be able to view the monitoring screen.

NOTE
If the patient admitted has study data recorded in Epic Cupid, that medical record is loaded to the Charting screen in the previously configured Charting Menu (see “*Menu Builder” on page 111*).

3.1.5 Admitting a Patient from the Study Scheduler

You may admit patients from the Study Scheduler. To do so:

1 Find the patient’s study on the schedule and right-click on the study.

2 Select **Admit** to open a Case Details screen.

This will contain all available information from the scheduled event (name, medical record number, procedures, and staff).

3 Complete the remaining fields manually or by using data scrapers.

3.1.6 Admitting a Patient from Allura

To admit a patient to the Xper Information Management System from an Allura X-ray system, you must first create the study on the Allura system.

After entering the patient data on the Allura system:

1 Click **ADMIT** > **ADMIT FROM ALLURA** on the Xper Information Management System Workstation.

A new study will be created with any available data from the Allura system populating the matching fields.

2 The following data elements must be completed in the Allura system in order to successfully admit a study into Xper Information Management System:

- First name
- Last name
- Patient ID

This will populate the MRN in Xper Information Management System. Date of birth, height, and weight can be added at a later time.

NOTE
The Xper Information Management System Workstation requires configuration in order to use the Admit from Allura function. For assistance in configuring your workstation, contact Customer Support.

3.1.7 Allura – Xper Information Management System Patient Mismatch

When a study selected on the Allura system does not match the study opened in Xper Information Management System, you will receive a notification at the bottom of the Case Details screen:

"[Patient Name] ALLURA-CIS PATIENT MISMATCH!"

If you receive this notification, you should verify that the correct patient study is selected on each station, Allura and Xper Information Management System, before proceeding. You should receive this notification only if the patient has been admitted on each system independently. If you are admitting a study from Allura to Xper Information Management System, you should not receive this notification, as the patient data should match up automatically.

3.1.8 Pre-admission to Waiting List

You can manually pre-admit patients to a Waiting List, or you can pre-admit patients through your ADT interface. Patients who have been pre-admitted can be placed on the schedule, or can be admitted directly from the Waiting List when they arrive for their procedures.

To pre-admit a patient manually,

1 Click **ADMIT** > **PRE-ADMIT** > **MANUAL PRE-ADMIT** to open a blank Case Details screen.
2 Type any demographic and lab data (minimum required is first and last names and medical record number).
3 If known, type the scheduled **Procedure Date**.
4 Click **Pre-Admit Case**.
5 Click **Cancel** to abort the operation.

To pre-admit a patient from the ADT interface:

1 Click **ADMIT** > **PRE-ADMIT** > **PRE-ADMIT ADT** to open the Search Patient Admissions screen.

You have the option to search for patients based on MRN (medical record number), SSN (social security number), Account Number, Accession Number, Last Name, or DOB (date of birth).

2 Select the search method; then type the data to search for in the **Input Patient Identifier** field.

3 Click **Search** to begin searching through the current hospital admissions for your patient.

The application will return a list of matching patients.

4 Double-click on the patient you want to pre-admit to open a Case Details screen that will contain as much information as is available from the ADT interface.

5 Complete the remaining fields manually or by using data scrapers.

6 Click **Pre-Admit Case**.

7 Click **Cancel** to abort the operation.

After pre-admitting, you may chart the patient's pertinent history, import historical arterial trees, add the physician and referring physician, the scheduled procedures, or enter any other data you may have. You cannot initiate monitoring, record pressures, vitals or full disclosure.

Pre-admitted patients will be available on the Waiting List tab in the Study Scheduler (see *"Scheduling" on page 61*). There is also a Waiting List pane that can be incorporated into user roles in the Portal Designer (see *"User-Centric Navigation" on page 78*).

When the patient arrives for the procedure, you can double-click on the patient in the Waiting List, or right-click on the event in the Study Scheduler and select **Admit**. When the case opens, click ***Start Case*** and proceed normally.

Click the **SWITCH** button to be able to view the monitoring screen.

To pre-admit a patient from the Study Scheduler:

1 Click on the **Pre-Admit** tab.

2 Type the desired search criteria and click **Search Now**.

3 Double-click on the historical case you want to use for pre-admission. A new Case Details screen, populated with available data from the historical case, will open.

After pre-admitting, you may:

- Chart the patient's pertinent history
- Import historical arterial trees
- Add the physician and referring physician
- Add the scheduled procedures
- Enter any other data you may have.

You cannot initiate monitoring, record pressures, vitals or full disclosure. If the historical case contained any post-procedure arterial trees (see *"Arterial Trees" on page 48*), the trees will automatically be transferred to the new study and be marked as Pre-Procedure.

After you have entered data:

1 Close the study to place it on the Waiting List.

2 Click on the **Waiting List** tab and then click **Refresh** to update the list with the new entry.

If your search returns no results, **Manual Pre-Admit** and **Pre-Admit from ADT** become active, allowing you to pre-admit your study using one of those methods.

3.1.9 Readmit

New studies may be created for patients who were previously admitted into Xper Information Management System by using the Study Readmit function. This function is most frequently used to create a new interventional study for a current patient who has undergone a diagnostic procedure, but whose intervention will be performed by a different physician; however, any patient may be readmitted. To readmit a patient:

1 Click **HEMODYNAMICS** > **CASE TOOLS** > **STUDY READMIT**.

You will be prompted to close the current case and readmit for a new procedure.

2 Select the **INCLUDE LABS** and/or **INCLUDE STAFF** check boxes if you want the lab results and staff from the currently opened case to populate the new case.

3 Select the PRE-ADMIT check box if you want to admit the study to the Waiting List (see *"Pre-admission to Waiting List" on page 25*).

4 Click ***OK*** to continue, or **Cancel** to abort the operation.

If you click **OK**, you will be prompted to print a case report.

5 Select a report configuration and print option, and click **OK** to continue, or click **Cancel** to skip printing and proceed with the readmit procedure.

The current case closes, and a new study opens. If you chose to include labs or staff, that data will be present in the new study. Any menus that were designated as History (see *"Building and Editing Menus" on page 112*) are populated with the charting done in the previous study.

6 If you have chosen to admit the study to the Waiting List, you can type any additional data and close the study, which will then appear on the Waiting List.

3.1.10 Patient Status Viewer

The Patient Status Viewer is an optional feature that displays a patient's location and procedure status (to configure status messages, see *"Case Status" on page 125*), and can also display optional messages about a patient or procedure.

1 To update a patient's status to the Patient Status Viewer, click the **Status** tab on the Case Details screen. The controls and descriptions of their functions are listed in the following table.

Control	Function
Case Status window	Displays all posted status messages and the time each message was sent to the Patient Status Viewer.
Clear	Clears the message board window.
Display for	The length of time (in seconds) that a message will be displayed on the selected Patient Status Viewer.
Message Board window	Type message text to post to the Patient Status Viewer message center.
Send	Sends the message to the selected Patient Status Viewer.
Timestamp	Allows a user to edit the time stamp of a message to be sent to the Patient Status Viewer.
Update Case Status To	Allows a user to select a procedure status message to post to the Patient Status Viewer.
Patient Status Viewer	Allows a user to send a message to a specific Patient Status Viewer location.
Remove from Whiteboards	Allows a user to remove the Case Status set to the whiteboard.
WhiteBoard	Allows a user to send a message to a specific Patient Status Viewer location.

The Patient Status Viewer contains four sections:

- Pre-procedure Holding
- Procedure Room
- Post-Procedure Holding
- Message Board

You can update the status of a patient so that family and Holding Area staff can keep track of the patient's location.

Note
Only the first three letters of the patient's surname and the first letter, followed by three asterisks, of the first name are displayed, protecting the patients' identity.

To update the status of a procedure:

1 Double-click a status message from the **Update Case Status** list.

The patient's status will be displayed in the appropriate window on the Patient Status Viewer, and in the Current Status window on the screen.

2 Select the appropriate patient status.

The available status selections are:

- Patient In

- Patient Ready
- Procedure Begin
- Procedure End
- Patient Out

You can also build scrapers that will automatically send status messages to the Patient Status Viewer when certain data is charted. For more information, see *"Data Scrapers" on page 63*.

You may also post a message to the Patient Status Viewer (e.g., asking family members to report to a conference room, requesting the next patient be brought to the procedure room, etc.).

To post a message to the Patient Status Viewer:

1 Type the message you wish displayed in the **Message Board** window.

2 Select the appropriate Patient Status Viewer on which you want it to display.

3 Select a length of time for the message to be displayed.

4 If you wish, change the time/date of the message.

NOTE
If you click **Send** without changing the time/date of the message, the stamp will set to the current time and date. To clear the message window, click **Clear**.

5 Click **Send**.

The message will be displayed on the selected Patient Status Viewer for the length of time you specified.

To remove a patient from the Patient Status Viewer:

- Click **Remove from Whiteboard** on the Case Status screen.

3.2 Document Scanning

Xper Information Management System Workstations support the scanning of external documents (history and physical, reports from previous studies, etc.) into a patient record in PDF format through a USB document scanner.

Recommended models:

- Canon CanoScan LiDE 35
- Fujitsu fi-6130
- Hewlett Packard ScanJet Professional 3000
- Hewlett Packard ScanJet N6010
- Visioneer Strobe XP 300
- Visioneer RoadWarrior

To scan a document:

1 Ensure that the scanner is attached and powered on.
2 Open the patient study to which the document will be scanned (if the study is already opened, skip this step).
3 From **Hemodynamics**, select **Case Tools**.
4 From the **Case Tools** menu, select **Scan Documents** and then **Show User Interface** to display the scanner interface dialog.

   This allows you to set options such as 2-sided, color, paper size, etc. (If you do not want to set any options, skip this step.)

5 Click **Acquire** to scan the document.

You may then save the document in one of two file formats: JPEG or PDF. To save the document as a PDF file:

1 Click **Save as PDF**.
2 If there are multiple pages to be included, press **Ctrl** and click on each page you want to select.
3 Rename the document, if desired.
4 Click **OK**.

   The document will be available for viewing as a PDF on the **Documents** tab.

To save the document as a JPEG file:

1 Set the desired compression (100 = no compression).
2 Click **Save as JPEG**.

   The document will now be available under **HEMODYNAMICS > IMAGING** > **STILL FRAMES** and may be included in transcription reports.

NOTE
Scanners must be connected to Xper Information Management System Workstations only.

3.3 Entering Procedural Data

3.3.1 Charting a Procedure

The application allows you to quickly and easily chart a procedure. Because you can create custom menus in the Menu Builder, you can ensure the accuracy and thoroughness of your patient records. Procedural charting is integrally connected to transcription and statistical reports, as well as other modules throughout the application. In addition, entries and modifications to charting are tracked, so that you can perform audits in the event discrepancies arise.

Once you have a study open, access the charting module by clicking **HEMODYNAMICS > CHARTING**. This opens the Charting Menus window.

The Charting Menus window consists of four sections:

- **Main Menus**—charting is arranged into menus, or categories, such as History and Assessment, Complications, Findings, etc. The menu selection you see depends on the modality of the study you're charting.
- **Menu tree**—these are the statements from which you chart your procedure.
- **History**—in this section, the actual charting of a procedure is displayed. As you chart statements, they appear here, along with information about who charted the information and whether modifications or deletions were made, when they were made, and who made them.
- **Edit Entry**—this window allows you to correct errors in charting, as well as permitting a user to type notes directly, rather than selecting from the menu entries.

3.3.2 Charting in Xper Information Management System

To chart:

1 Select a menu from the list on the left, and then point and click through the menu tree items on the right.
   - Menu items that have associated sub-level choices will be indicated by a **+** (plus sign). As you click on the item, the sub-levels will expand, allowing you to make your selection.
   - Once you have gone through all the levels, the finished statement appears in the History window, along with the time and date the line was charted and the user who charted it.
   - As you switch menus, the History window will refresh with items charted in the menu you select.

2 To make several entries from the same sub-list, press and hold the **Shift** key and click on the level you want to expand.
   - That level will then be marked with a padlock icon. It will remain expanded, allowing you to make additional selections without having to constantly click on the "parent" level in order to chart.
   - When you want to close the level, press and hold the **Shift** key and click on the padlocked item.

Some menu items have a **variable entry tag** associated with them. This means that keyboard entry is required to chart an item.

For menu items that require an entry, click on a variable entry item. The Variable Item window will open, prompting you to enter the required data.

Some variable items may have a **unit type** associated with them. The unit type for a specific item is set when the menu is created, but you can select a different unit type from the Unit Type drop-down list before clicking **OK**. Clicking **Cancel** closes the window without charting an entry.

Once you have entered the required data, you can click **OK** to save the data and move on to the next selection, or press **Enter** on the keyboard. You can use the keyboard to chart if you like, by typing the corresponding letter next to the item you want to chart (A, B, C, D…).

Inventory items are also a special function in charting. Inventory items are marked with a special icon. When you click on a particular inventory item, a window opens containing a list of items belonging to that inventory category. You can select an item from the list, or you can use the barcode reader to scan the item into your procedure. You can filter the list by clicking into a field (e.g., Item Name) and typing a few characters.

Inventory items may also be entered by scanning their barcodes. To scan a single barcode, hit **Ctrl+B** on the keyboard. To scan multiple barcodes, hit **Ctrl+D**. Both methods open a window that allows you to scan the item barcode into your procedure, but if you hit **Ctrl+B**, the window closes automatically after scanning. If you hit **Ctrl+D**, the window remains open until you click the *X* to close it.

In addition, if an item has been marked as Implantable (see *"Inventory Maintenance" on page 91*), upon scanning the item barcode, depending on the type of barcode, you will be prompted to enter the lot number, serial number, and expiration date of the item. If your item has a separate barcode containing these attributes, you can scan the attribute barcode into the Attribute Bar Code field, and the information is automatically charted, as well (see *"Inventory Overview" on page 87*).

If the expiration date of the implantable item you have charted has expired, you will receive a prompt to verify the expiration date. You will be prompted to confirm the date. If the item has expired, click **Yes** to cancel the charting. If the item has not expired, or if you want to chart it anyway, click **No**.

If an inventory item must be credited to the patient's account, click the item, then click **Credit**. The item is marked as credited, it is not billed, but it is decremented from inventory. Similarly, if an item has been wasted, click the item, then click **Waste**. The item is marked as wasted and it is not billed, but it is decremented from inventory.

You can duplicate a charted entry by clicking on the entry, then clicking **Re-chart**. The line is charted again into the menu, but with the current date/time. It is also marked with a RECHARTED icon. If you rechart an inventory item, it is marked REUSED, it is not deducted from inventory, and no charge is generated. It is assumed that the same item is being reused.

Charting kits allow you to chart multiple items with one click (see *"Kit Builder" on page 107* and *"Menu Builder" on page 111*). To chart a kit, simply click on the kit name in your menu. The items associated with the kit are inserted into the procedure record. Any inventory items included in a kit are automatically decremented, and if there are charges associated with them, the patient is billed. Procedures associated with a kit appear on the Case Details screen.

Once entries have been charted, you may find it necessary to make changes or additions to the text, or you may want to enter a note (free text) into the procedure log. The Edit Entry section lets you do both.

To edit a previously charted item, simply double-click on the line in the History section, make the necessary changes, and click **Confirm**. The newly edited line appears in the History section. The previously charted item remains in the History section, but it is struck through and marked "Modified." The edited item has the same time and date stamp as the modified item to preserve the procedural flow, but a notation appears with the time and date of modification, along with the user who performed the modification.

To enter a free text item, click ***Free Text***. Click into the Edit Entry window, type your note, and click ***Chart*** to enter the note into the procedure log. Free text entries are marked with a ^FreeText^ tag at the end of the line.

The Given By marker enables you to mark any line with the name of a staff person or physician who participated in the procedure. Its intended use is for medication administration, but you can mark any charted item with the Given By tag. It is important to remember that only staff and physicians who appear on the Case Details screen are available in the drop-down list, so if you do not see the person whose name you are searching for, you have to add it in the Resources list.

You may hide deleted and modified entries in the charting history by checking the “Hide Deleted Entries” or “Hide Modified Entries.”

3.3.3 Charting in Xper Information Management System with Epic Cupid data

With the Epic Cupid to Xper Information Management System interface, data charted in Epic Cupid becomes available for clinical, procedural, registry and statistical reporting in Xper Information Management System. The intent is to streamline the workflow by preventing duplicate entry of information and associated potential information entry errors.

The intended users of this workflow are the Cath Lab nurses or monitors that log the patient medication, staff in/out times and events.

Cases are synchronized between Epic Cupid and Xper Information Management System.

The following data elements charted in Epic for a case are imported into Xper Information Management System for that same case:

- Medications
- Staff in/out times
- Events

Epic Cupid has triggers to send a message stream with the above data – such as “log complete” and “log addendum”.

Upon importing of the data elements from the incoming message stream into Xper Information Management System’s Charting module (see “*Menu Builder” on page 111*), the data becomes integral part of Xper Information Management System’s structured data readily available for:

- reporting
- scraping
- querying

The most recent incoming message stream for a case always contains all the data elements (not just the delta) and replaces any previously imported data. The case must be open(ed) in Xper Information Management System to process updates from Epic into the case’s charting module in Xper Information Management System.

To access the Epic Cupid patient's data, click HEMODYNAMICS > CHARTING and select from the main menus one of the Epic's options: Medications, Staff and Events.

NOTE

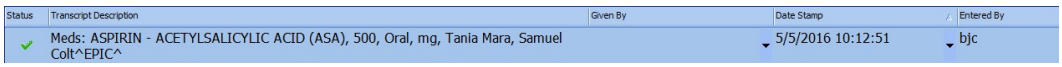
The menus information is recorded through the Charting Menu, from where it is available to be accessed via scraper. This information does not generate user registration such as Case Resources. So, in order to sign a document or finalize a study, the user must be manually assigned (see *"User Administration" on page 82*).

Medications

This information is composed by the definition previously configured on the XML Integration screen for the Menu Attribute **EPIC Medications**.

On the following example, the information was imported containing: prefix "Meds" medication name, dose, route, dose unit, 'given by' first name, 'given by' last name, 'ordered by' first name and 'ordered by', last name and the suffix "^EPIC^".

The Date Stamp column shows the date and time as configured on the XML Integration screen. If this information was not configured or if the XML file does not have this information, the date and time when the XML file was imported is shown.



NOTE

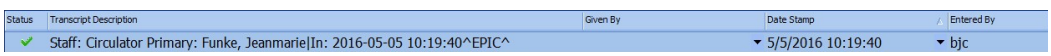
The medication entry can have duplicated entries if there is more than one administration per medication. In that case, information that is not related to the administration repeats as many times as there is administration information.

Staff

This information is composed by the definition previously configured on the XML Integration screen for the Menu Attribute **EPIC Staff**.

On the following example, the information was imported containing: prefix "Staff:", role, last name, first name, the date time in or date time out, and the suffix "^EPIC^".

The Date Stamp column shows the date and time as configured on the XML Integration screen. If this information was not configured or if the XML file does not have this information, the date and time when the XML file was imported is shown.



NOTE
The staff entry may have duplicated entries if there is more than one active time per staff member. In that case, the staff information repeats as many times as there is active time information.

Events

This information is composed by the definition configured on the XML Integration screen for the Menu Attribute EPIC Events.

On the following example, the information was imported containing: prefix “Event:”, Epic Event description, date and time and the suffix “^EPIC^”.

The Date Stamp column shows the date and time as configured on the XML Integration screen. If this information was not configured or if the XML file does not have this information, the date and time when the XML file was imported is shown.

3.3.4 Charting in the Patient Care Console

The Xper Flex Cardio Physiomonitoring Patient Care Console (FC2020) is a single display system, which means that physiomonitoring and procedural charting are displayed side by side on the same monitor. When you click on a menu, you see the same tree view and chart and edit the procedure just as you would on a Physiomonitoring 5 system.

3.3.5 Lesion Markers

Lesion markers (L1–L9) are indicators that flag a charted entry for use by scrapers to transfer data from charting to the ACC and ICD data collection screens, or to a transcription report. You may manually mark any charted entry by right-clicking on the entry and selecting the desired lesion number from the marker list. The marker appears in French brackets at the end of the charted item (e.g., {L1}, {L2}, etc.).

You may apply multiple lesion markers to a charted entry, or remove a marker from an entry in the same way. To add additional markers, right-click the entry, then select the additional marker to be added. To remove a marker, right-click the entry and select the marker you want to remove.

In Lesion menus, you may activate a function called **Auto Lesion Numbering**, which automatically attaches a lesion marker to each entry as you chart. To activate Auto Lesion Numbering in a menu with the Lesion attribute:

1 Click **Auto Lesion #**.
2 Select the marker you want to use (L1–L9).
3 Click **OK**.

As you chart, each entry in the menu is marked with the designated lesion number. The button label indicates the selected marker (e.g., AUTO LESION {L1}). To disable lesion marking, click the button **Auto Lesion #**, select **OFF**, and click **OK**.

NOTE
Auto lesion marking is available only in menus that have the Lesion attribute assigned. In menus that do not have the attribute, the Auto Lesion # button is disabled. For more information, see *"Building and Editing Menus" on page 112*.

3.3.6 Procedure Log

The procedure log is the chronological report of your charted items from all menus. As you add, modify and delete entries in charting, the log is automatically updated so that you have a concise report that you can refer to at any time. To view the procedure log during a study, click **HEMODYNAMICS > PROCEDURE LOG**.

The procedure log can help you move quickly to a charted item you need to modify or delete. Simply double-click the entry in the log, and the application opens the menu in which that item was charted. You can choose to display any recorded vitals in the log by clicking the Show Vitals check box.

The procedure log can be digitally signed at the end of a procedure. To sign a procedure log:

1 Click **Sign**.

2 Enter your user name and signature password.

3 Click **OK**.

When the procedure log is printed, the name and title of the person signing appears at the end of the log, as well as the time and date the signature was applied.

NOTE
The procedure log may be signed by up to ten (10) users. The digital signature appears in the log at the time the signature was applied, and at the end of the printed report.

You have the option to include the Given By and Entered By information on the procedure log printout. For assistance with activating these features, please contact Customer Support.

3.3.7 Changing Users During a Procedure

During a procedure, it is possible that the person recording the study may be relieved by another staff member. To change the logged in user during a procedure, click on the user name in the lower right corner of the screen. A Change User window appears, allowing the next user to enter a username and password without closing the case. Monitoring, vitals capture and full disclosure recording continue without interruption. You may change users during a procedure as often as is necessary.

3.3.8 Locking a Case

A case may be temporarily locked to protect case data integrity, in the event that a user must step away from the computer. To lock a case, click on the user name in the lower right corner of the screen and click **Lock**. The case locks. No charting or editing may be performed while a case is locked, although monitoring, vitals capture and full disclosure recording continue. To unlock a case, enter your user name and password and click **Unlock**. You will then be able to proceed normally. You may also use this process to change users during a procedure, if you are relieving a fellow staff member.

3.4 Hemodynamics Screen

The Hemodynamics screen contains all the invasive pressure and cardiac output data that is collected during a procedure. The collected data is used to perform calculations, such as vascular resistance, intracardiac shunting, and valve stenosis. The calculations are performed automatically as samples are captured, and is recalculated when you edit samples using the Waveform Review screen. You also enter oxygen saturation data into the Hemodynamics screen.

Hemodynamics screens correspond to monitoring conditions. When you record an initial pressure sample in a condition on the monitoring screen, a hemodynamics screen is created to match that condition. Any data from subsequent samples taken in that condition is recorded on the corresponding hemodynamics screen.

The hemodynamics screen is divided into several sections to organize the data:

- General controls,
- Ventricular data,
- Valve data table,
- Cardiac outputs,
- Oxygen uptake data,
- Heart diagrams and oxygen saturations,
- Hemodynamic data tables and controls,
- Vascular resistance data, and
- Oxygen content data.

The fields and their functions are specified in the following tables:

Ventricular Data	
Field	**Description**
LV Dias	Left ventricular diastolic volume calculated by image analysis.
LV EF%	Left ventricular ejection fraction.
LV RF%	Left ventricular regurgitant fraction.
LV Syst	Left ventricular systolic volume calculated by image analysis.

Ventricular Data	
Field	**Description**
RV Dias	Right ventricular diastolic volume calculated by image analysis.
RV EF%	Right ventricular ejection fraction.
RV Syst	Right ventricular systolic volume calculated by image analysis.
Note: See *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for formulas used in calculations.	

Valve Data	
Field	**Description**
Aortic b/m	Heart rate used in calculating aortic valve data.
Aortic cm2	Aortic valve area (in cm^2).
Aortic ind	Aortic valve index.
Aortic mn	Mean aortic valve gradient.
Aortic ms	Interval in milliseconds that the aortic valve was open.
Aortic note	Accepts limited user entry.
Aortic p-p	Peak to peak aortic valve gradient.
Mitral b/m	Heart rate used in calculating mitral valve data.
Mitral cm2	Mitral valve area (in cm^2).
Mitral ind	Mitral valve index.
Mitral mn	Mean mitral valve gradient.
Mitral ms	Interval in milliseconds that the mitral valve was open.
Mitral note	Accepts limited user entry.
Mitral p-p	Peak to peak mitral valve gradient.
Other b/m	Heart rate used in calculating other gradients.
Other cm2	Other area (in cm^2).
Other ind	Other index.
Other mn	Mean other gradient.
Other ms	Interval in milliseconds.
Other note	Accepts limited user entry.
Other p-p*	Peak to peak other gradient.
Pulmonic b/m	Heart rate used in calculating pulmonic valve data.
Pulmonic cm2	Pulmonic valve area (in cm^2).
Pulmonic ind	Pulmonic valve index.
Pulmonic mn	Mean pulmonic valve gradient.
Pulmonic ms	Interval in milliseconds that the pulmonic valve was open.

Valve Data	
Field	**Description**
Pulmonic note	Accepts limited user entry.
Pulmonic p-p	Peak to peak pulmonic valve gradient.
Tricuspid b/m	Heart rate used in calculating tricuspid valve data.
Tricuspid cm2	Tricuspid valve area (in cm^2).
Tricuspid ind	Tricuspid valve index.
Tricuspid mn	Mean tricuspid valve gradient.
Tricuspid ms	Interval in milliseconds that the tricuspid valve was open.
Tricuspid note	Accepts limited user entry.
Tricuspid p-p	Peak to peak tricuspid valve gradient.
Note: See *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for formulas used in calculations.	

NOTE

"Other" refers to gradients calculated from sites other than valves, such as femoral compensation. Some fields may not be completed if data is not appropriate.

Cardiac Outputs	
Field	**Description**
(blank)	Cardiac output calculation method may be entered by the operator.
Angio CI	Cardiac index calculated from angiography.
Angio CO	Cardiac output calculated from angiography.
Angio SV	Stroke volume calculated from angiography.
CI	Cardiac index may be entered by the operator.
CO	Cardiac output may be entered by the operator.
Fick CI	Cardiac index calculated using the Fick method.
Fick CO	Cardiac output calculated using the Fick method.
Fick SV	Stroke volume calculated using the Fick method.
SV	Stroke volume may be entered by the operator.
Thermal CI	Cardiac index calculated using thermodilution.
Thermal CO	Cardiac output calculated using thermodilution.
Thermal SV	Stroke volume calculated using thermodilution.
Note: See *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for formulas used in calculations.	

Oxygen Uptake Data	
Field	**Description**
Act O2	Actual oxygen consumption of the patient.
BSA	Body surface area, populated from the Case Details screen.
Est O2	Estimated oxygen consumption of the patient.
Hgb (g/dl)	Hemoglobin, populated from the Labs/Procedure Data screen.
Hgb (g/l)	Hemoglobin in standard international units.
Hgb (mmol/l)	Hemoglobin in millimoles per liter
KO2	A constant used to calculate estimated oxygen consumption. The default value is 133.
L>R Shunt	Left to right shunt flow (L/min).
L>R Shunt %	Left to right shunt flow percentage.
LOAD button	Used to load a constant value from the LaFarge table based on heart rate, age and gender of the patient (*see "LaFarge Table" on page 166*).
LR Threshold	Operator-defined L>R shunt threshold
PV-PA (VA)	Pulmonary O_2 difference (ml/min).
PV-SV (VV)	Venous O_2 difference (ml/min).
Qe	Effective flow (ml/L).
Qei	Effective flow index.
Qp	Pulmonary flow (ml/L).
Qp/Qs	Pulmonary/systemic flow ratio.
Qpi	Pulmonary flow index.
Qs	Systemic flow (ml/L).
Qsi	Systemic flow index.
R>L Shunt	Right to left shunt flow (L/min).
R>L Shunt %	Right to left shunt flow percentage.
RL Threshold	Operator-defined R>L shunt threshold
SA-SV (AV)	Systemic O_2 difference (ml/min).
Note: See *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for formulas used in calculations.	

Vascular Resistance Data	
Field	**Description**
PAm Mean	The mean pressure used as pulmonary arterial pressure.
PAm Site	Pressure sample used as pulmonary arterial pressure site.

Vascular Resistance Data	
Field	**Description**
PVm Mean	The mean pressure used as pulmonary venous pressure.
PVm Site	Pressure sample used as pulmonary venous pressure site.
PVR	Pulmonary vascular resistance
PVR/SVR	Pulmonary/systemic vascular resistance ratio
PVRI	Pulmonary vascular resistance index
SAm Mean	The mean pressure used as systemic arterial pressure.
SAm Site	Pressure sample used as systemic arterial pressure site.
SVm Mean	The mean pressure used as systemic venous pressure.
SVm Site	Pressure sample used as systemic venous pressure site.
SVR	Systemic vascular resistance
SVRI	Systemic vascular resistance index
TPVR	Total pulmonary vascular resistance
TPVR/TSVR	Total pulmonary/total systemic vascular resistance ratio
TPVRI	Total pulmonary vascular resistance index
TSVR	Total systemic vascular resistance
TSVRI	Total systemic vascular resistance index
Use HRU	When checked, calculates vascular resistance values in Woods hybrid resistance units. The default is Dynes units.
Note: See *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for formulas used in calculations.	

Oxygen Content Data	
Field	**Description**
PA_O2 Hgb g/dl	Hemoglobin, populated from the Case Details screen.
PA_O2 Hgb g/l	Hemoglobin in standard international units.
PA_O2 O2	Pulmonary arterial oxygen content.
PA_O2 PO2	Partial pressure oxygen, entered by the operator
PA_O2 Sat	Pulmonary arterial saturation value.
PA_O2 Site	Site used for pulmonary arterial oxygen content calculation.
PV_O2 Hgb g/dl	Hemoglobin, populated from the Case Details screen.
PV_O2 Hgb g/l	Hemoglobin in standard international units.
PV_O2 O2	Pulmonary venous oxygen content.
PV_O2 PO2	Partial pressure oxygen, entered by the operator
PV_O2 Sat	Pulmonary venous saturation value.
PV_O2 Site	Site used for pulmonary venous oxygen content calculation.

Oxygen Content Data	
Field	**Description**
SA_O2 Hgb g/dl	Hemoglobin, populated from the Case Details screen.
SA_O2 Hgb g/l	Hemoglobin in standard international units.
SA_O2 O2	Systemic arterial oxygen content.
SA_O2 PO2	Partial pressure oxygen, entered by the operator
SA_O2 Sat	Systemic arterial saturation value.
SA_O2 Site	Site used for systemic arterial oxygen content calculation.
SV_O2 Hgb g/dl	Hemoglobin, populated from the Case Details screen.
SV_O2 Hgb g/l	Hemoglobin in standard international units.
SV_O2 O2	Systemic venous oxygen content.
SV_O2 PO2	Partial pressure oxygen, entered by the operator
SV_O2 Sat	Systemic venous saturation value.
SV_O2 Site	Site used for systemic venous oxygen content calculation.
Use Flamm's for systemic venous	When checked, uses the Flamm formula for systemic venous calculation.
Note: See *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for formulas used in calculations.	

3.4.1 The Heart Diagram

In the center of the page, there is a heart diagram with data boxes located in each of the major vessels and chambers. There are 68 congenital anomaly diagrams in addition to the Normal Heart. You can select an alternate diagram by selecting it from the drop-down menu immediately above the heart diagram.

The data boxes display either pressure data (mean/edp) or oxygen saturations. To control which type of data is displayed, click either the Saturation or Pressure tab located to the top right of the heart diagram. Pressure data are automatically populated from samples obtained during the case.

Oxygen saturation data must be entered manually. To enter saturation data, click the box that represents the site from which the sample was obtained, enter the value with the keyboard and press Enter. You can also select sites from the drop-down list at the bottom left corner of the heart diagram. You can save multiple saturation values for each site by typing them in the (F4) Other Sat boxes located just below the heart diagram. You can average the values by affixing a number to each site to differentiate it from the others. For example:

1 Type **RA1** in the first box, type a value of **50** in the second box, and then press **Enter**.

2 Do the same for RA2 (value 70) and RA3 (value 75).

Notice that each site and value is inserted in the Sample Display Window as soon as you press Enter, and an average value is calculated and placed at the top of the list.

The average value is also inserted in the appropriate site box in the heart diagram.

You can also identify multiple sites in other ways (e.g., by location). If you took readings at the upper, middle, and lower portions of the right atrium, for example, you might identify the readings as high RA (HRA), mid RA (MRA), and low RA (LRA). As you enter them, the sites and values are inserted into the Sample Display Window, but they are not averaged. To average your values, you must use numbers. You must select a value to use for the main saturation value and enter it into the heart diagram site box.

Blood Gases Worksheet

The blood gases worksheet is used to enter complete blood gas data in addition to oxygen saturations. Open the worksheet by clicking the Blood Gases tab at the very bottom left corner of the Hemodynamics screen. To enter data:

1 Click **Insert**.

2 Choose the desired site from the drop-down list, and manually enter the data in the remaining fields. You do not have to select the time or date. This information will populate automatically when you save the data. You may enter it if desired.

3 Click **OK** to save or **Cancel** to abort.

To delete a blood gas sample, highlight it and click **Delete**.

If desired, you may dock the Blood Gases screen by clicking the push-pin icon in the upper right corner.

Sample Display Window

This window displays all manually entered oxygen saturation data, and all data obtained from the patient (pressures, thermal cardiac outputs, valve gradients, etc.). Only one data parameter is displayed at a time. Toggle between the data elements by clicking one of the tabs labeled Saturation, Pressure, Therm, Grads or FFR located above the data window. Each element is described in detail below.

NOTE
Definitions for all site abbreviations used with Xper Information Management System are listed in “*Monitoring Site Abbreviation Definitions” on page 163*.

Oxygen Saturation Data

- View data by clicking the **Saturation** tab.
- Saturations are entered manually as described above.
- To delete specific saturation values, click **DEL**, then select the value.
- To exclude specific saturation values from calculations click **X**, then select the value. A dash will replace site labels with excluded values.
- For calculation purposes, Xper Information Management System assigns specific saturation data to represent systemic arterial, systemic venous, pulmonary arterial, and pulmonary venous values. Algorithms are in place to ensure that the best match is made for each of the variables. You can override the assigned selections by clicking **SA**, **SV**, **PA**, or **PV**, then clicking on the sample you wish to assign to that variable.

Invasive Pressure Data

- View data by clicking the **Pressure** tab.
- To view the waveforms used to derive pressure data, click the desired sample. This opens the waveform review screen on a separate tab.
- To delete specific pressure samples, click **DEL**, then select the value.
- To exclude specific pressure values from calculations click **X**, then select the value. A dash will replace site labels with excluded values.
- For calculation purposes, Xper Information Management System assigns specific saturation data to represent systemic arterial, systemic venous, pulmonary arterial, and pulmonary venous values. Algorithms are in place to ensure that the best match is made for each of the variables. You can override the assigned selections by clicking **SA**, **SV**, **PA**, or **PV**, then clicking on the sample you wish to assign to that variable.

Thermal Cardiac Output Data

- View data by clicking the **Therm** tab.
- To view the waveforms used to derive thermal cardiac output data, click the desired sample. This opens the waveform review screen on a separate tab.
- To delete specific thermal cardiac output samples, click **DEL**, then select the value.

Valve Gradient Data

- View data by clicking the **Grad** tab.
- To view the waveforms used to derive valve gradient data, click the desired sample. This opens the waveform review screen on a different tab.
- To delete a specific valve gradient, click **DEL**, then select the item.
- By default, the first gradient of each valve will print on the case report. To select a different valve gradient for the printed report, click **Valve**, then select the gradient. The data will be printed in the valve gradients section of the Hemodynamic Page.

FFR Data

- View data by clicking the **FFR** tab.
- To view the waveforms used to derive FFR data, click the desired sample. This opens the waveform review screen on a separate tab.
- To delete specific FFR samples, click **DEL**, then select the value.

Sample Display Window Function Controls

With the nine controls located at the top right corner of the Hemodynamics page, you can select samples in the display window for various operations. The controls and their functions are listed in the following table.

Control	Description
DEL	Deletes a selected hemodynamic value.

Control	Description
PA	Designates a selected pressure or oxygen saturation as a Pulmonary Arterial value to be used in calculations.
PV	Designates a selected pressure or oxygen saturation as a Pulmonary Venous value to be used in calculations.
SA	Designates a selected pressure or oxygen saturation as a Systemic Arterial value to be used in calculations.
SV	Designates a selected pressure or oxygen saturation as a Systemic Venous value to be used in calculations.
T	Indicates a hemodynamic value to be included in transcription (default is first recorded).
TM	Allows a user to edit the time stamp of a selected sample.
Valve	Allows a user to select a valve gradient to be used as the reported value (default is first calculated).
X	Allows a user to select a hemodynamic value to be excluded from calculations.

Vascular Resistance

The vascular resistance section is located below the sample display window. It contains resistance values that are automatically populated as necessary data are entered or sampled during procedures (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas). Site and mean pressure data are displayed for each of the variables (SA, SV, PA, and PV). For patients whose cardiac output data (thermal or Fick) are available, total resistance values are displayed in either Dynes (D/S, D/S/cm-5) or hybrid resistance (Woods) units. Check the HRU box if you want to use hybrid resistance. Leave it unchecked if you want to use D/S.

O2 Content

The O2 content section is located at the bottom right of the screen. It contains oxygen-related values that are automatically populated as necessary data are entered or sampled during procedures (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas). For each of the variables (SA, SV, PA, and PV), the following information is displayed: site, saturation, hemoglobin, and oxygen content. PO2 data (from blood gas results) can be entered manually for each variable. If you would rather not use the automatically posted data assigned by Xper Information Management System, delete them by clicking *X* next to the respective item. Click the checkbox at the bottom of the section to calculate systemic venous from IVC and SVC samples using Flamm's equation.

To enter specific saturation pressure location values, click the appropriate label across the top (SA, SV, PA, or PV), and click the desired value. The O2 content section updates with the selected value.

O2 Uptake, Differences, Flows, and Shunts

This section is located at the lower left portion of the screen. It contains several variables that are automatically populated as necessary data are entered or sampled during procedures (see

"Hemodynamic and Lab Value Conversion Calculations" on page 158 for calculation formulas). The variables are described below.

K Variable

KO2 is used to calculate estimated oxygen consumption. The default value is 133. You may also load an alternate value from the LaFarge table, which bases the estimated oxygen consumption on the gender, age, and heart rate of the patient. To select a value from the LaFarge table (see *"LaFarge Table" on page 166*), click **Load** in the O2 Uptake section of the page. The correct value is inserted, based on your patient's information.

Alternately, you may manually enter the desired value in the KO2 field, if your patient falls outside of the age range specified in the table.

Specify the O2 consumption field (Act or Est) used for calculations by clicking the appropriate box at the top right of the section. If your facility uses an oxygen consumption monitor, you can manually enter the actual oxygen consumption data into the Act O2 box.

BSA and Hgb Variables

BSA and Hgb are populated from the Case Details and Labs/Procedure Data screens.

SA-SV, PV-PA, and PV-SV Variables

These variables for O2 difference data are automatically populated (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas).

Qs, Qsi, Qp, Qpi, Qe, Qei, and Qp/Qs Variables

These variables for flow data are automatically populated (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas). The values will differ depending on whether estimated or actual oxygen consumption data are used, and whether Fick or thermal cardiac output data are used.

Shunt L>R and R>L Variables

Variables for shunts are automatically calculated only if Fick cardiac output data are available and a significant oxygen saturation step-up is present (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas). Shunt type (L>R and R>L) is defined. Blood flow across the shunt in liters per minute, as well as the total percentage of cardiac output, is displayed.

Cardiac Outputs

Located at the lower left-hand side of the screen, this section contains cardiac output values that are automatically populated as necessary data are entered or sampled during procedures (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas). For each of the variables (Fick, Thermal, Angiographic, and User-defined), stroke volume, cardiac output, and cardiac index data are displayed. Data displayed in other sections of the page are often influenced by the cardiac output data used during calculations. You can

control which calculation data are used by clicking the radio button next to the desired cardiac output value. The four cardiac output variables are described below.

Fick Variables

Fick cardiac output is calculated only if proper oxygen saturation data have been entered into the system. The Fick variable may be estimated or actual, based on which oxygen consumption field is activated.

Thermal Variables

Thermal cardiac output is a calculated average from all thermal samples performed during a procedure. As samples are added or deleted, the average will change accordingly.

Angiographic Variables

Angiographic cardiac output is calculated from ejection fraction functions in the Image Analysis module. It can also be calculated by manually entering diastolic and systolic volumes.

User-Defined Variables

User-defined cardiac output may contain data from devices such as green dye monitors. The data must be entered manually.

Valves

Located at the mid-left-hand side of the screen, this section contains valve-related values that are automatically populated as necessary data are entered or sampled during procedures (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas). For each of the valves (Aortic, Mitral, Pulmonic, Tricuspid, and Other) the following information is displayed: peak and mean gradient, filling period, heart rate, valve area, and valve index data. Valve area and index data will be populated only if cardiac output data are present. You can enter free text comments regarding each valve into the box labelled Note. If you would rather not use the automatically posted data for particular valves, delete them by clicking *X* under the respective item.

Ventricles

Located at the top left of the screen, this section contains ejection fraction-related values that can be manually populated by the system user based on data from the X-ray or Imaging functions system (see *"Hemodynamic and Lab Value Conversion Calculations" on page 158* for calculation formulas). For each ventricle, the system displays diastolic and systolic volumes, ejection fraction percentages, and regurgitant fraction percentages.

Miscellaneous Controls

Miscellaneous controls and their functions are listed in the following table.

Control	Description
- Delete	Allows a user to delete a hemodynamic condition.

Control	Description
+ Add	Allows a user to create a new hemodynamic condition.
< (Prev Condition)	Navigates to the previous hemodynamic condition screen.
> (Next Condition)	Navigates to the next available hemodynamic condition screen.
Condition drop-down list	Allows a user to select a hemodynamic condition to display on screen.
Print	Prints the current hemodynamic condition screen.
Update	Refreshes the hemodynamic condition data.

3.4.2 Arterial Trees

The Arterial Trees module allows a physician to create a graphic representation of a patient's cardiac or peripheral arterial anatomy. The arterial trees allow you to indicate areas of disease, collaterals and bypass grafts, interventions performed, and other diagnostic data, such as anatomical aberrations. The data from the tree is automatically placed in the appropriate charting menu and can be included in a report or queried at a later time. Operators may use the provided templates or replace any or all of them with a preferred set. The templates include:

- Right dominant coronary anatomy,
- Left dominant coronary anatomy,
- Co-dominant coronary anatomy,
- Upper peripheral arterial anatomy,
- Lower peripheral arterial anatomy,
- Brachial arterial anatomy,
- Pulmonary arterial anatomy,
- Renal anatomy, including the abdominal aorta and kidneys,
- Carotid arterial anatomy,
- Cranial arterial anatomy,
- Hepatic arterial anatomy, and
- Cardiac mapping for electrophysiology studies.

Creating an Arterial Tree

To create an arterial tree for a procedure, click on **HEMODYNAMICS > ARTERIAL TREE > NEW**, and select a template from the list. The selected template will be displayed. The Functions tab on the right contains the tools you will use to customize your tree.

If you place the mouse cursor over a vessel on the tree, you will notice that the vessel and segment labels (e.g., LAD Mid) appears at the bottom left of the screen. If you move the mouse cursor around the tree, the label will change as you pass over the different vessels and segments.

To enter a lesion on the tree, simply click on the proximal starting point in the target vessel, then click again at the distal point, defining the length of the lesion within the vessel. You are then prompted to define the primary type of lesion and select a secondary type, if desired:

- Generic
- Diffuse
- Luminal irregularity
- Tubular
- Discrete
- Complex
- Thrombus
- Calcified
- Eccentric
- Aneurysmal
- In-stent restenosis
- Ectasia

There are also Unvisualized, Visualized, <A>, <B> and <C>. These are special types that will be described later.

Once you have selected a primary lesion type, and a secondary type, if desired, click ***OK***. A graphical representation of the lesion appears at the point you selected. You will be prompted to adjust the amount of stenosis using the scrollbar on the Functions tab. Scroll up to increase the percentage of stenosis, or down to decrease. The inner set of arrows increase or decrease by increments of one (1). The outer arrows increase or decrease by increments of five (5). If you set the stenosis to 100%, the vessel and any branches distal to the lesion collapse. Click into the black area around the tree to set the lesion. Repeat the process as many times as is necessary.

The Unvisualized type is used to collapse a section of vessel when the type of lesion cannot be determined. The Visualized type is used to open a segment of vessel within a collapsed area. <A>, <B>, and <C> are lesion type designations required by the American College of Cardiology.

Once you have entered a lesion, you can indicate whether an intervention was performed or add notes using the Annotation Functions.

Annotation Functions	
Control	**Description**
Arrow	Used to draw directional arrows from one point to another.
DA	Indicates directional atherectomy performed on a lesion.
Note	Used to create and place notes on a tree.
PTA	Indicates a percutaneous transluminal angioplasty performed in a peripheral vessel.
PTCA	Indicates a percutaneous transluminal coronary angioplasty performed on a lesion.
ROTA	Indicates a rotablation performed in a vessel.

Annotation Functions	
Control	**Description**
Scrollbar	Allows the operator to adjust the percentage of stenosis, or the diameter of a vessel (see text on changing vessel size on ***page 52***).
STENT	Indicates a stent placement in a vessel.
WNL	Marks a vessel as being within normal limits.

To indicate that a vessel has no disease, click **WNL** and then click to position the WNL (within normal limits) marker on the tree.

To indicate that an angioplasty was performed on a lesion, click **PTCA**. You will be prompted first to click to position the note on the tree near the lesion. Next, use the scrollbar to adjust the residual stenosis (the default value is 0%). Last, you will be prompted to click into the area of stenosis to position an indicator arrow. Be sure that you click into the lesion, not into the area around it.

You will use the same process for the other types of intervention (**DA**, **PTA**, **ROTA**). If you are indicating a stent placement, you will be prompted to indicate the proximal and distal points of the stented segment after you have placed the arrow. When drawing overlapping stents, click the distal end of the second (and any subsequent stents) first, then click on the proximal end.

You may also want to place additional notes or arrows on a tree. To place a note, click **Note**. A window opens to allow you to enter text, then click **OK**. You will then be prompted to click into the tree to position the text. Be careful not to place the text where it obscures vessels or other notes.

To create a directional arrow, click **Arrow**. Click in the tree to indicate the starting point, then click to indicate where you want the arrow to point.

Editing an Arterial Tree

There are a number of tools that can be used to edit an arterial tree so that you can more closely approximate a patient's anatomy. You can add vessels, delete vessels, change the diameter or location, or redraw existing vessels to demonstrate length or tortuosity. The editing controls and their functions are listed in the following table:

Procedure Status	
Control	**Description**
Copy	Allows the operator to copy the pre-procedure tree to post-procedure status.
None	Default status for arterial trees.
Post-Procedure	Designates an arterial tree as post-procedure.
Pre-Procedure	Designates an arterial tree as pre-procedure.

Tree Editing Functions	
Control	**Description**
ACC Lesion #	Allows the operator to assign a number to a lesion when reporting to the American College of Cardiology.
Art Label	Allows the operator to change the display label (top right corner) of a vessel.
Cusp Structure	Used when creating new templates to draw non-artery structures, such as the aortic cusp or kidneys.
Delete	Used to delete vessels, grafts, collaterals, and notes.
Lesion Side	Allows the operator to switch an eccentric lesion from one side of a vessel to another.
Termination	Used when creating an arterial template.
Undo	Allows the operator to undo the previous ten (10) operations.
Vessel Size	Allows the operator to adjust the diameter of a vessel.

Move Functions	
Control	**Description**
Move Artery	Allows the operator to change the location of a vessel.
Move Lesion	Allows the operator to change the location of a lesion.
Move Note	Allows the operator to change the location of a note.

Vessel Functions	
Control	**Description**
Collateral	Used to draw collateral vessels on a tree.
Graft	Used to draw bypass grafts on a tree.
Position	Used to change the position markers (proximal, mid, or distal) within a vessel.
Seq Graft	Used to draw sequential grafts on a tree.
Vessel Artery	Used to insert arteries into a template or tree.
Y Graft	Used to draw Y grafts on a tree.

Tree Functions	
Control	**Description**
Menu	Opens the designated coronary or peripheral menu (***see "Building and Editing Menus" on page 112***)

Tree Functions	
Control	**Description**
Print Tree	Prints the displayed tree.

To add a vessel, click **Vessel Artery**. You will be presented with a list of vessels appropriate to the type of arterial tree you selected. Coronary trees have a list of coronary vessels, while the peripheral trees have the appropriate list of vessels for that system. Choose the type of vessel you wish to draw, or type in your own label and click **OK**. You are then prompted to click on the point of origin of the new vessel. Draw the path of the new vessel, then click on the end point to complete the drawing.

NOTE
When drawing any object (i.e., vessel, graft, arrow, etc.), do not hold down the mouse button. Click once and release, draw the path of the vessel or object, and click a second time to complete the process.

To delete a vessel, lesion or note, click **Delete**, then click on the object you wish to delete. If you wish to delete a note, click on the first character of the text.

The **Undo** control reverses up to ten (10) previously performed functions, such as drawing lesions or grafts, moving vessels, or adding notes.

You may increase or decrease the diameter of a vessel by clicking **Vessel Size**. You will be prompted to select the vessel you wish to change, then use the scrollbar to increase or decrease the diameter.

NOTE
If you wish to change the length or tortuosity of a vessel, you must delete it before redrawing it.

An eccentric lesion extends from the right or left side of a vessel. If you draw an eccentric lesion in a vessel and wish to switch it to the opposite side, click **Lesion Side**, then click on the lesion you wish to change.

You may move an artery, note or lesion to a different location on the tree. To move an artery, click **Move Artery**. Click on the artery you wish to move, then click on the position from which the vessel should originate. To move a lesion, click **Move Lesion**, select the lesion, and click on the new location within a vessel or graft.

Notes are the white text on a tree. They can be vessel labels or annotation added by a physician. To move a note, click **Move Note**. Click on the first character of the note you wish to move, then click on the new location. Be careful not to move a note to a location that obscures a vessel or lesion, or another note.

The vessel label is the green text that appears in the top right corner when you move your mouse cursor over the tree. You may change the vessel label by clicking **Artery Label**. Click the vessel you wish to relabel, then select from the list or type in a new description and click the vessel. Move your mouse cursor over the vessel to confirm the change.

You may indicate bypass grafts and collaterals on the tree. To add a graft, click **Graft** on the Functions tab. Click once at the start of the graft (do NOT hold down the mouse button), drag the mouse to the other end of the graft, and click a second time. The starting point determines the type of graft drawn. If you begin drawing your graft inside the aortic structure, Xper Information Management System labels it as a saphenous vein graft (SVG). If you begin drawing your graft in the black area to the right of the aorta, you get a LIMA (left internal mammary artery) graft, and if you begin drawing to the left of the aorta, you get a RIMA (right internal mammary artery graft). If you are using a template other than the coronary anatomy, the graft is labelled simply as "Graft." Once you have placed a graft, you can pass your mouse cursor over it to see the label.

There are two other types of grafts you may include on an arterial tree, sequential grafts, and Y-grafts. To draw a sequential graft, click **Seq Graft** and draw the first segment from the aorta to the target vessel. Click **Seq Graft** a second time, and draw the second segment from the exact point of termination of the first segment to the second target vessel.

To draw a Y graft, click **Y Graft** and draw the first segment from the aorta to the target vessel. Click **Y Graft** a second time and draw the second segment from any point on the first segment to the second target vessel.

NOTE
Always make sure that any graft terminates inside the lines of a vessel.

Drawing collaterals is similar to drawing a graft. Click **Collateral**, then click at the starting point within a vessel. Draw a line in the direction of the flow to the end point and click a second time. Collaterals must begin and, like grafts, terminate within the lines of a vessel.

Pre- and Post-Procedure Trees

You may choose to show your pre-procedure findings and post-procedure results as separate trees. To create a pre-procedure tree, select a template as usual. When the diagram opens, select PRE-PROCEDURE from the upper right, then proceed to place lesions and other findings.

When you are ready to create your post-procedure tree, click **Copy**. You will be prompted to copy the pre-procedure tree to a new diagram. Click **Yes** to continue. A new copy of the tree will appear, designated POST-PROCEDURE, containing all the data you had already inserted onto the pre-procedure tree. You may now indicate intervention results, such as stent or directional atherectomy, on the post-procedure diagram.

Historical Tree

The Historical Tree function allows a user to import an arterial tree from a previous study in Xper Information Management System. Click HEMODYNAMICS > ARTERIAL TREE > HISTORICAL. A list of trees created in the patient's previous studies will be presented. The user may select from the list and import, then proceed to update the tree with new findings.

3.4.3 Patient Charges

Patient Charges can be accessed from within a case. The billing code is automatically inserted when the procedure is added on the ID Screen but you must manually add a modifier.

1 From the **Hemodynamics** menu, select **Case Tools**, then select **Patient Charges**.

2 Click on the ellipsis (three-dot) **(...)** button in the **Mod** column for the procedure you want to work with. A list of Procedural Modifiers will open.

3 Select the check boxes for modifiers you want to add and click **OK**.

4 Click **Preview** to view the list of patient charges, or click **Print** to print it.

NOTE
If a charge has been processed, you can also Credit or delete the charge from this screen.

3.4.4 Custom Forms

To utilize custom forms during a study, click **Screens** and select the form you wish to complete (see *"Custom Forms" on page 119* for information on creating and deploying custom form). You may enter the data manually, or you may create scrapers (see *"Data Scrapers" on page 63*) that will populate the fields automatically as you chart.

During review of a custom form, you may chart additional data that can be scraped to the form. In order to activate the scrapers, click **Refresh** at the top of the custom forms screen to pull additional data or to update the form with any changes you have made in charting.

To print the actual custom form as it appears on the screen, click **Print Form.** Clicking **Print Data** will print the fields and data that appear on the form. The data format can be included in case report configurations (see *"Case Report Configuration" on page 140*).

3.4.5 Transcription

To access the Transcription module, click HEMODYNAMICS > TRANSCRIPTION. To create a report, select the template from the Templates drop-down list on the Transcription toolbar and click **Add**. The new template will be completed, as well, using data elements from charting and hemodynamic sampling.

You may create multiple revisions of any report. After you have selected a template and the available data has been filled in, you may make changes to the report, then click **Save** to update the revision. The most current revision will then be available on the History tab for review and corrections by you or another user. To update a saved draft, click the **Edit** link next to the current revision on the History tab, make changes on the Editor tab and click **Save**.

To review a report, select the Preview/Print tab.

To cancel a draft, click **Cancel** on the Transcription toolbar while on the Editor or Preview/Print screen.

NOTE
You can only cancel a draft. After a report has been signed, it cannot be canceled and must be amended.

To electronically sign a report, click **SIGN** on the Transcription toolbar, then enter your username and signature password. This will create a PDF of the report that will be available for viewing and printing on the Documents tab, and will be sent through the Results interface, if you have one. If your interface requires a transcription type, select the appropriate type from the Transcription Type drop-down menu. After a report has been signed, you may create an amended report by clicking the AMEND link next to the signed report on the History tab.

NOTE
A user must be assigned as a resource on a study in order to sign a document or finalize a study, unless the user account is set for Transcription Signature Override. See *"User Administration" on page 82* for more information.

When all reports are complete, you can change the status of the case to Finalized and lock the signed transcription documents. Click **HEMODYNAMICS > CASE TOOLS > FINALIZE STUDY.** You will be prompted to enter your username and signature password. If there are transcription drafts that have not been signed, Xper Information Management System displays a message requesting that you sign all unsigned documents prior to finalizing. After clicking **OK**, the Case Finalized flag will be set on the Case Details screen. The study will no longer appear in the Unread Studies pane, but will be listed under Finalized Studies.

3.5 Image Review

Xper Information Management System uses Philips Xcelera for image review and frame capture. Xcelera is a standalone application with its own Instructions for Use. Consequently this chapter will describe only the procedures needed to open cases in the imaging program and to import still frames for inclusion in transcription reports. For other X-ray Angiography related functions, such as quantitative coronary analysis or left ventricular analysis, you must refer to the imaging product user's guide and/or the Xcelera Instructions for Use.

To display cine runs or still frames in Xcelera, click **HEMODYNAMICS > IMAGING >VIEW IMAGING**. Xcelera opens and displays the available images for the study. To capture still frames, pause the cine run, then click and drag the image to the image folder in the lower left hand corner of the screen.

Right-click on each image and select "Make available to CIS" to import the images one by one. Alternatively, click anywhere in the black area of the image folder, right click and select "Make available to CIS" to import all the images in the image folder at once. When you are finished, click the *X* icon to close Xcelera. The captured still frames may be included in a transcription report.

To view still frames for a study, click **HEMODYNAMICS > IMAGING > STILL FRAMES**. Any stills captured in Xcelera are displayed.

WARNING
The image viewing screen provides some basic functions, such as contrast level, brightness level, and zoom, to manipulate the images to be included in a transcription report. This image viewing screen and these basic functions are NOT intended to be used for diagnostic purposes.

3.6 Still Frame Capture

If an Xper Information Management System host is equipped with a video capture card, you can select and store frames from a patient's cineangiograms. The still frames can be printed as part of the case report, or they can be included in a transcription report.

To capture still frames:

1 On your x-ray equipment, loop a cine run from the patient's study.

2 Click **HEMODYNAMICS** > **IMAGING** > **FRAME CAPTURE** (if your host is not equipped, this option will be disabled in the menu).

3 Click **Play**. After a short time, the cine run selected on the x-ray equipment will appear on the Xper Information Management System screen.

4 On the x-ray equipment, advance to the frame you want to capture and pause the playback.

5 Click **Capture Frame** to acquire and store the still frame in the patient's study.

6 Repeat as necessary to capture additional frames.

7 Click **Stop** to clear the image from the screen.

NOTE
It is not necessary to click **Stop** between runs or to close the module.

If you have a dual-monitor system, you can display the image full screen on either monitor. Select Monitor 1 or Monitor 2, then click **Enable Full Screen**. Hit the **ESC** key to return to normal viewing.

You may crop the image by checking Enable Cropping. Set the desired level of cropping for left, right, top and/or bottom, then click **Refresh**. The cine run will be redisplayed in cropped format. To return to normal mode, uncheck Enable Cropping and click **Refresh**.

3.7 Printing a Case Report

To print a case report, click **Print Case** on the Case Details screen. You will be prompted to select a report format (see *"Case Report Configuration" on page 140*). Choose the desired format and printing option:

- **Print:** sends the selected case report format to the printer.
- **Archive:** creates a PDF of the selected case report format.

- **Print & Archive:** sends the selected case report format to the printer and create a PDF file, as well.
- **Print & Close Case:** sends the selected case report format to the printer and close the case when printing is complete.
- **Preview:** allows you to review the case report before printing. The preview screen opens, and you can scroll through the various pages of the report. When you are ready to print, click the Printer icon at the top left corner. The selected report format prints to your default printer. To select a different report format, close the Preview and repeat the process, selecting a different format when prompted.

3.8 Finalizing a Case

Once a procedure is over and all required documentation has been completed (case notes, transcription reports, etc.), you may finalize the case so that no changes can be made to the case data. To finalize a case:

1 Click **Lock Study**.

2 Enter your username and signature password (see *"User Administration" on page 82*).

3 Click **OK**. The Case Finalized box on the ID screen will be checked, and the Finalized Date will be populated with the date on which you locked the case.

After a case has been locked, users are able to open the case and review the data, but are not able to make any changes, additions or deletions to the data.

Locked cases may be unlocked, in the event that changes do need to be made. The process is basically the same as locking a case. The button will now display **Unlock Study**. Click **Unlock Study**, type your username and signature password, and click **OK**. You may then make the necessary changes and lock the case when you are finished.

NOTE
Users must have Lock and/or Unlock privileges in order to lock or unlock a case. For more information, see *"User Administration" on page 82*.

3.9 Electrophysiology

NOTE
Requires an Xper Connect interface to import the EP data.

Xper Information Management System can display data collected during electrophysiology studies performed on an EP-Workmate. The data can also be included in transcription reports. To view EP data:

1 Open the case.

2 Click **HEMODYNAMICS** > **EP** > **EP-Workmate**. The data screens open, populated with the data that was sent from the EP system.

3 To add data, click **Add**. A blank line appears at the bottom of the selected tab, allowing you to add information.

4 To delete data, click on the line you want to delete to highlight it and click **Delete**.

5 To save changes, click **Save**.

6 To export the data from the selected tab to an Excel spreadsheet, click **Export**.

7 To import the data into a charting menu, click **TRANSFER TO MENU**. You may then scrape or query the data as you would any other menu.

NOTE
Data can be transferred to a charting menu one time only. Do not perform this operation until you are sure the data is complete.

If you have created transcription templates for EP studies, the report begins to auto-populate as soon as you have assigned a procedure on the Case Details screen and selected a template.

NOTE
Arterial trees cannot be created for EP studies.

3.10 IntelliVue Interface

The Xper Information Management System application includes a configuration setting that allows users to activate an interface with IntelliVue patient monitoring for pre- and post-procedure vitals recording.

When the IntelliVue interface is configured on a workstation, the following fields are required on the Case ID screen in order to start a case in Xper Information Management System:

- Last Name
- First Name
- Medical Record Number
- Gender
- Date of Birth

The interface sends and accepts the following information between Xper Information Management System and IntelliVue patient monitoring:

- Patient name
- Date of birth
- Medical record number
- Heart rate
- Non-invasive blood pressure
- Pulse oximetry
- Temperature
- End tidal carbon dioxide

- Respiration rate

NOTE
Patient must be admitted on both an Xper Information Management System Workstation and an IntelliVue patient monitor.

Patient Data and Polling

When the patient study is opened on the Xper Information Management System Workstation, the patient's demographic data (name, date of birth, MRN, and gender) is matched and validated.

When matching patient data is found, available vitals with NIBP for the study are pulled into Xper Information Management System.

All existing vitals data for a study, after polling, are flagged so that they are not reposted.

Xper Information Management System will continue to poll the IntelliVue table and post new records as they are received.

Level of Consciousness and Level of Pain

If activated in Settings, Xper Information Management System automatically prompts for Level of Consciousness (LOC) and Level of Pain (LOP) assessments when vitals are posted to the record.

Vitals Data

Users can:

- Edit, delete, or manually insert vitals data.

NOTE
When a refresh is requested, Xper Information Management System scans the IntelliVue table for updated information and posts new records to the study. These records are flagged so that they are not reposted during the next automatic polling cycle.

Physiological Alarms/Arrhythmia Detection

All physiological alarms are configured, controlled, and monitored by the IntelliVue patient monitors. Xper Information Management System does not have alarm capabilities.

- Arrhythmia detection is performed by the IntelliVue patient monitors. The Xper Information Management System does not have arrhythmia detection capabilities.
- Arrhythmia detection information in not posted to the Xper Information Management System vitals record.
- Stat vitals recording is not available in the Xper Information Management System application.

3.11 Philips TraceMaster Interface

This system supports a view-only interface with Philips TraceMaster ECG carts. Through the Xper Connect interface, a TraceMaster patient will be placed in the Unread Studies or Patient Locator window. To view the ECG:

1 Open the case from the Unread Studies or Patient Locator list;

2 Click the History tab;

3 In the LINKS section, click on the link provided for the ECG;

4 The ECG will be displayed in an embedded browser window.

3.12 GE MacLab Interface

NOTE
Requires an Xper Connect interface to import the MacLab data.

This system can display hemodynamic data collected during cardiac catheterization studies performed on a GE MacLab system. The data can also be included in transcription reports. To view the data:

1 Open the case.

2 Click **HEMODYNAMICS > HEMO INTERFACES > GE MACLAB**. The data screens open, populated with the data that was sent from the MacLab system.

3 To add data, click **Add**. A blank line appears at the bottom of the selected tab, allowing you to add information.

4 To delete data, highlight the line you want to remove and click **Delete**.

5 To save changes, click **Save**.

6 To export the data from the selected tab to an Excel spreadsheet, click **Export**.

7 To import the data into a charting menu, click **Transfer to Menus**. You may then scrape or query the data as you would any other menu.

NOTE
Data can be transferred to a charting menu one time only. Do not perform this operation until you are sure the data is complete.

If you have created transcription templates for MacLab studies, the report will begin to auto-populate as soon as you have assigned a procedure on the Case Details screen and selected a template.

4 Extended Operation

4.1 Scheduling

This system includes a scheduling system that allows you to enter both procedures and staff. In addition, the Work Hours scheduler allows you to manage staff working hours and vacation, and the Room Staffing module gives you the ability to better manage resources by ensuring that procedure rooms are fully staffed to meet your department needs.

4.1.1 Study Scheduler

The Study Scheduler module allows you to manage your procedure room utilization effectively. You can display all your procedure rooms at once, or narrow the view to a single room. In addition, you can display scheduled procedures for a single day, a week or month, or even an entire year at a time. To access the Study Scheduler, click MODULES > SCHEDULER > STUDY SCHEDULER.

To set up the Study Scheduler, you must first add rooms. To add a room:

1 Click **Rooms** to open the Rooms Configuration window.

2 Click **New Room**.

3 Enter the room name.

4 Click **Apply**.

To display a room, place a check in the box next to the room name. If you wish to turn off the display for a room, uncheck the box. To delete a room from the list, highlight the room name and click **Delete**.

After you have configured your rooms, you can begin to schedule procedures. To schedule a procedure:

1 Double-click on the desired time slot in the appropriate room.

2 Enter the type of procedure (Subject)

3 Set a Start and End time

4 If you wish, enter notes on the patient or procedure.

5 Click **OK** to save the procedure, or click **Cancel** to discard it.

You may also change the procedure room, or even schedule an event in all rooms by using the Resources drop-down list. To save an event, click **OK**, or click **Cancel** to discard the event.

To add patient data (name and medical record number), CPT codes and staff:

1 Click on the newly scheduled event. The Event Information window opens on the bottom right side of the screen.

2 Drag staff names to the event and drop them to assign them to the procedure.

3 Hover over the event to view all the data.

You may also place pre-admitted patients from the Waiting List into schedule time slots. Simply drag the patient from the Waiting List tab to the desired slot on the schedule. Patients assigned to the schedule from the Waiting List appear in green. You may then assign additional resources and procedures.

To move a study to a different room:

1 Click on the study

2 Drag it to the room and time slot to which you want to move it.

To move a study to a different day:

1 Click and drag the study to the desired day in the calendar view at the top right. This moves the study to that day, placing it in the same room and time slot.

2 Click on the new day in the calendar to move the study to a different room and time.

To save all changes and additions, click **Apply**. If you do not remember, you will be prompted to save your modifications when you close the Scheduler.

You can admit from the Scheduler, if you have entered the patient's first and last names and medical record number. To admit from the Scheduler, right-click on the scheduled study and click **Admit**. A new Case Details screen opens with the patient's data. If you have assigned resources, they will be present, as well.

4.1.2 Staff Schedule

The Staff Schedule is directly tied to the Study Scheduler. To access staff scheduling, click MODULES > SCHEDULER > STAFF SCHEDULER.

Double-click on the desired time slot for the staff member you wish to schedule. You may then enter the type of procedure (Subject), a Start and End time. To save an event, click **OK**, or click **Cancel** to discard the event.

4.1.3 Staff Work Hours

The Staff Work Hours module allows you to manage work schedules for all members of your staff, including physicians. You can enter work times for each individual for a number of time periods, daily, weekly, monthly, and so on. Access the Work Hours module by clicking MODULES > SCHEDULER > STAFF WORK HOURS.

To create a work schedule for a staff member:

1 Select the individual from the drop-down list. Any existing hours scheduled for the person selected will be displayed in the Available Work Hours list below.

2 Click **Add Work Hours** to activate the Staff Work Hours Editor window at the bottom left.

3 Select a start and end date for the period you wish to schedule. When you click on the drop-down list, a calendar appears, allowing you to specify the start date and end date of the time period.

4 Once you have specified the dates, you can click into each day of that time period, highlight a time block, and right-click to create a scheduled time block.

5 Continue creating as many blocks as necessary. To save time, you may click on a block, right-click and copy it, then click and paste it into a new time slot. You can copy multiple blocks at once by holding down the **Ctrl** key, clicking on each block, then right-clicking and selecting COPY.

6 Click **Save** to schedule the time. Click **Cancel** to discard the changes.

7 To delete a time block, right-click on it and select **Delete**.

8 To delete an entire work period, highlight the date range in the list and click **Delete** in the Editor window.

4.1.4 Room Staffing

Once you have created work hours schedules for your staff, you may then assign them to procedure rooms and roles using the Room Staffing module. To access Room Staffing, click MODULES > SCHEDULER > ROOM STAFFING.

To assign staff to rooms:

1 Use the calendar at the top right to select a day. Staff members who are scheduled to work on that day will be available in the list on the bottom right.

2 You can click on a name and drag it to the procedure room in which you wish to place the person.

3 Right-click on the time blocks for that individual to assign a procedure role: Nurse, Scrub, Circulate, Record, or X-ray Tech. Staff members whose names appear in dark gray windows are not scheduled to work on that day.

4 As in the other scheduling modules, you can click and drag a block to a different room or date, but you cannot schedule a staff member on a day on which he or she is not scheduled to work. Click **Apply** to save changes.

4.2 Data Scrapers

The data scrapers are powerful tools that enable you to collect data more efficiently, and eliminate duplication of work and errors in data entry. The functionality of the data scrapers has been expanded to allow you to copy data from one field to another, as well as copying data from charting to related fields in the patient demographics screen, registry screens, and to transcription reports.

To access the data scraper utility, you must have a case open. We suggest creating a test case that you can use to build and test your data scrapers. Before creating any scraper line, you can chart the pertinent data into the case, so that you can see the results of your scraper as you build, and make adjustments so that you can collect data in the correct format. To access the Scraper module, click HEMODYNAMICS > CASE TOOLS > SCRAPERS.

4.2.1 Scraper Types

There are three types of data scrapers you can create: Direct Copy, Label, or Data Mining. The Scraper Administration screen displays a short description of the different types:

Direct Copy: A direct copy scraper copies the contents of one data field to another data field, usually on a different screen. For example, you can create a direct copy scraper that will copy the contents of the ALLERGIES field on the Demographics screen to the PERTINENT HISTORY field on the Sedation Flowsheet.

Data Mining: Data mining scrapers pull data from information which has been charted in a case and places it in data fields or in transcription reports. For example, you can create a data mining scraper that pulls a patient's allergies from the charting in the History & Assessment menu and places the data into the ALLERGIES field on the Demographics screen.

Label: A label field is used primarily in transcription. If data is present in a case, a label, or tag, will be entered in the indicated point in your transcription report. For example, you may want an "ALLERGIES:" label in a particular place in your transcription report. You can decide when creating the scraper whether you want the label to appear only when data is present in the patient's case, or whether you always want the label to be inserted.

The Scraper Administration screen consists of several sections. At the top is the Scraper Entries list. This is a list of all the scraper fields you have created, along with data about each entry, such as type, the scraper field name (Destination) and other information about the items.

The controls for creating, editing, deleting and testing items are located on the scraper toolbar in the center of the screen. The bottom of the screen is a quick-view information section which will display all pertinent data about any scraper field you have selected in the Scraper Entries list at the top.

4.2.2 Scraper Creation

Direct Copy

Direct copy scraper fields are relatively easy to build. You begin by identifying the destination field; that is, the field in which you want to place data. To begin, click **Add**. This opens the Scraper Creation Wizard.

The Scraper Creation Wizard helps you create the scraper items you need to collect your data and direct it to fields on various screens. The Live Scraper section shows you the results of your scraper line as you build it, so that you can make adjustments to get exactly the data you want in the format you want. The only thing you have to do is to chart menu entries or fill in source fields ahead of time, which you can easily do in a test case without affecting actual patient data.

Click "Direct Copy" to set the scraper type and open the Destination Field dialogue. There are two tabs on the Destination Field screen, Fixed and Transcription Value. A fixed field has a name that has been specified by the application and cannot be changed. A transcription value will be a field that you create and assign a name. The fields and their functions are listed in the following table:

Destination Field - Fixed	Description
Screen	Select the ***screen*** that you are scraping TO.

Destination Field - Fixed	Description
Condition	Used only for the Hemodynamic Data screen, indicates hemodynamic condition to scrape to.
Field Name	Select the ***field*** that you want the data to scrape to.
Merge Name	The system-assigned scraper field name. These names are set automatically by the application.
Description	Enter a short description of the scraper field, if desired.

Destination Field - Transcription Value	Description
Transcription Field Name	Enter the desired field name.
Merge Name	The system-assigned scraper field name. These names are set automatically by the application.
Description	Enter a short description of the scraper field, if desired.

The following is an example of how to create a direct copy, fixed destination field, NOTES, on the Sedation Flowsheet screen that pulls data from a field on the patient demographics screen, ALLERGIES:

1 Click **Add**.

2 Select DIRECT COPY in the Type section.

3 In the Screen drop-down list, select “SEDATION FLOWSHEET”.

4 In the Field Name drop-down list, select “NOTES”. You have now a system-assigned Merge Name “F.Sedation FlowSheet.Notes”.

5 Click **Next >**. This opens the Source Field dialogue window.

The Source Field contains information that tells the application where to find the data you are looking for. The fields and their functions are listed in the following table:

Source Field - Fixed	Description
Screen	Select the ***screen*** that you are scraping FROM.
Condition	Used only for the Hemodynamic Data screen, indicates hemodynamic condition to scrape from. You can have the scraper check ALL conditions, you can specify a condition from 1 – 5, or you can select the condition name.
Occurrence	Refers to the index of a value in a table (e.g., Procedures, Resources, hemodynamic data, etc.).
Field Name	Select the ***field*** that you want the data to scrape from.
Merge Name	The system-assigned scraper field name. In a direct copy scraper, the names are set automatically.

Source Field - Transcription Value	Description
Transcription Field Name	Select the existing Transcription field from which you want to copy data.
Merge Name	The system-assigned scraper field name. These names are set automatically by the application.

To continue building our scraper:

1 In the Screen drop-down list, select “DEMO”. This will tell the scraper to look for a field on the patient demographics screen.

2 In the Field Name drop-down list, select “ALLERGIES”. The resulting merge name is the system-level field name for the ALLERGIES field on the demographics screen.

3 Click **Finish**.

Your line is now complete and should appear in the Scraper Entries list at the top of the screen. You can check the results by highlighting the field F.Sedation FlowSheet.Notes in the list and clicking **Test Match**. The test match function applies the scraper to your test case and displays the resulting data. In this case, however, unless you have filled in the ALLERGIES field on the patient demographics screen, the scraper result returned is “No data returned from source field.”

Data Mining

You can go to the patient demographics screen and manually type in an entry in the ALLERGIES field, but there is another way to fill in that field. You can use a Data Mining scraper to pull data from the charting menus and place it in any field on any screen. If you need the data to go to more than one location, you can create a Data Mining scraper to fill in one field (in this case, ALLERGIES), and then use Direct Copy to duplicate the data in other locations. To create a Data Mining field:

1 Click **Add**.

2 Select DATA MINING in the Type section. The drop-down list will become active.

3 From the drop-down list, select the menu in which the data will be charted. If the same data might be charted in more than one menu, select “ALL”.

4 Select “DEMO” in the Screen drop-down list.

5 Select “ALLERGIES” in the Field Name drop-down list. You should now have a Merge Field name “F.DEMO.Allergies”.

6 Click **Next >**.

The next step in creating a Data Mining scraper is to identify the “key” words and/or phrases that will indicate what data you want to scrape. A key can be a single line, or it can be a string of words or phrases. What a data mining scraper basically does is tell the application to go to a certain menu, look for a certain phrase or phrases that have been charted, and if it finds the key(s), to apply a set of instructions to that line in the menu. You can also tell it what to do if it does **not** find the key(s).

To create a key, you will be presented with the menu you selected in step 3 in the previous step list. If you selected “ALL,” you will have a drop-down list of all menus from which to select. The next step is to “chart” the key into the Virtual Charting window by clicking through the menu selections. Then, highlight the word (or words) you want to use as a key. In this case, “Allergies:” is highlighted. In our example, the word “Allergies:” (with punctuation included) is the phrase that identifies the target data to be scraped. You may chart more than one entry (X-ray contrast, latex, strawberries), but they will all be prefaced with the word “Allergies:”. The most important thing to remember about a key is that it will always be present in the charting, and therefore can always be used by the scraper to identify the target.

Now that the key has been identified, click and drag it to the Criteria window. If you need to identify more than one key, chart the next line and highlight and drag the next key to the window. You may need to adjust the condition of the key. By default, the condition of a key is set to AND and EXISTS. If you have more than one key, and the condition is set to AND and EXISTS for all of them, you are basically telling the scraper to look for Key 1 **and** Key 2 **and** Key 3 and if it finds all of them, apply its instructions. If you set the condition to AND and NOT EXISTS for a key, you are telling the scraper to apply its instructions in a case where Key 1 is **present** and Key 2 is **not** present. In this case, if Key 2 is present, the scraper will not apply its instructions, because the conditions for applying them are not met.

If you have multiple keys that may exist, use the condition modifier OR. This tells the scraper to look for Key 1 **or** Key 2 **or** Key 3, and if it finds either of them, apply the instructions. OR can also be used with NOT EXISTS.

When you do have more than one key, you must group them into a string in order to use them correctly in a data mining scraper. To do this, highlight the first key in the group, hold down the **Ctrl** key, and click the last key you want to include in a group, then click **Group**.

By grouping the different keys, you have created a **key string**. The scraper treats a key string as a single key, even though the string may contain many words or phrases.

You can create multiple groups of keys to create more than one key string. Just highlight and group the first set, then repeat the operation for any subsequent sets. If you need to ungroup a set, highlight the first key in the set, hold down the **Ctrl** key and click on the last key in the set, then click **Ungroup**. **Ungroup All** deletes the grouping for any and all sets in your Criteria window.

You can delete a key by highlighting it in the list and clicking **Delete**. **Clear All** deletes all the keys in the Criteria window.

Once you have identified your keys, you are ready to create the instructions that will allow the scraper to operate. The first element is OUTPUT TYPE. There are three types:

Type	Description
Label Yes/No	Selecting this type will instruct the scraper to insert a particular phrase in the target field if the conditions of the scraper are met. You may also instruct the scraper to insert a different phrase if the conditions are ***not*** met, or you can do both in the same line.
Data Mining	Selecting this type will open up the Data Mining criteria window, where you can give the scraper more elaborate instructions on what to scrape and how to format it.

Type	Description
Time Stamp	Selecting this type will instruct the scraper to pull the time/date stamp (that is, the time and date on which a line was charted) and insert it in the target field.

The SEARCH PATTERN tells the scraper to search for data in a single menu or in all available menus.

If you select Label Yes/No, the Yes default and No default windows will activate. You can then type in the phrase the scraper will output if it finds the key, and if desired, the phrase the scraper will output if it does not find the key.

If you select Data Mining as your scraper type, the Data Mining window will be activated. A data mining type scraper searches through the charting for the keys, then apply a set of instructions that you create here. You can also tell it what to do if it does **not** find the keys by giving it a NO default phrase, if necessary. In the example below, if the scraper does not find the key “Allergies:” charted in a menu, it inserts the phrase “NKDA” in the destination field.

The **Prefix** and **Suffix** fields allow you to enter a phrase of up to five hundred (500) characters that appears before (Prefix) the scraper results, or after (Suffix) the scraper results in a transcription document. These fields are available only with Data Mining scrapers.

NOTE
You can configure your system to add the prefix and/or suffix to each line of a group, or to add the prefix only to the first line, and suffix only to the last line of a group. For assistance in configuring your Xper Information Management System, contact Customer Support, or your local Philips Healthcare representative.

The POSITION section tells the scraper where the target data is located in relation to the key:

Before	Scrapes data that occurs in the charted line ***before*** the key.
After	Scrapes data that occurs in the charted line ***after*** the key.
Between	Scrapes data that occurs ***between*** two keys.

The OUTPUT section tells the scraper how much of the target data to output:

Line	Outputs data from any line in which it finds the key, using the position setting to identify which data will be scraped.
All	Outputs all data in the menu that occurs before, after or between the keys, depending on the position setting.
Word	Outputs a single word either before, after or between the keys, depending on the selected position setting.

Once you have set the position and output settings, you can select the key(s) from the drop-down lists below. If you have chosen between as the position setting, both lists will be active.

After selecting the keys, position and output, you must tell the scraper the format in which you want the data output. Output formats are described in the following table:

Format	Description
Single Line	The default output format, outputs scraped data from a single line.
Group Comma	When multiple lines are identified, the scraper outputs the results in a string with commas between each entry (e.g., X-ray contrast, Iodine, Latex,).
Group Period	When multiple lines are identified, the scraper outputs the results in a string with periods between each entry (e.g., X-ray contrast. Iodine. Latex.).
Group	When multiple lines are identified, the scraper outputs the results in a string with no additional punctuation between each entry (e.g., X-ray contrast Iodine Latex).
List	When multiple lines are identified, the scraper outputs the results in a list format: X-ray contrast Iodine Latex
Quantity	When multiple lines are identified, the scraper outputs the total number of results found (e.g., 3).

You can also tell the scraper to look for only the numeric characters in a line, and to output them in a particular data format:

Format	Description
Alpha Numeric	The default data format, includes letters, numbers and other characters.
Numeric	Scrapes numbers to a field as a numeric value that can be used in calculations.
Date	Scrapes numbers to a field and applies a date format (mm/dd/yyyy).
Time	Scrapes numbers to a field and applies a time format (hh:mm:ss).
Include Keyword	Includes the keywords with the scraper results.
Include Time	Includes the time stamp with the scraper results.

NOTE
The date and time formats are applied to data within a charted line. The TimeStamp output type refers to the time and date when the line was charted.

Label

Label scrapers are used primarily in transcription templates, but can be used for other fields, as well. The most common use is to insert a label for hemodynamic data, such as AO pressure, Heart Rate, etc. However, you can also use a label scraper to insert data into a fixed field, based on certain criteria you set when building the scraper.

You begin creating a label scraper in the same manner as the other types, by selecting a destination field. In the case of a Fixed field, the field names already exist. In the case of a Transcription field, you have to assign a name to the field.

The following is an example of a Label scraper that will insert the phrase “Allergies:” into a transcription template. To begin:

1 Click **Add** and select the LABEL scraper type.

2 In the Transcription Field Name box, type ALLERGIES. The Merge Name will read "L.ALLERGIES".

3 Enter a description, if desired.

4 Click **Next >** to open the Reference Field screen.

5 In this case, we are looking for allergy data on the patient demographics screen:

6 In the Screen drop-down list, select DEMO.

7 In the Field Name drop-down list, select ALLERGIES. The Merge Name should now read "F.DEMO.Allergies."

8 Click **Next >** to display the CRITERIA screen.

The Criteria screen allows you to set specific conditions that must be met in order for the scraper to operate. The fields and their functions are specified in the following table:

Data Present button	Select this if the only criterion for scraper function is that data be present in the reference field.
Value button	Select this if you want to set a value criterion for scraper function.
Condition (Value)	Specify the condition for the value (e.g., equal to, greater than, less than, etc.).
Value	Specify a value, or the lower limit of a range.
Upper Value	Specify the upper limit of a range.
Field Length button	Select this if you want to set a field length criterion for scraper function
Condition (Field Length)	Specify the condition for the value (e.g., equal to, greater than, less than, etc.).
Value	Specify a field length, or the lower limit of a range
Upper Value	Specify the upper limit of a range.
Yes:	The default response if scraper criteria are met.
No:	The default response if scraper criteria are not met.

In our example, we are simply checking the Allergies field on the patient demographics screen to see whether data is present, so we will select the DATA PRESENT option. Now we can set a Yes default response, and if desired, a No default response. In the YES: field, enter ALLERGIES:.

You do not have to specify both a Yes and a No default response. You only need a No default if you want the label to appear on a report even when there is no data in the reference field. In the case of the ALLERGIES field on the demographics screen, we created a Data Mining scraper that inserts the phrase "NKDA" if it does not find any allergies charted in the case; therefore, the ALLERGIES field will always contain data, so we do not need a No default response. Click **Finish** to complete the new Label scraper.

You can use the Label type for fixed fields, too. For example, say you want to insert the word "True" in the Diabetes field on the ACC registry screen if a patient's glucose is between 110–199. In this case, your destination field would be the ACC Core field "Diabetes," your reference field would be GLU on the demographics screen, and you would set a Value condition of between, a value of 110, and an upper value of 199.

Sedation/Reversal Agent Scrapers

Sedation and Reversal Agent scrapers, which scrape data to the Sedation Agents and Reversal Agents sections of the Sedation Flowsheet, have a specific structure that must be followed in order for them to work. Since both types of scraper are built in the same way, we will use the Sedation Agent scraper as an example. To create a sedation scraper:

1 In the Menu Builder, highlight the word or phrase to be used as the scraper key and check the SEDATION (or REVERSAL) attribute, then apply changes (see section 4.11.3 'Building and Editing Menus').

2 In Scraper Administration, click **Add**.

3 Select Data Mining and choose the menu in which the keys are charted from the drop-down menu.

4 Select Sedation Flowsheet as the destination screen, and Sedation Agent as the destination field. Click **Next**.

5 Chart the line containing the key (e.g., {Narcotics/Sedation} Versed 2 mg IV).

6 Highlight the key (previously identified in the Menu Builder; in the example above, {Narcotics/Sedation} is the key) and drag it to the Criteria list. Click **Next**.

7 Select Output Type of Data Mining.

8 Select Data Mining position as AFTER and select the key from the drop-down menu.

9 Set Output to LINE and Output Format to LIST.

10 Set Data Format to ALPHA NUMERIC. Click **Save**.

Case Status Scrapers

Case status scrapers automatically sends a designated status message to update the Whiteboard Viewer (see *"Patient Status Viewer" on page 27*). To create a case status scraper:

1 Click **New**.

2 Select the Data Mining type.

3 Select the appropriate menu from the Data Mining drop-down menu.

4 Set the designation screen to DEMO.

5 Set the Field Name to Case Status.

6 Click **Next**.

7 Chart and drag keys to the Criteria list.

8 Click **Next**.

9 In Output Type, select Case Status to activate the Case Status drop-down menu.

10 Select the desired case status message from the list.

11 Click **Finish**.

During a procedure, when you chart the keys and click **Scrape**, the status message will be sent to the designated Whiteboard.

You can see how data scrapers give you the ability to maximize data collection while minimizing workload. You can eliminate the need for staff to duplicate their efforts by charting in the menus, and then manually entering the same data on multiple screens. In the case of the transcription fields, you can create many different transcription reports, from physician reports to nursing notes, to custom forms for data submission to state agencies, and many more. The possibilities are limitless!

4.3 Structured Reports

This system gives you the ability to create structured report templates that may be used to generate transcription reports for procedures. You can create as many report templates as you desire per modality. Once you have created your templates, you can assign them to a modality and procedure, designating one template as the default for each procedure type. When a study is opened and the procedure type indicated, the default template opens. As the study progresses, the template is completed automatically (see *"Transcription" on page 54*).

4.3.1 Transcription Builder

To access the structured reporting module, click TOOLS > TRANSCRIPTION, then select TRANSCRIPTION BUILDER. Several tabs appear on the left side of the screen. Click the Templates tab to view the list of available report templates or to create a new template.

The Transcription Builder is a fully functional word processor with all the commands and capabilities of other word processing applications. The template builder controls and their functions are listed in the following table.

Control	Description
File Menu	Contains commands for working with files (New, Open, Save, etc.).
Edit Menu	Contains commands for editing documents.
View Menu	Contains commands for viewing different elements of the editor (rulers, headers/footers, etc.).
Insert Menu	Contains commands for inserting elements into a document.
Format Menu	Contains formatting commands.
Tools Menu	Contains tool commands (spell checker, macros, etc.).
Table Menu	Contains commands for creating and editing tables.
New Document	Creates a new, blank document.
Open	Opens an existing document in the user's My Documents folder.
Save	Saves the open document to the user's My Documents folder.
Print	Prints the open document.
Print Preview	Displays the document as it will appear when printed.

Control	Description
Spell Check	Checks the spelling in the document.
Cut	Cuts selected text from the document and places it on the clipboard.
Copy	Copies selected text to the clipboard.
Paste	Pastes selection from the clipboard to the document.
Undo	Undoes the last performed action.
Redo	Repeats an action that was cancelled by Undo.
Insert Hyperlink	Inserts a hyperlink to a file or URL into the document.
Insert Table	Inserts a table into the document.
Show Paragraph Codes	Displays paragraph and text formatting codes on an open document.
Zoom Level drop-down	Allows a user to select a zoom level.
Style drop-down	Allows a user to apply a style to selected text.
Font drop-down	Allows a user to select font types for selected text or the entire document.
Font Size drop-down	Allows a user to specify a font size.
Bold	Displays and prints selected text in bold type.
Italic	Displays and prints selected text in italic type.
Underline	Underlines selected text in display and printing.
Left Justify	Aligns text to the left margin.
Center Justify	Aligns text along the center point of the document.
Right Justify	Aligns text to the right margin.
Full Justify	Aligns text to both left and right margins.
Bullets and Numbering	Allows a user to format bulleted or numbered lists or paragraphs.
Decrease Indent	Decreases the amount of indentation of selected text.
Increase Indent	Increases the amount of indentation of selected text.

Templates

The Templates tab contains a list of available report templates that have been created or loaded to the system. To view a template, click on the name in the list. The selected template

will load to the editing screen, where you can make changes or preview the printed document. You can save changes to a template by clicking **Save Template**.

If you want to save a template under a different name, click **Save Template As** and type in a new name. If you want to replace an existing template, select the name of the template you want to replace in the list and click **OK**. You will be asked if you want to overwrite the existing template.

To delete a template, highlight it in the list and click **Delete**. You will be asked to confirm the deletion. Click **OK** to delete or **Cancel** to cancel the operation.

NOTE
Certain characters (| ^ ~ \ &) cannot be used in transcription templates if you have a results interface. If these characters are included in your template, the transfer of reports across the interface will fail.

Sections

The Sections tab contains a list of report sections that may be inserted into templates. Sections include such items as headers, footers, or tables. To create a section, start with a blank document and create the section in the same way you create a new report template. Click **Save Section** to save your work.

If you want to save a section under a different name, click **Save Section As** and type in a new name. If you want to replace an existing section, select the name of the section you want to replace in the list and click **OK**. You will be asked if you want to overwrite the existing section.

To delete a section, highlight it in the list and click **Delete**. You will be asked to confirm the deletion. Click **OK** to delete or **Cancel** to cancel the operation.

NOTE
It is recommended that you do not copy and paste from one template or section to another. The templates and sections contain underlying code that will be replicated by copying and pasting. Creating sections or templates in this way can greatly increase the file size of your transcription templates and subsequent reports, resulting in performance degradation and decreasing space on your server and local hard drives. The correct method is to build sections first, then place them in your templates, or to build templates separately.

Tables

The Tables tab contains a list of data tables that may be included in a template. These tables, when placed in a template, will be automatically populated with the appropriate data from a procedure. The tables include:

- **Case Procedures:** list of all procedures from the Case Details screen.
- **Case Resources:** list of all resources (staff) from the Case Details screen.
- **Case Diagnosis Codes:** list of all diagnosis codes assigned to a study'
- **Patient Vitals:** list of vitals signs recorded during a procedure.
- **Hemo Saturation:** list of any oxygen saturation results recorded during a procedure.
- **Hemo Pressure:** list of invasive pressures recorded during a procedure.
- **Hemo Cardiac Output:** list of thermal cardiac outputs recorded during a procedure.
- **Hemo Gradients:** list of valve gradient data recorded during a procedure.
- **Hemo Functional Measurements:** list of functional measurements samples recorded during a procedure.
- **Sedation Agents:** list of sedation agents administered during a procedure.
- **Sedation Reversing Agents:** list of reversal agents administered during a procedure.
- **Charges:** list of patient charges generated during a procedure.
- **Procedure Log:** list of all charting entries performed during a procedure.
- **Lab Series:** list of all lab results received during a procedure.

Names

The Names tab allows you to place specific entries from the Procedures and Resources tables from the Case Details screen into a template. To add a name field to a template, position the cursor in the template and then double-click the field.

Signatures

The Signatures tab allows you to insert up to five (5) digital signature markers for resources assigned to a case. To add a signature marker to a template, select the resource type, position the cursor in the template and double-click the field (e.g., Physician 1). When the user applies a digital signature to a report, a signature stamp containing the name of the person signing, and date and time that the signature was applied appears in the report. If a signature bitmap has been assigned to the user, it will also appear in the report (see *section 4.5.3 'User Administration'*). If more than one signature marker has been placed in a template, signatures for each resource must be applied before the report is finalized and converted to a PDF.

Addresses

The Addresses tab allows you to insert markers for resources assigned to a case. When the report is executed, the name and address of the designated resource appears in the report.

NOTE
User demographics must be entered in the user account. See *section 4.5.3 'User Administration'*.

Scrapers

The Scrapers tab contains a list of available scraper fields, which can be included in a template. To add a scraper field to a template, position the cursor in the template and then double-click the field.

Custom Fields

The Custom Fields tab contains a list of all custom forms and their associated fields, which can be included in a template. To add a custom field to a template, select the form on which the field appears, position the cursor in the template and double-click the field. To add a charting menu to a template, position the cursor in the template and then double-click the menu.

Charting

The Charting tab contains a list of current charting menus, which can be included in a template. If placed in a template, the report will populate with any charting done during a procedure in the specified menu.

Images

The Images tab contains markers for up to ten (10) still frames, arterial trees, and waveforms, which can be included in a template. To add an image to a template, select the type of image to be inserted, position the cursor in the template and then double-click the field. The number corresponds to the order in which the images were acquired during the procedure (e.g., Wave 1 would be an image of the first waveform sample acquired during a procedure, Wave 2 would be an image of the second, etc.). When a template containing images is selected for a study, any markers that do not have corresponding images in the study will be removed from the report.

Data Fields

The Fields tab contains lists of all available database fields, which can be included in a template. To add a database field to a template, position the cursor in the template and then double-click the field.

Conditional Markers

Conditional markers allow you to designate sections of a template to appear in a report only when a certain condition is met. For example, you may have one section of the template that you want to use only when a right heart catheterization is performed.

GE MacLab

The GE MacLab tab contains a list of all fields for electrophysiology cases imported from a GE MacLab system.

EP Workmate

The EP Workmate tab contains a list of all fields for electrophysiology cases imported from an EP Workmate system.

Cardiolab

The Cardiolab tab contains a list of all fields for electrophysiology cases imported from a Cardiolab system.

NOTE
EP tabs will be available only if you have an EP interface.

4.3.2 Transcription Configuration

In order to utilize transcription templates during a procedure, you must associate the templates with the type of procedure. To access the Transcription Configuration module, click TOOLS > TRANSCRIPTION > TRANSCRIPTION CONFIGURATION.

The Transcription Configuration screen is divided into two sections. On the left is a list of study modalities and their associated procedures (*see section 4.17 'Coding'*). On the right is the list of transcription templates.

To associate a template with a procedure, click on the template in the list on the right and drag it to the desired procedure on the left. You may drag and drop as many templates to a procedure as you want. Once templates have been associated with a procedure, you may designate one as the default template by clicking with the right mouse button on the template name, then selecting Make Default from the list. The default template for a procedure is indicated by a green check mark.

To remove a template from a procedure, click with the right mouse button and select Delete Document. This will not delete the template, but it will no longer be associated with the procedure and cannot be accessed during a study (*see "Transcription" on page 54*).

4.3.3 Transcription Types

Transcription types are used to identify the type of document being sent across the Xper Connect or IntelliBridge Enterprise interface to a facility's results interface.

To add a transcription type:

1 Enter a description.

2 Select X-Ray Angiography (XA) modality.

3 Click **Add**.

To edit a type, select it from the list, make the necessary changes, and click **Update**.

To hide a type, select the type from the list and click **Hide**. If a type is already hidden, you may redisplay it by selecting it and clicking **Show**.

4.4 Registries

This system includes a data collection module for the American College of Cardiology (ACC) registry, and the Implantable Cardiac Defibrillator (ICD) registry. The module contains all the fields required by the various bodies for reporting. You can elect to enter data manually in both registries, or build data scrapers to complete the fields for ACC and ICD as a study is charted.

To access any registry, open a study and click **Registries**, then select the appropriate registry from the list. The screens opens, and you can begin filling in the data, or, if you have built scrapers, the data is populated.

4.5 Security

4.5.1 User-Centric Navigation

This system stands out from other applications by utilizing user-centric navigation. That is, the user interface configures itself to the assigned role of a user's account, instead of the traditional "patient-centric" focus that forces most users into a screen configuration that they do not need or that presents them with information or functions not applicable to their job. By having a user-centric focus, this system helps you work more efficiently by giving you only the tools you need to perform your job and avoid information overload. User-centric navigation also increases the security of your system by allowing you to restrict user access to certain functions by removing them from the user interface when not appropriate for the user role. To access the Portal Designer, click SYSTEM > SECURITY > PORTAL DESIGNER.

User Roles

User roles are the heart of user-centric navigation. This system provides you with a wide variety of preconfigured user roles which you can fine-tune for your needs, or you can create your own. Once you have created and defined a role, you can assign it to users in the User Administration module (see section 4.5.3 'User Administration'). Keep in mind that creating user roles is not the same as adding users to the system. You must create your user roles prior to adding users, or use the roles provided when adding new users.

To create a user role:

1 Click **Add** below the user Roles Description list.

2 You will be prompted to enter a description for the new role, then click **OK** to save the new role or **Cancel** to discard it.

Once you have saved the new role, it will appear in the User Roles list, and you will be prompted to create a Portal Layout.

3 To delete an existing role, highlight it in the list and click **Delete**.

Portal Designer

The Portal Designer is the next step toward designing a user-centric system. You can use the Portal Designer to create custom user roles, define the functions that will be assigned to these roles, and determine the layout of the workspace a user sees when logged in to the system, as well as the functions available on the user's toolbar.

The first step in creating a Portal Layout is to determine how the workspace should look. Use the Pane Layout drop-down list to select the number and configuration of panes (or windows) appropriate to the role, then use the Pane Contents drop-down list to determine what the contents of each pane will be. For example, users assigned as Scheduler may need to see the Schedule viewer, the Basic Search screen, and Room Usage information, while an IT role might need only System Status or Users Logged On.

If you would like to designate the Study Scheduler as read-only for a particular role, check Scheduler View-Only. Any user assigned a role with this setting are able to view the Study Scheduler, but are not able to make changes.

To assign content to a pane, select the item in the Pane Contents drop-down list, then click and drag the selected item to the pane in which you want it to appear. Click **Save** to save the layout, or **Clear** to start over.

Some of the pane contents items contain columns. You can choose to hide or display particular columns within a pane. Clicking the **COLUMN SELECTOR** will open a list of the available columns for the selected content. To hide a column, uncheck the box next to the column title. To display a column, mark the box with a check. You can adjust column order by clicking on a column header and dragging and dropping it in its new location.

You can duplicate an existing user role's settings under a new name, and adjust the settings for the new, similar role. To do this, click **Duplicate**, then give the "new" role a name and click **Save**. You can then adjust the layout and contents as needed, and save again when you are ready.

Menu Bar Builder

Once you have determined how the workspace will look for a role, you must create a toolbar layout to match. A user toolbar contains navigation tools, such as LOGOUT, and permits access to the other modules within Xper Information Management System, such as Inventory, Transcription utilities, System tools, or Scheduling.

To create toolbars, highlight the desired user role and click the Menu Bar Builder tab. You will notice several toolbar type selections at the top of the screen: MAIN, CASES, and CASES (QUERY). The Main toolbar is the one a user will see when first logging into the system. The Cases toolbar is what a user will see when he has opened a case.

Underneath the toolbar types is the toolbar functions tree. This is where you decide which buttons will be available on a given toolbar for the user role. Functions marked with a green check will be available on the toolbar, while functions marked with a red "X" will not appear.

You can restrict user access within a given module to individual functions within the module. For example, the Scheduler module has four main functions, Study Scheduler, Staff Scheduler, Staff Work Hours and Room Staffing. You can restrict a user to accessing only the Study

Scheduler by marking it with a green check, and marking the other three screens with a red “X”. When the user clicks the Scheduler button on the main toolbar, the only associated function he can select is Study Scheduler.

The Sample Layout section shows you how the toolbars you create will appear to a user assigned to the selected role. When the main toolbar and any appropriate modality toolbars are arranged to your liking, click **Save** to save your toolbar configurations.

4.5.2 Password Management

The Password Management module allows you to perform operations such as setting username and password lengths and characteristics, specify how long a password history will be kept, and set user lockout limits. This module is closely related to the User Administration module. To access password management, click **SYSTEM > SECURITY > PASSWORD ADMINISTRATION**.

User Name Settings

On this screen, you set the minimum and maximum character lengths for usernames. The minimum length has a range of 3–10. The maximum length has a range of 3–20.

System Password Settings

On this screen, you maintain various settings for system login passwords. The fields and their functions are specified in the following tables:

Field	Definition
Minimum Length	Specifies the minimum number of characters (letters, numbers, and symbols) for a system login password. The range is 3–15.
Maximum Length	Specifies the maximum number of characters for a system login password. The range is 3–20
Minimum Digits	Specifies a minimum number of digits that must be included in a system login password. The range is 0–4.
Minimum Letters	Specifies a minimum number of letters that must be included in a system login password. The range is 0–20.
Passwords are Case Sensitive	Check if you want passwords to be case sensitive.
Minimum Upper Case Letters	Specifies the minimum number of upper case letters for a case-sensitive system login password. The range is 1–20.
Minimum Lower Case Letters	Specifies the minimum number of lower case letters for a case-sensitive system login password. The range is 1–20.
Force Password Expiration	When checked, forces password expiration of a set interval for all users in the system.
Passwords Expire Every (Days)	Sets the interval for system-wide password expiration. The limit is 30–90 days.
Enable Password History	When checked, keeps a history of user passwords for a specified interval.
Password History is Kept for (Months)	Sets the interval for retention of password history. The limit is 1–60 months.

Field	Definition
Enable User Lockout	Activates the user lockout feature. Users who attempt to log in with an incorrect password will be locked out after a specified number of attempts.
Lock out users after (Failed Login Attempts)	Specifies the number of attempts a user can make with an incorrect password before the user account is locked.
Do Not Allow Login For (Minutes)	Sets the amount of time (in minutes) that a user account will be locked after a specified number of failed attempts.
Lock out all users now	When checked, initiates a system-wide lockout. No users may log in while this is active.
Enable User Password Clues	When checked, activates the “Forgot Password” function. Users who have forgotten their passwords will be prompted to answer the System Password Clue Question entered in their user profile (see ***section 4.5.3 ‘User Administration’***).

Signature Password Settings

On this screen, you maintain various settings for signature passwords. The fields and their functions are specified in the following tables:

Field	Definition
Minimum Length	Specifies the minimum number of characters (letters, numbers, and symbols) for a signature password. The range is 3–15.
Maximum Length	Specifies the maximum number of characters for a signature password. The range is 3–20
Minimum Digits	Specifies a minimum number of digits that must be included in a signature password. The range is 0–4.
Minimum Letters	Specifies a minimum number of letters that must be included in a signature password. The range is 0–20.
Passwords are Case Sensitive	Check if you want passwords to be case sensitive.
Minimum Upper Case Letters	Specifies the minimum number of upper case letters for a case-sensitive signature password. The range is 1–20.
Minimum Lower Case Letters	Specifies the minimum number of lower case letters for a case-sensitive signature password. The range is 1–20.
Force Password Expiration	When checked, forces password expiration of a set interval for all users in the system.
Passwords Expire Every (Days)	Sets the interval for system-wide password expiration. The limit is 30–90 days.
Enable Signature Password History	When checked, keeps a history of user passwords for a specified interval.
Password History is Kept for (Months)	Sets the interval for retention of password history. The limit is 1–60 months.
Enable Signature Password Clues	When checked, activates the “Forgot Password” function. Users who have forgotten their passwords will be prompted to answer the Signature Password Clue Question entered in their user profile (see *section 4.5.3 ‘User Administration’*).

After changes to any of the screens, click **Save** to accept the changes. If you make changes and forget to click **Save**, you will be prompted to save or discard changes when you close the Password Management module.

4.5.3 User Administration

The User Administration module allows system administrators to create and maintain the security settings for individual users in the system. User Administration is closely tied to the other security modules, Portal Designer and Password Management. It also allows an administrator to see security settings for any user at a glance and to create and maintain physician groups. To access User Administration, click **SYSTEM > SECURITY > USER ADMINISTRATION**.

User Settings

The list of current users appears on the left. At the bottom of the list are several filter tools that can be helpful when maintaining users. There are alphabetical tabs and an ALL tab, which displays the entire list of users. The Filter List By section allows you to filter the user lists by user type. You can also click on the title of any column to sort the list in ascending or descending order for that column.

To the right, the User Settings screen is used to enter information about the user and to set passwords. At the top right are the controls for adding and deleting users. To create a new user, click **Add User**. This clears the User Settings screen and assigns a new User ID number. Fill in the rest of the user data and click **Save** to save the changes. If you forget to click **Save**, you will be asked to save changes when you close the User Administration module. The fields and their functions are specified in the following tables:

User Settings	Description
User ID	This number is automatically assigned by the application when you click ADD USER.
User Name	Enter the user's login name here.
Login Allowed	Enables login for the user account.
Allow System Configuration	Gives the user access to the Configuration Screens module.
Last Name	The user's last name
MI	The user's middle initial (optional)
First Name	The user's first name
Title	The user's professional title, if any (optional)
User Type	Assigns a user resource type
Physician ID	This field can be used to enter a physician's license number or other identifier (optional)
Physician UPIN	Unique Physician Identification Number field
Show Only Patients	When checked, the physician will see only his/her patients
Transcription Signature Override	When checked, allows a physician to sign a transcription report as proxy for another physician.

User Settings	Description
Physician Groups	A list of groups to which a physician can be assigned (see ***section 4.5.3 'User Administration'***). When physicians are assigned to a group, only patients belonging to the group will be visible when the physician logs in to Xper Information Management System.
Assigned Groups	Displays the group to which a physician is currently assigned
> ADD	Adds a group to the Assigned Groups list
< REMOVE	Removes a group from the Assigned Groups list
Disable Charting Timestamp	When selected, user will be unable to edit time stamps on charted line
Approve Patient Charges	When selected, user will be able to approve a patient's charges for processing (see Coding)
Billing Override	When selected, a user will see all queued patients, regardless of the user assigned (see Coding)

System Password Settings	Definition
System Password Change Next Login	When checked, prompts the user to change his/her system password on the next attempt to log in
Validate Macro Security	Gives the user privileges to create, edit and delete recording macros
System Password Expiration	When checked, user's password will expire after a designated interval
System Password	Enter the user's system password
System Password (Verify)	Re-enter the user's system password for confirmation
System Password Expiration Days	Sets the interval for the system password expiration period (30 - 180 days)
System Password Clue Question	Enter a question that the user must answer when resetting a lost or forgotten system password
System Password Clue Answer	Enter the response the user must provide to the System Password Clue Question
Validate Disable Audible Alarms	When selected, a user will be permitted to disable audible physiomonitoring alarms (Flex Cardio only)

Signature Password Settings	Definition
Use Signature Password	Check this box if you want to assign a unique password for applying digital signatures.
Signature Password Expiration	Check this box if you wish to set an expiration limit on a signature password.
Signature Password	Enter the user's signature password here.
Signature Password (Verify)	Enter the user's signature again to be verified.
Lock Study	When checked, gives the user rights to lock a study so that no changes can be made to the patient data, and sets the Case Finalized flag and date

Signature Password Settings	Definition
Unlock Study	When checked, gives the user rights to unlock a study that has been locked
Physical Signature Required	Check this box to set physical signature as required instead of digital signature.
Signature Password Expiration Days	The interval (in days) after which a user will be asked to enter a new signature password. The interval can be set from 30 to 180 days.
Signature Password Clue Question	Enter a question that the user must answer when resetting a lost or forgotten signature password.
Signature Password Clue Answer	Enter the response the user must provide to the Signature Password Clue Question.

To delete a user account, highlight it in the list on the left and click **Delete User**. You will be prompted to click **Yes** to delete the user account or **No** to cancel the deletion.

User Demographics

The User Demographics screen stores data such as mailing address, telephone and cell phone number, fax and pager numbers, and e-mail address. Enter any desired data and click **Save** to record the information.

A signature bitmap may be attached on this screen to a user account. If you have a bitmap of a physician's or other staff member's signature, right-click on the Signature field, click **Load**, browse to the location of the bitmap, and Double-click the file. The image will appear in the Signature field. When the user applies a digital signature to a transcription report, the image is inserted at the place in the template where a signature marker has been inserted (see section 4.3.1 'Transcription Builder').

User Roles

On this screen, you assign the roles created in the Portal Designer to the individual users. You can assign just one role, or a user could have multiple roles. Whatever the number of roles assigned to a user, you must specify a Primary User Role. This is the default role the user sees when he logs in to the system. If a user is assigned more than one role, he can switch roles after logging on by using the User Roles drop-down list at the bottom of the main screen.

The available user roles appear in the list on the right. To assign a role, highlight it in the Available Roles list and click **< Add**. If you want to create a "super user" who is assigned to all available roles, click **<< Add All**. Once you have assigned at least one role to a user, it will appear in the Primary User Role list. If a user has been assigned more than one role, use the Primary User Role drop-down to choose which of the assigned roles will be the user default. If you want to remove an assigned role, highlight it in the Assigned Roles list on the left and click **> REMOVE**. Once you are satisfied with the list of assigned roles, click **Apply**. Use **Cancel** to start over.

Checking the box next to Allow Case History Criteria Change allows the user to set criteria for linking historical cases (see section 4.23 'Patient Historical Links').

Repositories

The Repositories section allows you to assign user access to specific data repositories within the Xper Information Management System database. To grant access, place a check next to the repository name. When the user logs in to Xper Information Management System, only the designated repositories will be available. Checking GLOBAL USER gives the user access to all available repositories. When a user logs in, the repository will default automatically to the last repository the user had accessed. If a user is given access to multiple repositories, he can access a different repository after logging on by using the Repositories drop-down list at the bottom of the main screen.

LDAP Settings

The LDAP Settings tab allows you to associate an Xper Information Management System user account with the user's LDAP (Light Directory Access Protocol) account. If your system is configured to use LDAP authentication, enter a valid domain and username in the LDAP Username field, typing a slash between (e.g., domain\username). When you log in to Xper Information Management System, you then may enter your Windows username and password.

4.5.4 Audible Alarms Deactivation

When Xper Information Management System Workstations are paired with Xper Flex Cardio Physiomonitoring systems, you may disable audible alarms, if desired (visible alarm signals cannot be disabled, but will terminate automatically when the alarm condition is corrected). To do so, open Alarm Setup and check **Disable Audible Alarms**. Click **OK** to save the setting. You will be prompted to enter your username and password.

To disable audible alarms:

1 Open **Alarm Setup** and select the **Disable Audible Alarms** check box.

2 Click **OK** to save the setting.

You will be prompted to enter your username and password.

NOTE
Users must be assigned alarm disable privileges in order to be able to disable audible alarms. See *"User Administration" on page 82* for more information.

On the live screens, an **Audible Off** indicator will be displayed next to the heart rate indicator at the top center of the screen as a reminder that audible alarms are disabled. A reminder tone will sound every three (3) minutes while audible alarms are disabled. If you enable audible alarms, the icon will no longer be displayed, and audible tones will sound.

4.5.5 Macro Validation Security

Xper Information Management System Workstations that are paired with Xper Flex Cardio Physiomonitoring systems may be configured to require the entry of a username and password to save or delete monitoring macros. In order to enable macro validation security, you must activate the function for each user, and also enable the security check on each workstation:

1 In User Administration, for each user to whom you want to assign macro privileges, check Validate Macro Security on the User Settings tab.

2 On each workstation where macro security will be required, check Validate Macro Security on the System Setup tab of the Configuration Settings screen.

After enabling macro security on a workstation, any user who attempts to save or delete a monitoring macro will be prompted for a username and password. If the user has not been assigned the privilege in User Administration, the user will not be permitted to save or delete the macro.

NOTE
Macro security must be enabled on the workstation. If macro security is not enabled on a workstation, any user may save or delete macros without being prompted for username and password, regardless of the user account settings.

4.5.6 Physician Group Administration

Physician groups give an additional layer of security to patient information. When physicians are assigned to a group, only studies performed by physicians assigned to the same group will be available in the patient lists.

NOTE
If no group is assigned, a user will be able to access any patient unless additional security is applied (see section 4.5.3 ‘User Administration’, for information on applying the Show Only Patients filter).

Use this screen to maintain the list of physician groups (see section 4.5.3 ‘User Administration’). A physician group can be a professional group, a departmental group, or a group you create. To create a group, enter a name or other identifier in the GROUP field. Enter an optional description in the GROUP DESCRIPTION field. Click **Save** to add the group to the list. If you want to clear the fields without saving, click **Cancel**.

You can edit existing groups by Double-clicking on the Group name in the list. Make the desired changes and click **Save**.

To delete a group, highlight the item in the list and click **Delete**. You will be prompted to click **Yes** to delete the group, or **No** to cancel the deletion.

4.5.7 System Password Reset (Forgot Password)

The application has a “Forgot Password” function that allows a user to create a new system password if necessary. To reset a lost or forgotten system password:

1 On the login screen, enter your user name and click **Forgot Password**.

2 You will be prompted to enter the answer to your system security question. Enter the response and click **Submit**.

3 Enter your new password, then re-enter the password a second time for confirmation. If the two entries do not match, you will be prompted to retype your new password.

4 Click **Submit**. You will receive a confirmation that your password has been successfully reset.

4.6 Inventory Management

Effective inventory management plays a crucial role in the smooth and efficient running of any organization. Inventory control for your department, procedure suites, or facility can be performed by tracking inventory as it is received, moved and issued. You are able to quickly perform physical inventory and cycle counting, or receive system alerts when inventory levels are getting low. Track disposable supply levels and use barcodes to expand your data entry capabilities. The entire inventory function is seamlessly integrated within the menu structure (see *“Charting a Procedure” on page 30*). As items used are charted into a case, your inventory is decremented automatically. The Inventory Module can import a supplies list from an Excel file and interfaces with supply cabinets such as Pyxis and Omnicell.

4.6.1 Inventory Overview

The Inventory Overview screen allows you to view all active or inactive inventory items, as well as specific information pertaining to each item, such as part number, location, serial number, quantity at hand, barcode value, expiration date, and so on. In this screen, you may perform searches by multiple criteria, build and view orders, and generate preset reports to either view on screen, print out, or export to MS Excel. To access Inventory Overview, click **MODULES > INVENTORY > OVERVIEW**.

Dragging and Dropping Column Headers

You can adjust Inventory column order by clicking on a column header and dragging and dropping it in its new location. Once you have arranged Inventory columns, click **Save Grid Settings**.

Grouping by Columns

You can drag a column header to the top of the list in order to group items by that category. You can also drag more than one header if you want to create subgroups. For example, if the Location column is dragged up to this position, all items will be grouped by location. Dragging the Mfg Name header creates a subgrouping under Location. Drag the column headers off to the left to undo the grouping.

You can choose to hide or display particular columns within a pane. Clicking the Column Selector will open a list of the available columns for the selected content. To hide a column, uncheck the box next to the column title. To display a column, mark the box with a check. You may also see this feature in other modules.

Clicking on Column Selector at the top left corner of the Search Results list displays a list of available columns. Column order, column size and contents can be arranged and saved, permitting you to organize the display as you desire. Use the scroll bar on the right to see the complete list of available columns. Check the column headers you wish to display, and uncheck headers you do not want. When you have finished, click on the top left square of the Search Results again to hide the column list.

Click **Save Grid Settings** to save changes to your column format. The format you select will appear the next time you access the Inventory Module. However, the Under Par Row Color is a global setting activated in the system configuration screen. You may change the color while in Inventory, but it will revert to the global system configuration setting the next time you enter Inventory.

Searching Inventory

Search for items by specifying values in the Input Inventory Search Criteria section and clicking **Search**. You may also select the number of items displayed in the search result by selecting a choice in the Max # of Records drop-down list. Clicking on any column header sorts the fields by that header. Items highlighted in red are those whose total quantities are below their par value. To highlight these items in a color other than red, select a different "Under Par Row Color" using the drop-down box located directly above the search results to change the color of the highlighted rows. You can use “Wildcard Search” when attempting to find something. If you place a “**%**” before or after a partial search string and click **Search**, the application searches for any items that fit the criteria. The fields and their individual functions are listed in the following table:

Field	Description
Bar Code	Internally generated barcode number
Mfg Bar Code	Manufacturer’s barcode number
Item (Active)	When checked, only items marked as Active are displayed.
Item (Under Par)	When checked, only items whose quantities are below a desired quantity on hand are displayed.
Location	The location where an item is stored.
Part Number	A required field for each item. May be an internal number or the manufacturer’s part number.
Mfg Part Number	The manufacturer’s part number.
Exp Date From	Specifies a starting expiration date for a search range
Exp Date To	Specifies an ending expiration date for a search range
Serial Number	Manufacturer’s serial number
Last Ordered	Date when the item was last ordered.
Lot Number	Manufacturer’s lot number

Field	Description
Max # of Records	Specifies the maximum number of results to be displayed. Selections include 100, 500, 1000, or ALL.
Manufacturer Name	Item manufacturer or vendor

Exporting to Excel

The **Export** button saves the contents of any screen to a Microsoft® Excel file. The default Save In location is your My Documents folder, although you may specify any other location. Export to Excel includes data for all selected columns and contains all column headings.

NOTE
Excel must be installed on your computer in order to use this function.

Adding and Editing Inventory Items

To add a new item, click **Add Item**. The Item Maintenance screen opens, where you can enter information including the item name, cost, packaging, vendor and manufacturer details as well as barcode information. Required fields are indicated in bold print. The Quantity in Stock field is not enabled. You will be prompted to set a Cycle Count Class and to receive the item once you click **Save**. Receiving an item activates the Quantity in Stock field.

The Type designation indicates whether an item is general stock, diagnostic equipment, or interventional equipment. If you have a Results interface, all items in your inventory must be designated as the correct type. If you do not have a Results interface, Type is not required, but recommended.

To edit an existing item, double-click on the item to be edited. This opens the Item Maintenance screen for the selected inventory item. Make your modifications and click **Save** to record or **Cancel** to discard the changes.

Ordering Inventory Items

Clicking **Order** brings up the Inventory Order screen. To place an order:

1 Enter the manufacturer name and select the part number from the drop-down list.
2 Select the Order Unit. If you did not specify an Order Unit when adding the item, the only option under the order unit field will be EACH (Individual item).
3 Order the number of items requested in the order under Order Qty.
4 Click **Insert Line**.
5 To add more orders, click **Clear Criteria** to reset the fields.
6 When you have finished placing your order, click **Save Order.** The order displays in print preview.
7 You can select **Print** or click **Close** to exit.

You can keep track of order information and status or modify existing orders on the View Orders tab.

Receiving Inventory Items

You can receive items into inventory from the Inventory Overview screen by double-clicking the item to open the Item Maintenance window:

1 Click **Receive** to begin.

2 Select the storage location from the drop-down list, then enter the quantity. If you must enter a serial number for individual items, set the quantity to 1 and enter the numbers. You must receive items with serial numbers one at a time.

3 If the item you are receiving is checked as an implantable item and has an additional barcode containing information such as lot number, serial number, and/or expiration date, scan that barcode into the Attribute Bar Code field. This ensures that, when the item is scanned during a procedure, the correct item is removed from inventory.

4 Click **Save**.

5 You can also indicate an expiration date. If you do not have to enter lot or serial numbers, enter all other information, then click **Save**.

To enter a new location:

1 Click the ellipse button next to the drop-down list. The Location Maintenance screen will be displayed.

2 Enter a location name, a brief description (optional) and section (optional).

3 Click **Save New**.

To edit a location, highlight it in the list and click **Update**. To delete a location, highlight the location and click **Delete**. If the location is assigned to active inventory items, you will not be able to delete it until you have indicated a different location for these items.

It may also be helpful to receive items into inventory from the Orders section so you can verify whether you received a complete or partial shipment. If a partial shipment was received, the order can be modified. Items can be placed on back order, and an expected date of delivery can be inserted for your records. Remember to click **Save** if you have received or modified an order.

Deleting Inventory Items

In order to delete an item, highlight the item in the Inventory Overview list and click **Delete**. You will be prompted to click **Yes** to delete or **No** to cancel. The item record is not actually deleted, but instead has been made inactive. You can review inactive items by unchecking the Active box and clicking **Search**. If you have accidentally deleted an item, you can restore the item to current inventory by opening the item record and rechecking Active in the Item Properties section.

Reports

The Inventory Overview screen allows you to view and print some preset reports. Click the Reports drop-down list to specify the type of report to be generated:

- **Items:** Displays a report of all items in the search results list, arranged by manufacturer.

- **Below Par:** Displays a report of items under par, arranged by manufacturer. Items under par are highlighted by color in the search results.
- **Location Inventory:** Displays a report of items arranged by location. Items that have not been assigned a location are displayed first on the report.
- **Expiration Aging:** Displays a list of items with expiration dates, arranged by location.

To print a report, select the type, enter desired search criteria, and click **Search**. The **Preview** and **Print** buttons become active. To view the report prior to printing, click **Preview**. To print the report, click **Print**.

4.6.2 Inventory Maintenance

There are several tools available to help you maintain all aspects of your inventory, from items to categories, manufacturers, vendors, cycle counting, and locations. To access the maintenance screens, click **MODULES > INVENTORY > MAINTENANCE** and select the appropriate screen from the list.

Item Maintenance

The Item Maintenance screen contains all data about a specific inventory item. You can access the Item Maintenance screen by clicking on an item in the Inventory Overview list. This displays the properties for that item. The controls for performing maintenance on an item appear at the top of the screen. The specific controls and their functions are listed in the following table:

Button	Description
Add New	Adds a new item.
Edit	Edit information for an existing item
Receive	Activates the fields in the Receiving/Putaway section.
Transfer	Activates the fields in the Transfers section.
Delete	Deletes an item.
Cancel	Cancels any operation without saving.
Save	Saves any modifications.

Within the Item Maintenance screen, the different categories of information are grouped into several sections. The Identification section contains information about the item itself. The fields and their functions are listed in the following table:

Field	Description
Part Number (Required)	A unique identifying number. This can be a facility-generated number or the manufacturer's part number.
Mfg Part Number	The manufacturer's part or catalog number
Manufacturer (Required)	The manufacturer of the item
Vendor	Allows you to indicate a preferred vendor, if you do not order an item directly from the manufacturer

Field	Description
Item Name (Required)	The name of the item
Item Description	A brief description of the item
Mfg Bar Code	The manufacturer's barcode
Bar Code	An internally generated barcode
Categories	Used by the Menu Builder when adding Inventory Items to menus (see ***section 4.11 'Menu Builder'***).
Category List	A list of all categories to which an item belongs
Type	Used to specify whether the item belongs to a General, Diagnostic or Interventional equipment group. Default is General.

To add a manufacturer or vendor, click the ellipse button next to the field. This opens the Manufacturer Maintenance or Vendor Maintenance screen. You may add a category to the Categories list, as well (see section 4.6.2 'Inventory Maintenance').

The Pricing section contains information about costing. The fields and their functions are listed in the following table:

Field	Description
List Cost	The manufacturer's suggested retail price
Cost	The cost to your facility
Patient Cost	The cost charged to the patient
Charge Code	Will appear on the patient's bill
Chargeable	Denotes whether or not an item is chargeable. If not checked, the item will be maintained in Inventory, but will not appear on patient bills.
Category Code (C-Code)	Device category code. Determining which category code is applicable for a specific item will be the responsibility of the billing facility.

The Properties section contains information such as whether an item is currently used, consignment status, etc. The fields and their functions are listed in the following table:

Field	Description
Active	Item is currently in use.
Consignment	Item is used on a consignment basis.
Critical	Item is considered critical to the department and should not go under par.
Evaluation	Item is being evaluated for inclusion in active inventory.
Investigation	Item is part of a research or clinical trial.
Non Stock	Item is not routinely stocked in the department and is being used during a procedure.
Stocked in Lab	Stock is kept in procedure room.
Implantable	Stents, ICDs, pacemaker generators, leads, etc.

If you have assigned the Implantable attribute to an item, you will be prompted during charting to enter the item's lot number, serial number, and/or expiration date (see *"Charting a Procedure" on page 30*).

The Packaging section allows you to indicate the order unit for an item. In many cases, items are ordered in bulk quantities, although they may be dispensed as individual items from inventory. The fields and their functions are listed in the following table:

Field	Description
Qty Per Case	Quantity of items in a case
Qty Per Box	Quantity of items in a box
Qty Per Pack	Quantity of items in a pack

The Print Barcode Labels section allows you to print internally generated bar codes onto labels which can then be placed on the product. The fields and their functions are listed in the following table:

Field	Description
Labels to Print	Specify the quantity and size of the labels.
Formats	Specify the type of barcode that will be printed on the labels.

To generate an internal bar code for an item, click **Barcode** in the Identification section. Once a barcode has been generated, the BarCode Labels button becomes enabled. Clicking on this button section activates the remaining fields in the section and causes the **Preview** and **Print** buttons to appear at the top of the screen. You may then specify the quantity, size, and format of the labels to be printed. Two formats of Avery labels are currently supported. To preview the label sheet, click **Preview**. To print, click **Print**.

The Inventory/Ordering section of the screen contains information such as the quantity currently in stock, quantity on order, and the date of the last order for that item. The Reorder Level is the level of stock at which an item should be marked for reordering. Min Order Qty specifies the smallest amount to order at a time when building a new order for the item. If you know how many days it takes to fill an order, you can enter that information in the Order Lead Time field. The fields and their functions are listed in the following table:

Field	Description
Quantity in Stock	The amount of stock currently on hand.
Issue Unit	Indicates the number of units issued from stock when an item is used.
Last Order Date	The most recent date the item was ordered.
Qty on Order	The amount of the item currently on order.
Max Quantity	The maximum desired amount of stock for the item.
Order Unit	Specifies whether an item is ordered by Each, Case, Box, or Pack. Refer to the Packaging section.
Order Lead Time	The time in days necessary to complete an order.

Field	Description
Reorder Level	Indicates the Par amount. When an item's Quantity in Stock drops below this number, the item will be highlighted in red on the Inventory Overview screen.
Min Order Qty	The smallest amount of the item that should be ordered.
Critical Quantity	The amount of an item that must be in stock at any given time.

In the event that you perform cycle counting, the Cycle Counting section is where you specify the cycle count class of the given item (see section 4.6.2 'Inventory Maintenance'). The fields and their functions are listed in the following table:

Field	Description
Cycle Count Class	A, B, or C, depending on the Cycle Count frequency
Last CC by Item	Displays the last time a Cycle Count by Item was performed on the selected item.
Last CC by Location	Displays the last time a Cycle Count by Location was performed on the selected item.
Last CC by Item w/Attr	Displays the last time a Cycle Count by Item with Attributes was performed on the selected item.

The Receiving/Putaway section contains information regarding an item's storage location, serial and lot numbers, and expiration dates (see section 4.6.2 'Inventory Maintenance'). The fields and their functions are listed in the following table:

Field	Description
Receive Item Into	Specify the location that the item will be stored.
Qty To Receive	The amount being stored at the stated location.
Lot Number	A number provided by the manufacturer for tracking purposes.
Expiration Date	Expiration date of the item, if applicable.
Serial Number	A unique number given to an item.
Attribute Bar Code	A bar code containing the serial number, lot number and expiration date of an item.

NOTE
Your system must be configured to use the Attribute Bar Code. For assistance, please contact your Philips Healthcare representative.

The Transfer section allows you to transfer items from one storage location to another. The fields and their functions are listed in the following table:

Field	Description
Transfer Amount	Specify whether the Entire Quantity or Partial Quantity of an item is to be transferred
Location Qty	The desired amount of items to be transferred, if Partial is selected.
From	Specify the current location of the items to be transferred.
To	Specify the destination of the items to be transferred.

The Miscellaneous section contains information about item substitutions. The fields and their functions are listed in the following table:

Field	Description
Substitute Part Exists	Denotes whether a similar item may substituted for the currently selected item.
Substitute Information	Information regarding the use of a substitute part.
Comments	Enter additional notes or comments.

Category Maintenance

Inventory categories are designed to group similar inventory items and to link items with charting in menus (see *"Charting a Procedure" on page 30*). Inventory items may belong to more than one category. An item can be placed in a category in the Item Maintenance screen or added from the Category Maintenance screen. The category is then associated with inventory items in the menu builder (see section 4.11 'Menu Builder'). You can create categories by vendor or size, but keep in mind if the categories are too general they may generate a large charting detail list (see *"Charting a Procedure" on page 30*). You may also export your category list to Excel by clicking **Export**.

Adding, Editing or Deleting a Category

To add a category, access the Category Maintenance screen. Type a name in the Category field and, if you want, a brief description, then click **Save New**. Your new category appears in the list.

To edit an existing category, highlight the category in the list, make changes and click **Update** to save the changes.

To delete a category, highlight it in the list and click **Delete**. You will be prompted to click **Yes** to delete the category and all associated items, or **No** to cancel. The items are not deleted from inventory, only the category and its associations.

Adding Items to a Category

There are two ways to add items to a category. The first is to associate an inventory item with a category when you add the item to inventory:

1 Click the Categories drop-down list and select the category.

2 Click the **+** key to associate the item with that category, which will appear in the Categories list.

You may associate an item with multiple categories. If you find that you need to create a new category with which to associate an item, clicking the ellipse button opens the Category Maintenance screen.

The other option is to add items to a category from the Category Maintenance screen:

1 Click on a category in the list to highlight

2 Click the Part Number drop-down list and select a part number.

3 Click **Save New** to add the item to the category.

4 Clicking the ellipse button next to the Part Number drop-down list opens the Inventory Overview screen.

Once you have added items to a category through either method, you can view the associated items by clicking the **+** next to each category to expand the list of items.

Deleting Items from a Category

Deleting items from a category can also be done from the Category or Item Maintenance screens. To delete an item from a category in the Category Maintenance screen, expand the category items list, highlight the item you wish to delete, and click **Delete**. You will be prompted to click **Yes** to delete the item from the list, or **No** to cancel.

To disassociate an item from a category from the Item Maintenance screen, highlight the category in the Categories list and click the - key. Click **Save** to accept the changes or **Cancel** to cancel the operation.

Cycle Counting Maintenance

A cycle count is an inventory management procedure where a small subset of inventory is counted on any given day. Cycle counts differ from traditional physical inventory counting in that a physical inventory count stops operation at a facility until all items are counted, audited, and recounted. Cycle counts are less disruptive to daily operations, provide an ongoing measure of inventory accuracy and procedure execution, and can be tailored to focus on items with higher value or movement.

Ranking items into A, B, and C groups—either by value or volume—should be the basis for cycle counting schedules. As a sample configuration, inventory items belonging to group A could be counted once or twice a month, B items once or twice per quarter, and C items once or twice per year. Scheduling cycle counts can be done on the Configuration Settings screen.

Cycle Counting Overview

The Overview screen allows you to view existing cycle counts without making changes to the data. By entering data into the appropriate search criteria fields, you can search for certain cycle counts. To list all cycle counts, click **Search** without inputting any search criteria. Note that cycle counts are not generated from the overview screen.

As is the case with many search results pages, you may group cycle counts by any column or series of columns by clicking and dragging column headers to the blue section labelled “Drag a column header here to group by that column.” You can sort in ascending or descending order by clicking the column header. The search criteria fields and their functions are listed in the following table:

Field	Description
Repository	Allows you to review cycle count information for a specific repository.
Bar Code	Barcode number assigned to inventory item by the internal barcode generation feature.
Mfg Bar Code	Manufacturer’s barcode number.

Field	Description
Manufacturer Name	Name of the manufacturer.
Item	Name of the item.
Part Number	A unique identifying number. This can be a facility-generated number or the manufacturer's part number.
Mfg Part Number	The manufacturer's part or catalog number.
Location	The physical location where the item is stored.
Serial Number	Manufacturer's serial number
Lot Number	Manufacturer's lot number
Exp Date From	Specifies a starting expiration date for a search range
Exp Date To	Specifies an ending expiration date for a search range
Scheduled From	Specifies a starting scheduled cycle count date for a search range
Scheduled To	Specifies an ending scheduled cycle count date for a search range
Report Number	The cycle count report number
Completed From	Specifies a starting completed cycle count date for a search range
Completed To	Specifies an ending completed cycle count date for a search range
User Name	The user who scheduled the cycle count.
Max # of Records	The maximum number of records that will be returned after ***Search*** is clicked.
Status	CAN (canceled cycle count) CMP (completed cycle count) DIS (discrepancy in cycle count) NEW (new cycle count available) RCT (recount scheduled due to discrepancy or Item attribute) REP (report generated and available for cycle counting)
Type	Item (returns all items), Location (returns all items, separated by location), Item with Attributes (returns all items, separated by location, lot number, serial number, and expiration date)

To perform a search, enter the desired criteria and click **Search**. **Clear Criteria** resets all fields.

You may print your search results as a worksheet for performing a cycle count, or as a final report after adjustments have been made. To preview the report, click **Preview**, and click **Print** to print.

You may also export your search results to an Excel spreadsheet by clicking **Export**.

Cycle Count Generation

You can generate cycle counts on the Generation tab. By default, the Auto radio button is selected, so all criteria fields are inactive. To generate a cycle count:

1 With the Auto option selected, choose a type of report from the Type drop-down box (Item, Location, Item w/Attr).

2 If you want to generate a cycle count for different repository than the one you logged into, select the repository from the drop-down menu.

3 Click **Auto Generate** to generate the cycle counts, which are displayed in the lower half of the screen.

To manually generate cycle counts, click on the Manual radio button. This deactivates the **Auto Generate** button and enables all of the previously inactive Criteria fields. In addition to selecting a Type of report, you can then specify as many additional criteria as desired to search for the specific items you wish to count before clicking on **Manual Generate** to create a filtered list of cycle counts. A wild card can be used by inserting "%" before or after your search criteria. To remove an unwanted item from the list of pending cycle counts, select the row containing the item, then click **Remove**. Once all of the unwanted items have been removed, click **Save** to save the report for use on the Confirmation tab, or click **Export** to save the report as an Excel spreadsheet. The search criteria fields and their functions are listed in the following table:

Field	Description
Repository	Allows you to select a specific repository in which to generate a cycle count.
Bar Code	Barcode number assigned to inventory item by the internal barcode generation feature.
Mfg Bar Code	Manufacturer's barcode number.
Item	Name of the item.
Location	The physical location where the item is stored.
Part Number	A unique identifying number. This can be a facility-generated number or the manufacturer's part number.
Mfg Part Number	The manufacturer's part or catalog number.
Exp Date From	Specifies a starting expiration date for a search range
Exp Date To	Specifies an ending expiration date for a search range
Serial Number	Manufacturer's serial number
Lot Number	Manufacturer's lot number
Max # of Records	The maximum number of records that will be returned once SEARCH is clicked.
Manufacturer Name	Name of the manufacturer.
Type	Item (returns all items), Location (returns all items, separated by location), Item with Attributes (returns all items, separated by location, lot number, serial number, and expiration date)

Cycle Count Confirmation

After a cycle count list has been generated and saved, you can specify assorted criteria for retrieving available, non-completed cycle count reports on the Confirmation tab. Clicking **Search** without specifying any criteria displays the complete list of available cycle counts. Click **Generate** to create a worksheet for counting the items. The report contains the names and

locations of each item, the expected (Original) quantity on hand at each location, and a column where you can write the actual (or Audit) quantity for each item.

If you find discrepancies between the expected and actual quantities of an item:

1 Enter the Audit quantity in the column next to the item on the Confirmation tab.

2 When you have made all necessary adjustments, click **Save**. You will be prompted: “Would you like to generate a report before saving Audit Quantities?” Click **Yes** to generate a report, or **No** to continue.

3 You will then be prompted: “Have you adjusted the audit quantity on each row for discrepancies?” Click **Yes** to continue or **No** to cancel the operation. If you have adjusted the quantity for an item, you must proceed to the Discrepancy/Adjustment tab to complete the cycle count.

Cycle Count Discrepancy/Adjustments

If you have found and entered audit quantities for items on the Confirmation tab, you can check the quantities for any adjusted items under the Discrepancy/Adjustments tab:

1 Click **Search** to generate a list of items that were adjusted on the Confirmation screen. The items appear with the original and audit quantities. If a particular item is stored in more than one location, there will be a row for each location.

2 Click **Adjust** to accept the adjustments and record the new quantities to the inventory item records. The list clears automatically.

If you have adjusted the quantity of any item, Xper Information Management System automatically creates a recount (RCT) report for those items. To perform a recount and complete the cycle:

1 On the Confirmation tab, set the Status to RCT and click **Search**. The items available for recount appear in the list.

   If necessary, adjust the quantity in the Audit Qty column.

2 If you have made the necessary adjustments, click **Save** and proceed to the Discrepancy/ Adjustments tab to complete the cycle count (see above). Any adjusted items will once again generate a recount.

3 If no adjustments were made, click **Save** to complete the cycle count. Completed cycle count reports can be viewed in Cycle Counting Overview by setting the status to CMP and clicking **Search**.

Manufacturer Maintenance

The Manufacturer Maintenance screen contains data about the different manufacturers from which you may purchase inventory. Since the Manufacturer is a required field when building inventory, you must create a list of manufacturers prior to entering items.

To add a new manufacturer, simply fill out the fields and click **Save New**. The only required field is Name, but you may complete as many other fields as you would like. The new

manufacturer record appears in the list. The fields and their functions are listed in the following table:

Field	Description
Name	Manufacturer's name
Contact Name	Name of your sales contact
Contact Title	Title of your contact
Contact Email	E-mail address of your contact
Address 1	Address field (P.O. Box, Street address, etc.)
Address 2	Additional address information
City	City in which the manufacturer is located
Region	State or province in which the manufacturer is located
Mfg Abbreviation	Abbreviation or display name (optional)
Postal Code	Zip or postal code
Country	Country in which the manufacturer is located
Phone Number	Manufacturer's phone number
Fax Number	Manufacturer's facsimile number
Home Page	URL of the manufacturer's website
Active	Check to make manufacturer active in Inventory
Notes	Comment field

To edit an existing manufacturer's information, double-click on the item in the list, make changes at the top, and click **Update** to save the changes or **Cancel** to discard them.

To delete a manufacturer from the list, double-click on the item and click **Delete**. However, if you have active items in your inventory that are associated with the manufacturer you wish to delete, the application will not allow you to complete the procedure until you have deactivated or changed the manufacturer for these items. You can deactivate the manufacturer instead by unchecking the Active box and clicking **Update**.

You can search for a particular manufacturer by entering data in the criteria fields and clicking **Search**. You may preview and print a report of manufacturer data or export the report to Excel by using the **Preview**, **Print** and **Export** buttons.

Vendor Maintenance

The Vendor Maintenance screen serves much the same function as the Manufacturer Maintenance screen. Vendors are companies or organizations from which you may purchase items which are manufactured by other corporations. Unlike Manufacturer, Vendor is not a required field in item maintenance.

To add a new vendor, simply fill out the fields and click **Save New**. The only required field is Name, but you may complete as many other fields as you would like. The new vendor record appears in the list. The fields and their functions are listed in the following table:

Field	Description
Name	Vendor's name
Contact Name	Name of your sales contact
Contact Title	Title of your contact
Contact Email	E-mail address of your contact
Address 1	Address field (P.O. Box, Street address, etc.)
Address 2	Additional address information
City	City in which the vendor is located
Region	State or province in which the vendor is located
Vendor Abbreviation	Abbreviation or display name (optional)
Postal Code	Zip or postal code
Country	Country in which the vendor is located
Phone Number	Vendor's phone number
Fax Number	Vendor's facsimile number
Home Page	URL of the vendor's website
Active	Check to make vendor active in Inventory
Notes	Comment field

To edit an existing vendor's information, double-click on the item in the list, make changes at the top, and click **Update** to save the changes or **Cancel** to discard them.

To delete a vendor from the list, double-click on the item and click **Delete**. However, if you have active items in your inventory that are associated with the vendor you wish to delete, the application will not allow you to complete the procedure until you have deactivated or changed the vendor for these items. You can deactivate the vendor instead by unchecking the Active box and clicking **Update**.

You can search for a particular vendor by entering data in the criteria fields and clicking **Search**. You may preview and print a report of vendor data or export the report to Excel by using **Preview**, **Print** and **Export**.

Location Maintenance

The location maintenance screen allows you to maintain information on the various locations in which inventory items may be stored in your facility. The fields and their functions are listed in the following table:

Field	Description
Location	The name of the location
Active	Check if this location is being used to store items

Field	Description
Description	A brief description or comment (optional)
Section	The section within a specific location in which an item is stored (optional)

To add a new location, simply fill out the fields and click **Save New**. The only required field is Name, but you may complete as many other fields as you would like. The new location appears in the list.

To edit an existing location, double-click on the item in the list, make changes at the top, and click **Update** to save the changes or **Cancel** to discard them.

To delete a location from the list, double-click on the item and click **Delete**. However, if you have active items in your inventory that are stored in the location you wish to delete, the application does not allow you to complete the procedure until you have changed the location for these items (see *section 4.6.2 'Inventory Maintenance'*).

The list of locations, in addition to the fields above, also reports the date of the last cycle count performed on items stored in those locations. You may export your location data to Excel by clicking **Export**.

4.6.3 Inventory Ordering

The Inventory Order screens are used to create new orders, or to view existing orders and back ordered items. There are two screens: Build Order and View Orders. To access the Order screen, click MODULES > INVENTORY > ORDER.

The Build Order tab is where new orders are created. You may automatically build an order consisting of all inventory items whose quantities are under par by clicking **Build Par Order**. You may also create orders for individual items. To manually create an order:

1 Select the manufacturer from the Manufacturer Name drop-down list or select the vendor from the Vendor drop-down list.

2 Select the part number from the Part Number drop-down list.

3 Select the appropriate unit from the Order Unit drop-down list. If you specified an order unit on the item's maintenance screen, it is automatically selected.

4 Enter the desired quantity in the Order Qty field.

5 Click **Insert Line** to create the order.

You may continue adding parts from the same manufacturer or vendor, or you may select a different manufacturer or vendor and create additional orders. You may delete any line by highlighting it in the list and clicking **Delete**. Clicking **Clear Orders** clears the screen without saving. When you are finished creating orders, click **Save Order** to generate an order report, which is automatically displayed in a preview window from which you can print. If you placed orders with more than one manufacturer or vendor, each order appears on a separate page.

The View Orders tab allows you to keep track of your orders. You may search for orders using any combination of criteria, then clicking **Search** to display results. The default grouping is by Order Number, then date, and manufacturer and order status. You can also use the filters to

the left of the **Search** button to narrow your view. If you would like to see any orders that are complete, have been voided, or are on back order, check the **Yes** box, or check the **No** box to see orders that do not meet any of these criteria. If no boxes are checked or other criteria indicated, all orders are displayed. Clicking **Preview** generates a report displaying each order on screen along with its status. You may then print the report by clicking **Print**.

To process incoming orders, click **Confirm**. Additional columns are activated on the right side of the Order Results screen. The additional columns and their functions are listed in the following table:

Column	Description
Unit Rec	The received unit. Note: this should match the Order unit of the item.
Qty Rec	The quantity received (may be a partial quantity).
Complete	Check if the order is completed.
Void	Check if the order is voided.
Back Order	Check if the order or any part of it is on back order.
Expected Date	The date the remaining number of items is expected.
Modified	If a row has been modified by a user, this box will be checked.

To receive a complete order:

1 Check the COMPLETED box.

2 Select a location from the LOCATION drop-down menu.

3 Click **Save**. The total quantity and location quantity for the item is updated and may be verified on the Inventory Overview screen.

To receive a partial order:

1 Select a unit type from the UNIT REC drop-down menu.

2 Enter the quantity to be received into the QTY REC field.

3 Select a location from the LOCATION drop-down menu.

4 Click **Save**.

To receive a completed order into multiple locations:

1 Select a unit type from the UNIT REC drop-down menu.

2 Enter the quantity to be received into the QTY REC field.

3 Select a location from the LOCATION drop-down menu.

4 Click **Save**.

5 Click **Search** and **Confirm** to refresh the order status.

6 Repeat as necessary for each remaining location.

You may preview, print and export order data by using the appropriate buttons at the top of the screen.

4.6.4 Inventory Transactions

The Inventory Transactions screen is where you may view the log of all actions that have taken place in the Inventory module. To access the Transactions screen, click **MODULES > INVENTORY > TRANSACTIONS**.

The Transactions log tracks the following:

- Cycle Count adjustments
- Orders placed
- Orders received
- Orders inserted by Inventory Import Wizard (if you had entered order information in your import spreadsheet)
- Items received and the location to which the items were received
- Items transferred and the location to which the items were transferred

The log also displays the user who performed each action.

To view all inventory transactions, click **Search**, or you may filter search results by entering criteria in the appropriate fields. Search results can be grouped by any column header by dragging and dropping the column header into the dark blue section of the screen located at the top of the list. Clicking on any column header sorts the list by that data. The results can be saved as an Excel spreadsheet by clicking **Export**.

4.6.5 Importing Inventory

Rather than build your inventory manually, you may import inventory data from an Excel spreadsheet. To open the Data Import Wizard, click **TOOLS> INVENTORY IMPORT**, then click **Import Wizard**. A message asking you to be sure the part number are correctly assigned the barcodes in the spreadsheet appears. Click **OK** to continue or **Cancel** to cancel the import. After clicking **OK**, the file type, Excel spreadsheet, is selected by default in the Import Wizard window. To continue:

1 Click **Next >**.

2 Use the ellipse button to browse to your Excel file. You may also select ANSI or ASCII file origin.

3 Click **Next >.**

4 Set any necessary data formats, such as delimiters, currency symbols, etc.

5 Click **Next >** to display a preview of the spreadsheet. Click on the header of each column to select the data field to which you will import the column data.

6 Click **Next >** to check the mapping of the spreadsheet columns to the data fields in the inventory module (e.g., if your part numbers are in column C of your spreadsheet, map the Part_Number destination field to source column C).

7 Click **Next >** to preview your mappings. If you have mapped a column to an incorrect destination field, click < BACK to make corrections, then **Next >** to check your mappings.

8 Click **Next >** to view the Summary page

9 Click **Execute** to complete the process.

4.7 Query Wizard

The Query Wizard module allows users to query their data and compile statistical reports, extract data elements to other formats (Microsoft® Excel™ and Access™) or write more complex SQL queries. To access the Query Wizard, click **MODULES > QUERY WIZARD**.

The first step in performing a query is to specify a date range (section 1). To set the range, you may use one of three methods:

1 Select one of the choices from the Range box (last three months, last 6 months, etc.);

2 Manually enter a From date and To date in the Exact Dates section, or

3 Use the calendar tools to set the From and To dates.

After you have specified a date range, you may click **Search** to find all the patients that exist for those dates, or you may want to refine your search to patients who match specific criteria (e.g., all patients who received a specific medication, or all cases performed by a specific physician). If you wish to set up additional search parameters, click **Next** to activate the Query Parameters section (section 2).

To create a new filter (a set of search parameters):

1 Click **New**;

2 Assign a name to the filter;

3 Click **Save**. This activates the Parameters window.

4 Click **Add** to create a search parameter. Parameters can be created for data fields or charting elements.

To create a data field parameter:

1 In section A, select an operator (AND, OR, NOT, AND NOT, OR NOT) to activate the Folder list;

2 From the Folder list, select the source screen (Case Details, Hemodynamics, etc.);

3 From the Fields list, select the desired field and click **Next**;

4 In section B, select the appropriate statement (equals, between, is greater than, etc.);

5 In section C, set the value to search for. If you have selected a field that could have a high and low range (e.g., Age), you will be able to set the high and low values.

6 Hit **Enter** on the keyboard and click **Save Filter**.

To create a charting element filter:

1 In section A, select an operator (AND, OR, NOT, AND NOT, OR NOT) to activate the Folder list;

2 From the Folder list, select Charting Menus;

3 Select a modality;

4 Select the menu;

5 Chart through the entire line, then highlight key words from the charting results and drag to the VALUE field

6 If the text you are searching for could appear in more than one menu, check IN ALL MENUS;

7 Click **Save Filter**.

After creating a search filter, click **Search**. The list on the right populates with matching cases. You may then select an output type from Section 3:

1 Fixed Report, one of a number of pre-configured reports;

2 Export to Microsoft® Excel or Access;

3 View the filter's SQL statement;

4 Import the current query statement into the Advanced query module.

This system contains an Advanced query module where users can create raw SQL queries, custom reports and charts. The Advanced module is intended for users who have experience in writing SQL statements. For more information and assistance, contact Customer Support.

You may also create a custom report incorporating a wide range of formats and data. To create a custom report:

1 Click the Custom Reports tab in Section 3.

2 Click **Add** to open the Custom Report writer.

3 Enter a name in the field labeled "Report Layout Name.

4 Select a format (bar graph, pie chart, raw data, matrix) in step A.

5 Click **Next** to activate step B.

Depending on the format you selected, you are now able to identify the data fields to be used in the report.

To create a bar graph or pie chart:

1 Select the X field (the parameter that appears on the X, or horizontal, axis of the graph).

2 Select the calculation to be performed. You may select Average, Total or Difference.

3 Select the Y field (the parameter that appears on the Y, or vertical, axis of the graph).

NOTE
If you selected Difference, you will be prompted to enter two fields. The first of the two Y fields should be the larger value, and the second should be the smaller value.

4 If desired, you may select a field by which to group the results.

5 Click **Next**. You may then save, preview and save, or cancel without saving the report.

To create a matrix:

1 Select up to three (3) X fields.

2 Select up to three (3) Y fields.

3 If desired, select a field by which to group the results.

4 Click **Next**. You may then save, preview and save, or cancel without saving the report.

To create a raw data report:

1 Select up to six (6) fields, clicking **Add** after each one.

2 If you want to group by a particular field (e.g., room number), select the field and check GROUP, then add the field.

3 You may add a user-defined label by entering the desired text in FIELD LABEL. The custom label appears as the column header on the printed reports.

4 You can adjust the order in which the data columns appears by highlighting a field and using the UP or DOWN arrows to move the field.

5 If you would like to customize the look of your report (e.g., change column width, column headers, add calculations, etc.), check the box labeled Use Custom Design, then click **DESIGN** to open the custom report designer. For more information on using the custom report designer, please contact Customer Support.

6 Click **Next**. You may then save, preview and save, or cancel without saving the report.

Once you have created a custom report, it is available in the Custom Reports list to be run on demand. Simply run a search and select the custom report you wish to run.

Batch Reporting

Batch reporting allows you to schedule reports to print automatically at a selected interval (e.g., daily, weekly, monthly, etc.).

4.8 Kit Builder

Kits are a special tool in this system that allows you to incorporate inventory items, procedures, and charting elements in a “kit” that charts all elements with a single click. To access the Kit Builder, click **TOOLS > KIT BUILDER**.

The list of current kits is at the top of the screen. You can review the contents of a kit by clicking **+** next to a kit name to expand the tree view. You can search for a particular kit or kit type using the search fields. The fields and their functions are listed in the following table.

Field	Description
Kit Name	Searches for a kit by name.
Type	Searches for kits that contain a particular item type (Menu, Billing Procedure, Inventory).
Item	Searches for kits containing a specific item.
Description	Searches for a kit by description.

To perform a search, enter the desired parameter and click **Search**. To clear the search parameters and perform a new search, click **Clear Criteria**.

Creating a Kit

To create a kit:

1 Click **Add**.

2 Enter a name in the Kit Name field. You can then add one of three types of item:

- Menu: items from the charting menus;
- Inventory: items from currently active inventory;
- Billing Procedures: active items from the Procedures table (see *section 4.17 'Coding'*).

To add a menu item:

1 Select the modality from the drop-down list on the left.

2 Select the menu from which you want to chart.

3 As you click through the menu choices, the line is added to the kit. You can put as many items as you wish from any menu, with the exception of Inventory items.

To add an inventory item:

1 Find the item under the Inventory tab at the bottom left.

2 Double-click to move the item to your kit.

You may search for inventory items in the Kit Builder just as you can in Inventory Maintenance (see section 4.6 'Inventory Management'). The search fields and their functions are listed in the following table.

Field	Description
Item	Search by item name.
Part Number	Search by item part number.
Mfg Part Number	Search by manufacturer's part number.
Barcode	Search by internally generated barcode.
Mfg Bar Code	Search by manufacturer's barcode.
Location	Search by inventory location.
Manufacturer	Search by manufacturer name.
Category	Search by inventory category.
Max Records	Select the number of records to return (100, 500, 1000, or All).

To add procedures:

1 Click the Billing Procedures tab at the bottom left.

2 Select the desired modality.

3 Double-click the procedure you want to add.

You can search the procedures list by entering a search string in the Procedure field and clicking **Search**. To search a partial string, use the "%" symbol as a wild card (e.g., "%heart" will return all procedures containing the term "heart").

Once you have added all necessary items, click **Save** to save the new kit, or **Cancel** to discard it. You can now create a menu item linked to the kit that, when charted, places all items within the kit into the appropriate menus in a patient study (see *section 4.11 'Menu Builder'*).

Editing a Kit

To edit a kit:

1 Select the kit name in the Kit Entries list.

2 Click **Edit**. You will be prompted to confirm that you have selected the kit you wish to edit.

3 Click **Yes** to continue, or **No** to cancel and select a different kit.

4 Once the kit has loaded, you may add any of the three types of item.

5 You may also change the order in which items appear in the kit (and the order in which they will be entered in charting), by using the Move Up and Move Down arrows.

You may also remove items. Highlight an item, then click **Remove**, or you can remove all items from a kit by clicking **Clear All**.

After you have made all necessary changes, click **Save**, or click **Cancel** to discard the changes.

4.9 List Management

The List Management module allows you to import lists to be used in charting menus (see *section 4.11 'Menu Builder'*). The list may be an Excel spreadsheet, or it may be a CSV (comma separated values) list. To access the List Management module click **TOOLS > LIST MANAGEMENT**.

To import a list:

1 Enter a name for the list (e.g., "Interventional Physicians").

2 If a user is required to enter a serial number when charting items from the list, check the box labeled "Serial Number required."

3 Click **Import Wizard**.

4 Click the ellipse button to browse to your file. You may also select ANSI or ASCII file origin.

5 Click **Next >**.

6 Set any necessary data formats, such as delimiters, currency symbols, etc.

7 Click **Next >** to display a preview of the spreadsheet. Click on the header of each column to select the data field to which you will import the column data.

8 Click **Next >** to check the mapping of the spreadsheet columns to the data fields in the inventory module (e.g., if your part numbers are in column C of your spreadsheet, map the Part_Number destination field to source column C).

9 Click **Next >** to preview your mappings. If you have mapped a column to an incorrect destination field, click **< Back** to make corrections, then **Next >** to check your mappings.

10 After importing a list, you may preview it by clicking **View**. If you are not satisfied with the list, click **Reimport** to repeat the process and make any changes.

After importing a list, you may want to designate titles for the columns, which can be used as key words when building scrapers. To rename column headers:

1 Highlight the name of the list and click **Load Import**. The list will appear in the Imported Table window.
2 Click on a column to load the title into the Column Name window.
3 Rename the column and click **Update**.
4 Continue until all column titles are changed.
5 You may delete a column entirely by highlighting it and clicking **Delete**.
6 Click **Save Changes** to save the new titles, or click **Cancel Changes** to discard.

Once a list has been successfully imported, you may associate it with an item in the Menu Builder so that it can be used when charting a procedure (see *section 4.11 'Menu Builder'*).

If you have unwanted lists or lists you no longer want to use, you may hide them so that they will no longer be displayed in List Management or in the Menu Builder. To hide a list, uncheck the Active box next to the list name. To display inactive lists, uncheck the Show Only Active box.

4.10 Registry Lists

The Registry Lists module is specifically meant to enable users to maintain the lists utilized by the ACC Registry screens. These include Medications, Closure Devices, Lesion Segments, and Intracoronary Devices. The ACC updates these lists frequently, so it is important to maintain the lists by making any necessary additions or to hide obsolete items.

To add a new item to one of the lists:

1 Click **TOOLS > REGISTRY** LISTS to open the module.
2 Select the list you wish to edit from the List Name drop-down menu.
3 Enter the description of the new item in the Display Value field.
4 Click **Add New**. The entry will be added to the bottom of the list.

To update an item:

1 Select the correct list from the drop-down menu.
2 Double-click the item you wish to update.
3 Make the desired change in the Display Value field.
4 Click **Update** to save the change.

To hide an obsolete item:

1 Select the correct list from the drop-down menu.
2 Double-click the item you wish to hide.
3 Check the Hidden box next to the Display Value field.
4 Click **Update** to save the change.

4.11 Menu Builder

The Menu Builder utility is a powerful tool that gives you the ability to fully customize your charting menus. You can create menu sets for each modality, edit existing menus, copy menus from one modality set to another, or delete unused or unwanted menus.

To access the Menu Builder, click **TOOLS > MENUS BUILDER**. The builder opens in the default modality (X-Ray Angiography). To edit menus in a different modality, click the MODALITY drop-down list and select the modality in which you wish to work.

4.11.1 Menu Builder Screen

The Menu Builder screen consists of several sections:

- Main Menus list: Located on the left side of the screen, this is the list of existing menus for the selected modality. You will also find the command buttons to **Add**, **Delete**, or **Duplicate** a menu.
- Current Menu: The top center section of the screen is the section in which you will build and edit menu entries.
- Fixed Items/Global Fixed Items: The bottom center of the screen contains groups of fixed items (see below) that are used when building or editing menus.
- Edit Tools: At the very bottom of the screen are the tools used to insert charting statements into a menu, to save entries, or to delete existing line items.
- Menu Characteristics: The right side of the screen contains several tools for building special functions into your menus and to change the layout of the charting line items within a menu (see below). There is also a notification message to tell you whether you have selected a regular menu item or a fixed item in a group.
- Modality Selection List: This drop-down list allows you to select the menu set for the specified modality.
- Menu Status: The window at the top of the screen will indicate whether the menu can be edited, or whether it is locked by another user. If the status window displays a “READ ONLY” message and the menu builder title bar is highlighted in red, another user is currently working in that menu, and you will not be permitted to make changes until the other user has released the menu. A “READ/WRITE” status indicates that you can make changes to the menu.

You will also notice that the left margin of the Main Menus section and top margin of the Fixed Items section are collapsible. You can temporarily close these sections to give yourself more room to work by clicking on the arrows. Clicking the arrows a second time reopens these sections. You can also click and drag the arrows to resize these sections.

4.11.2 Creating and Deleting Menus

To create a menu:

1 Select the desired modality.

2 Click **Add** at the bottom of the Main Menus section. The Current Menu section clears, and the cursor flashes in the MENU DESCRIPTION field.

3 Type in the name of your new menu and select a menu icon from the Image drop-down list.

4 Click **Save** at the bottom right. The new menu (with icon) appears in the list at the left. The menu title also appears at the top of the Current Menu section.

To delete a menu:

1 Click on the menu title in the Main Menus list.

2 When the Current Menu screen has updated to display the selected menu, click **Delete** at the bottom left.

3 You will be prompted: “Are you sure you want to delete the following menu: {Menu Name}?” Click **Yes** to delete (or **No** to cancel). The menu will be deleted from the list.

To duplicate a menu to a different modality:

1 Click on the title of the menu you want to duplicate.

2 Click **Duplicate** at the bottom of the menus list.

3 You will be prompted: “Are you sure you want to duplicate the following menu: {Menu Title}?” Click **Yes** to proceed.

4 You will then be prompted to choose the modality to which the menu will be copied, and to rename the menu (if desired).

5 Click **Duplicate** to proceed. Once the menu has been duplicated in the selected modality, the system will report “Menu has been duplicated.”

6 Click **OK** to clear the message.

7 Choose the modality from the drop-down list. Your new menu will appear in the Main Menus list, where you can make any changes.

4.11.3 Building and Editing Menus

Levels and Sublevels

Once you have created a menu, you need to build charting statements into it. The menu structure is a tree view, with levels and branching sublevels.

To begin adding levels:

1 Click on the menu title at the top of the Current Menu section and click **Add Sublevel**.

2 Type the first line of charting into the Menu Description field.

3 Click **Save**. The line will be inserted under the menu title in the Current Menu field. If you want to create a “remark” statement that will be seen on screen as instructions to the users, but will not be charted into the procedure, you must enclose it with vertical pipes (|REMARK|).

To add subsequent lines on the same level, click on the new line item, then click **Add at Current Level**. Type in the next line item and click **Save**. You will now have two line item entries in your menu.

But what if the entries you have added have associated sublevels? To add sublevels:

1 Highlight the line item in the first level (**not** the menu title).

2 Click **Add Sublevel**. You can then type in the first associated entry.

3 Click **Save**. You will now see a sublevel under the "parent" line item.

4 Continue building your menu, using either **Add at Current Level** or **Add Sublevel** to place your entries where you want them. Your menu will start to expand into a "tree" view of levels and sublevels.

To delete a line item from any level, highlight the item and click **Delete**. You will be prompted: "Are you sure you want to delete the following node: ……" Click **Yes** to delete the item, or **No** to cancel.

NOTE
If the item you are deleting has sublevels associated with it, they will also be deleted.

Variable Items

Variable items, when built into a menu, prompt the user to enter data from the keyboard, such as the amount of a medication administered during a procedure, a date, or name. The essential characteristic of a variable item is the DATA TYPE, along with the optional elements of UNIT TYPE and MASK. To create a variable item, use **Add at Current Level** or **Add Sublevel** and enter text into the Menu Description field, then check the VARIABLE ITEM box. You then assign the data type to the new item.

There are seven data types that you can assign to a variable item:

Data Type	Definition
Text	accepts any keyboard character, alpha, numeric, or other.
Number	accepts whole numbers (see Float).
Date	accepts a date. The default format is MM/DD/YYYY.
Time	accepts a time. The default format is HH:MM:SS in military time.
True/False	accepts a "True" or "False" response.
Float	accepts a numeric value containing decimals (see Number).

After you have chosen the data type, you can use the MASK element to change the format, if you wish. For instance, you might want to change the date format to DD/MM/YYYY. If you want to use the default format, you do not need to assign a mask. You can also create your own custom masks.

The final element of a variable item is the Unit Type. Assigning a unit type attaches text to a variable entry typed by a user. For example, you may create a variable item using the data type Number, "Heparin drip @," and assign a unit type of units/hr. When a user charts a Heparin

drip and is prompted to enter the amount, the application will attach “units/hr” to that entry. The resulting charted entry might read: “Heparin drip @ 1000 units/hr.”

Items can be added to the Unit Type list if you need them. To do this, click the ellipse button next to the Unit Type drop-down list. This opens the Unit Type edit window. To add a new unit type.

1 Click **Add**.
2 Enter the desired text in the Display field. Enter a description in the Description field if desired.
3 Click **Post** to add the new type to the list.

You can edit an existing item by highlighting it and clicking **Edit**. Make the desired changes, then click **Post** to save the change.

To delete an item, highlight it and click **Remove**. Click **OK** to save and close the Unit Type window. Click **Cancel** to exit without saving.

Fixed Items and Global Fixed Items

In some cases, you may want to use the same group of items as a sublevel for more than one line item. While you could type in the same entries over and over, the Fixed Items section allows you to build the group once, and then assign it to the line items you have already created. If you want to use the same group for more than one menu, you will create a Global Fixed Items group. Either way, the process is the same.

To create a new group, click in the Fixed Items (or Global Fixed Items) section and click **Add Groups**. Type the name of your group in the Menu Description field and click **Save**. Your new group title appears in the list. From there, simply use **Add Sublevel** to insert the line items within your group. It is basically the same process as building the menu itself. You can build sublevels and include variable items, whatever you need to do.

Once you have built your group, you can add it to the line items above by clicking on the title and dragging it up to the item or items to which it belongs. You can even drag a group onto another, previously placed, group item. If you need to make changes to a group, the changes are automatically applied to the menu items, so you do not have to reassign the group. To remove a group from a menu item, highlight the item and click **Remove Fixed Levels.**

Global Fixed Items are built and work in the same manner. The difference is that a global group are available for all the menus in a modality, whereas normal groups are available for use only in the menu in which you created them.

Inventory Items

Inventory items are a special function within the menus. When you create an inventory item in a menu, you associate it with an inventory category (see section 4.6 ‘Inventory Management’). When the item is charted, the user is presented with a list of the items belonging to that category. The user can then select the correct item from the list, or can use the barcode gun to enter the item. Once the item has been charted into a patient record, it is decremented from inventory, and a charge for the item is generated on the patient’s bill.

To create the inventory item in the menu, use **Add Sublevel** to insert the item in the Menu Description field, then check the Inventory Item box and select the category from the drop-down list. Typically, inventory items are enclosed by French brackets ({Sheath}), but this is not required.

NOTE
In order to build inventory items into a menu, inventory must be present and assigned to a category. For more information, see the section on Inventory.

Kit Items

Kit items work in much the same way as the Inventory items. Once you have built charting kits (see *section 4.8 'Kit Builder'*), you can enter a line in a menu and check the Kit Item box, then associate the line item with a specific kit using the Kit Name drop-down list. Like Inventory, you must first build your kits before associating them with line items in a menu.

List Items

List items also work in much the same way as the Inventory items. Once you have imported a list (see *section 4.9 'List Management'*), you can enter a line in a menu and check the List Item box, then associate the line item with a specific list using the List Name drop-down list.

NOTE
ACC Registry lists are not imported using the List Management module, but may still be associated with menu items. For information on ACC Registry lists, see section 4.10 'Registry Lists'.

Menu Attributes

Menu attributes are special characteristics that are applied to all the entries in a menu. They are divided into three categories: multiple menu attributes, which may be assigned to as many menus as desired, single menu attributes, which may be assigned to only one menu in any repository, and line item attributes, which are assigned to line items within a menu. The attributes and their functionality are listed in the tables below:

Attributes - Multiple Menus

Attribute	Description
Bolded	Displays charted items in bold text and prints charted items in bold font in the procedure log.
History	Charting from designated History menus will populate a study created by the Readmit function.
Synopsis	If checked, the entries from a Synopsis menu will print in the Case Synopsis report. If not checked, entries from the menu will not appear on the Synopsis report.
Lesion	Turns on automatic lesion numbering when charting in the specified menu.
No Free Text	Disables the Free Text function for the specified menu.
Exclude from Log	When checked, charted items from the menu will be excluded from the study's procedure log.

Attributes - Single Menu

Attribute	Description
Coronary	Indicates the menu in which statements from coronary arterial trees will be inserted.
Peripheral	Indicates the menu in which statements from peripheral arterial trees will be inserted.
Monitoring	Indicates the menu in which statements will be placed when using the MARK feature in monitoring.
Inflate	Indicates the menu in which statements from the Merit Intellisystem will be placed.
Dictation Support	Indicates the menu in which data from Nuance Powerscribe 360 will be inserted.
Ext Data	When checked, data from external systems, such as GE MacLab, will be imported into the menu.
Epic Events	Indicates the menu in which statements from the Events information from Epic Cupid will be placed.
Epic Medication	Indicates the menu in which statements from the Medications information from Epic Cupid will be placed.
Epic Staff	Indicates the menu in which statements from the Staff information from Epic Cupid will be placed.

NOTE
If a single menu attribute is already assigned to a menu in your repository, and you attempt to assign the same attribute to another menu in the same repository, you will receive a warning that the attribute is already assigned to a menu. You must remove the attribute from the first menu in order to assign it to a different menu.

Attributes - Line Items

Attribute	Description
Sedation	Indicates a line item that will be used to build a sedation agent scraper.
Reversal	Indicates a line item that will be used to build a reveral agent scraper.

Sedation/Reversal Scraper Attributes

The line item attributes, Sedation and Reversal, are assigned to levels within the menu. These attributes mark the line items as keys that will be used in creating data mining scrapers for sedation agents and reversal agents on the Sedation Flowsheet. The medications must be charted in a specific order: medication name, dose, unit of measure, route of administration (e.g., Versed 2 mg IV). If the medication is charted in any other order (e.g., 2 mg Versed IV), the scraper will not work. For more information on building sedation and reversal agent scrapers, see *section 4.2.2 'Scraper Creation'*.

NOTE
Sedation and Reversal Agent keys should be a single word or phrase, rather than the medication name itself. It is suggested that you create a level 1 line item, such as {Narcotics/Sedation} or {Reversal} to be used as the scraper key.

Layout Operations

The Layout Operations tools enables you to move items exactly where you want them. If you have entered a line item that should be a sublevel of another line, simply click on the item and drag it to the “parent” level. To move a sublevel out from under another entry, highlight it and use **Move Left** to place it on the correct “branch” of the menu tree.

To change the order in which items appear on any level, use **Move Up** and **Move Down**. Using **Move Up** moves an item as far as the top of its current level. **Move Down** moves it down the “branch” until you have reached the bottom of that particular “branch.” If an item is already at the top of its branch, **Move Down** is active. If it is already at the bottom, **Move Up** is active.

Apply Changes

Once you have completed work in a menu, click **Apply Changes** to save all changes. It is also a good idea to click this button periodically if you are making lots of adjustments to prevent data loss.

4.12 Arterial Tree Builder

Editing an Arterial Tree Template

You can change or replace the existing templates to meet your needs by using the tools already described. To change or replace a template, it is best to use a test case to work with. First, click on **TOOLS>ARTERIAL TREE BUILDER**, then select the template you wish to change. Use the Tree Editing, Move, and Vessel functions to add, delete or redraw vessels, and adjust their size and position. The controls and their functions are listed in the following table:

Tree Editing Functions	
Control	**Description**
Art Label	Allows the operator to change the display label (top right corner) of a vessel.
Termination	Used when creating an arterial template.
Cusp Structure	Used when creating new templates to draw non-artery structures, such as the aortic cusp or kidneys.
Move Artery	Allows the operator to change the location of a vessel.
Move Note	Allows the operator to change the location of a note.
Note	Used to create and place notes on a tree.
Arrow	Used to draw directional arrows from one point to another.
Vessel Artery	Used to insert arteries into a template or tree.
Position	Used to change the position markers (proximal, mid, or distal) within a vessel.
Vessel Size	Allows the operator to adjust the diameter of a vessel using the scrollbar.
Undo	Allows the operator to undo the previous ten (10) operations.
Delete	Used to delete vessels, arrows, and notes.
Save Template	Saves changes to the selected template.

To draw a non-coronary structure (e.g, aortic cusp, kidneys, etc.), you will use the Cusp Structure tool. Click **Cusp Structure**, then select the type of structure you will draw. If you are editing a coronary template, you will need to create an aortic cusp on which you can place saphenous vein grafts. Use the other types (Structure 2 and Structure 3), to draw organs or other objects.

To add a vessel, click **Vessel Artery**. You will be presented with a list of vessels appropriate to the type of arterial tree you selected. Coronary trees will have a list of coronary vessels, while the peripheral trees will have the appropriate list of vessels for that system. Choose the type of vessel you wish to draw, or type in your own label and hit **Enter** on the keyboard. You will then be prompted to click on the point of origin of the new vessel. Draw the path of the new vessel, then click on the end point to complete the drawing.

NOTE
When drawing any object (i.e., vessel, arrow, etc.), do not hold down the mouse button. Click once and release, draw the path of the vessel or object, and click a second time to complete the process.

To delete a vessel, lesion or note, click **Delete**, then click on the object you wish to delete. If you wish to delete a note, click on the first character of the text.

The **Undo** control will reverse up to ten (10) previously performed functions, such as drawing lesions or grafts, moving vessels, or adding notes.

You may increase or decrease the diameter of a vessel by clicking **Vessel Size**. You will be prompted to select the vessel you wish to change, then use the scrollbar to increase or decrease the diameter.

NOTE
If you wish to change the length or tortuosity of a vessel, you must delete it before redrawing it.

You may move an artery, note or lesion to a different location on the tree. To move an artery, click **Move Artery**. Click on the artery you wish to move, then click on the position from which the vessel should originate. To move a lesion, click **Move Lesion**, select the lesion, and click on the new location within a vessel or graft.

Notes are the white text on a tree. They can be vessel labels or annotation added by a physician. To move a note, click **Move Note**. Click on the first character of the note you wish to move, then click on the new location. Be careful not to move a note to a location that obscures a vessel or lesion, or another note.

The vessel label is the green text that appears in the bottom left corner when you move your mouse cursor over the tree. You may change the vessel label by clicking **Art Label**. Click the vessel you wish to relabel, then select from the list or type in a new description and click the vessel. Move your mouse cursor over the vessel to confirm the change.

Some vessels do not terminate, but are open or tapered (e.g., left main coronary). In order to specify a different type of vessel termination, draw the new vessel. Click **Termination**. You will be prompted to choose one of three types: Closed (the default selection), Half Open, or Open.

Half Open will create a tapered vessel that is open at the end. Open will create an open vessel. Next, click on the vessel and the termination will change. You can then continue drawing.

Once you have completed the changes, click **Save Template** to overwrite the old template with the new. The new template will then be available for use when creating arterial trees.

4.13 Custom Forms

The Field Builder is a tool that can greatly expand your data collection and query capabilities. You can create custom data fields which can be placed on screens (or “forms”) which you configure using the Form Designer tool. The custom forms and fields can be accessed by operators during a procedure, or you can build data scrapers so that the fields are completed automatically as studies are charted. As data is collected, you can query it and create reports (see section 4.7 ‘Query Wizard’). To access the Field Builder and Form Designer, click **TOOLS > CUSTOM FORMS**.

Field Builder

The first step to customizing data collection is to create data fields. In the Select Work Area section, choose Field Builder to open the module.

To add a new field, click **Add Field**. This opens the Field Definition section. Required data is marked with an asterisk. The fields and their functions are listed in the following table:

Field	Description
Field Name	The name of the field in the database, used in querying data. NOTE: field names should be one word, or be connected by underscore (e.g., FIELD_NAME).
Display Name	The title of the field that will appear on the custom screen.
Page/Group	The group to which a field belongs.
Data Type	Identifies the type of data to be entered in the field.
Default Value	Optional default value that will appear in the field.
Definition	Optional description of the field.
Active	When checked, the field will be available in the Forms Designer. If unchecked, the field will be inactive, and will not be available for inclusion in new forms.

Creating a field is relatively simple:

1 Enter a field name. Field names should be one word, or should be separated using an underscore character (e.g., FIELD_NAME).

2 Enter a display name, or label. This is the text that will be viewed on the screen by the operators.

3 Enter a Page/Group name, or select from the existing groups using the drop-down list.

4 Select a data type. There are seven data types you can assign to a field:

Data Type	Definition
Text	accepts any keyboard character, alpha, numeric, or other.
Number	accepts whole numbers (see Float).
Date	accepts a date. The default format is MM/DD/YYYY.
Time	accepts a time. The default format is HH:MM:SS in military time.
True/False	accepts a “True” or “False” response.
Float	accepts a numeric value containing decimals (see Number).

5 Enter a default value, if desired. The default value will always appear in the field, but may be changed.

6 Enter a definition, if desired. This may help when placing the fields on a form.

7 Click **Save** to add the field to the group, or **Cancel** to discard the field.

To add a specific pattern to the field, click **Add Pattern**. It allows users to create field masks or use the samples already created. These field masks create their own acceptable data. Once the pattern is created, it can be assigned to as many custom fields as needed. The fields and their functions are listed in the following table:

Field	Definition
New Mask Name	the name of the mask created.
Mask Region	region/country appropriate for the mask (ALL, USA).
Input mask	pattern to display the information added to the field created.
Test input	the way the information typed is displayed on the field created. It does not accept information added out of the pattern established.
Sample	list of masks available to be used.
Description	description of the mask created.
Save	saves the mask created.
Cancel	discards the information changes/information added.

To facilitate data collection, you can also associate a list of responses with a field using the Text Properties window. The fields and their functions are listed in the following table:

Field	Definition
Valid Data List	entry window for inputting list items.
Max Letters	sets the maximum number of characters for a field.
Add (button)	adds an item to a list.
Del 1 (button)	deletes a selected item from a list.
Del All (button)	deletes all entries from a list.
Save (button)	saves a list to a text file.

Field	Definition
Load (button)	recalls a saved list to the window.
Display Style - Drop Down Fixed	creates a drop-down entry field that forces selection from a list.
Display Style - Drop Down Edit	creates a drop-down entry field that allows selection from a list or manual entry.
Display Style - Radio Group	creates a window containing list items displayed as radio button choices.
Select Pattern	allows the application of a pattern to a field (e.g., zip or postal code, social security number, etc.).
Sort List check box	when checked, sorts a list in ascending alphabetical order.

To create a list of responses for a field, type the desired entries into the Valid Data List, then click **Add** after each entry. You can also specify the maximum number of characters allowed in a field using the Max Letters setting. For example, a field set to a maximum length of 20 characters will truncate any response over 20 characters. You may also select the display style for a field, and sort the list alphabetically using the Sort List check box.

If you have created a list that you may want to use for multiple fields, you can save the list to a text file format by clicking **Save** in the Text Properties window. You will be prompted to select a name for the list and a location to save it. When you want to recall the list for use with another field, click Load and select the location and name. The saved list will be loaded to the window, and you can then save the new field.

To edit an existing field, double-click the field in the Field List on the left. You may then make any necessary changes and click **Save** to save, or **Cancel** to discard the changes.

The Field List contains all custom fields, sorted by group. You can quickly view a field and its attributes by expanding the tree view (click the **+** next to a group or field).

As you create more groups and fields, your list may become quite long, which can make locating fields somewhat difficult. You can easily find any field using the Find Field Definition window. You can search for fields using the Field Name or Definition, or selecting from the drop-down lists. The group in which the field appears is expanded in the Field List, and the field attributes appear in the Field Definition window. You may then click **Update** to make changes.

Form Designer

After you have created custom data fields, use the Form Designer to create screens that can be accessed by operators during a procedure, or by data scrapers. In the Select Work Area section, choose Form Designer to open the module. The Field List remains on the left.

The Form Designer screen consists of four sections. The Field List, which contains all the active custom fields available, appears on the left. The Form Management section contains the tools used to create a form appear at the top. The workspace is divided into two sections, the header section at the top, and the form section beneath it.

The header section allows you to place an element that appears at the top of every page in your form. You can place fields, boxes, labels, or even images. You can place the same

elements in the Form section, but you can also add pages so that you can organize your fields in a coherent order.

Creating a New Form

To create a new form:

1 Click **Load**. You will be prompted to enter a name for the new form.

2 Click **OK** to continue, or **Cancel** to start over.

3 You can now use the tools in the Form Management section to create your form. The controls and their functions are listed in the following table:

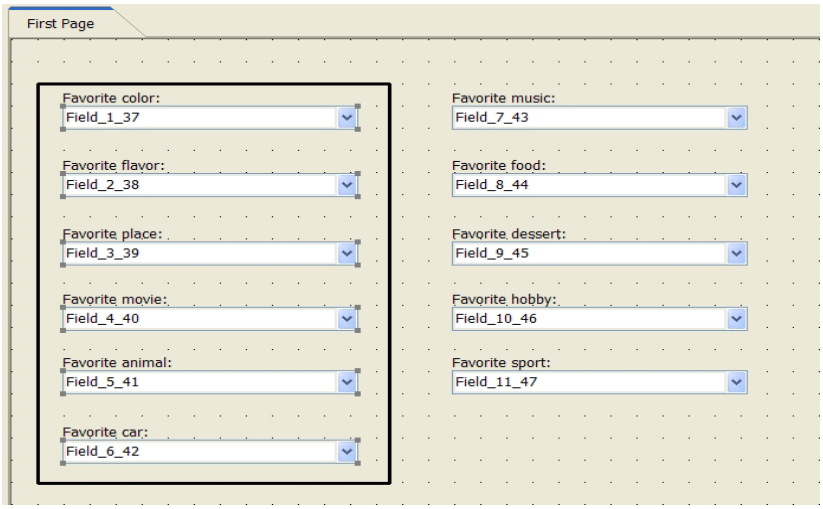
Control	Function
Load	Loads the selected form to the Designer window.
Save	Saves the selected form.
Delete	Deletes the selected form.
Unload	Unloads the selected form from the Designer window.
Preview	Previews the form as a user would see it.
1 Page	Adds a page to a form.
Box	Click and drag to create a box on the form.
1 Line	Click and drag to insert a divider line on the form.
Label	Click and drag to insert a label on the form.
Picture	Click an drag to insert a picture on the form.
Align Left 	Aligns the left edges of multiple selected items.
Align Right 	Aligns the right edges of multiple selected items.
Align Center 	Aligns multiple selected items on their center points.
Space Equally Vertically 	Spaces multiple selected items vertically.
Space Equally Horizontally 	Spaces multiple selected items horizontally.
Align Bottom 	Aligns multiple selected items along their bottom edges.
Align Top 	Aligns multiple selected items along their top edges.
Tab Order	Can be used to change the order in which users tab through the fields.
Grid Size	Changes the size of the alignment grid.

Begin building your form by selecting fields from the Field List and dragging them onto the form. You can arrange them in roughly the order and position you wish, then use the

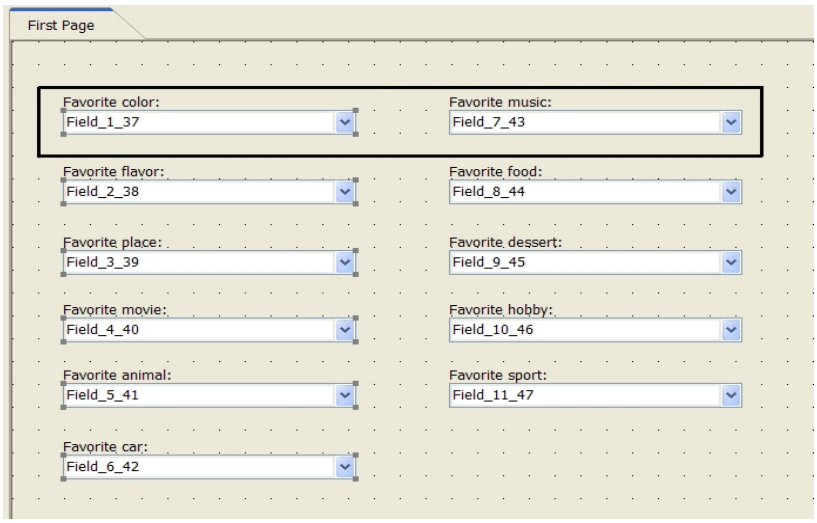
alignment tools to refine the appearance of the form. If you wish, you may change the grid size to make placement easier.

To align fields on the form, you must first select the group you wish to align. Hold the **Shift** key down and click on all the fields that need to be aligned, then click on the appropriate alignment control (right, left, center, top, or bottom). Depending on how you have arranged your fields (e.g., in two columns), you may have to group the fields more than once and in different combinations.

NOTE
The top and bottom alignment tools are used to align fields horizontally across a form, while the right, left and center alignment tools are used to align the fields vertically.



Align fields vertically using Right, Left, or Center



Align fields horizontally using Top or Bottom

Once you have aligned the fields, you can use the spacing controls to evenly space the fields horizontally or vertically.

You can group fields on a form by using the Box or Line tool. To insert a box around a group of fields:

1 Click **Box** and drag it to the form.
2 Enter a title for the box, then click **OK**.
3 You can then drag the box to the appropriate place on the form and drag the corners or sides to size it correctly around the desired fields.

To insert a horizontal line between groups of fields, click 1 LINE and drag it onto the form. You can then adjust the line's position, or adjust the length by dragging either end left or right.

To add a label, click **Label** and drag it to the form. Enter the desired text and click **OK**, then position the label wherever you want it.

To add a background image to a form:

1 Click **Picture** and drag to the form.
2 A window opens prompting you to point to the image file you wish to import. You may also select the image type (supported image types are JPEG, BMP, GIF, WMF, and ICO).
3 Once you have located the image file, click **Open**. The image appears on the form at the insertion point.
4 You may then resize the image by right-clicking on the image and selecting a percentage of the original size (100%, 50%, or 25%). You may also resize by dragging the corners or sides.

NOTE
Background images are not stored as part of the Xper Information Management System SQL database. If you use an image that is stored in a location that is inaccessible to other users (e.g., on your local hard drive), the image will not be visible on other users' workstations. It is recommended that you store the images in a central location on a server that is accessed by all Xper Information Management System workstations. If an image is not available to a particular workstation, the form appears without the background image.

You can add pages to your form by clicking 1 PAGE. You will be prompted to enter a title for the new page, then click **OK**. You may then place fields and other objects on the new page just as on the first. You may change the title of any page by right-clicking on the page tab, then selecting **Rename Page**. Enter a new title, then click **OK**. To delete a page, right-click on the page tab and select **Delete Page**, then click **Yes** to delete it, or **No** to cancel the operation.

Creating a Header

A header is an optional feature that will appear above all pages of a form. The Header section is located above the form section, directly below the dark blue line. Click into the grid area below the line and drag the bottom to resize your header section. You can then use the Form Management tools just as you did when creating your form to add images, fields or other elements, with the exception of pages.

Once you have created your form and header, click **Preview** to see how the form will appear to users and to check the functionality of the fields. Click **Design** on the preview screen to return to the Form Designer and make any necessary adjustments, then click **Save** to save the form.

Forms Configuration

After creating a form, you must associate it with a procedure modality in order to access the form during a patient study. On the Forms Configuration screen, click and drag the form to the desired modality (currently, only XA Cine Angiography is supported). The form will be available under the SCREENS drop-down menu when a study is open.

4.14 Case Status

The Case Status screen allows users to configure procedure status messages used by the Whiteboard viewer (see *"Patient Status Viewer" on page 27*). To create status messages:

1 Click into the Status Description field and enter the desired status text (e.g., Patient arrived in Holding).

2 Select the Status Parent from the drop-down menu (Pre-procedure, Procedure, or Post-procedure).

3 Select a status color, if desired (if no color is selected, the message color will default to white).

4 Click **Apply**.

The new status message will be available for use on the Status tab on the Case Details screen during a procedure.

To edit a status message, select the message from the list, make any necessary changes, and click **Apply**. To delete an unwanted status message, select the message in the list and click **Delete**.

NOTE
The "Removed" status message is a system message and cannot be edited or deleted.

4.15 Room Status

The Room Status screen can be used to monitor which labs are in use at any given time. Any station can be monitored, but only hosts and Patient Care Consoles are recommended.

To set up room status monitoring:

1 Click the Station ID drop-down menu and select the IDs of the stations you wish to monitor. Host stations are typically indicated by H (e.g., HA, HB, etc.), while Patient Care Consoles are typically indicated by M (e.g., MA, MB, etc.).

2 After selecting the desired station IDs, click **Save Monitored Stations**.

3 Periodically, click **Refresh** to update the screen.

4 To view a patient's procedure log, click on the patient's name. The log displays in the bottom half of the screen.

The Room Status columns will populate with data which can be used to update families, manage case flow, and even monitor a patient's procedure log. The columns and their functions are listed in the following table:

Column	Description
Status	Empty (no patient is active on the station), or Occupied
Station ID	The unique, two-letter identifier of each Xper workstation.
Name	Name of the active patient.
Procedure	Procedure 1 from the Case Details screen.
Physician	Physician 1 from the Case Details screen.
Event	Event from the Case Details screen (e.g., Patient In, Setup Done, Begin Time, etc.)
Time	The time stamp of the displayed event.
Case Number	The case number automatically assigned by Xper Information Management System on admission of a patient into the system.

4.16 Required Fields

The Required Fields module allows users to designate data fields and menu items as required elements in order for a case to be printed or closed. It ensures data integrity and more accurate query result. Required fields may be global, for use at all workstations, or local, for use at a specific workstation. You may also specify required fields for a particular user type (e.g., Nurse, Circulate, Physician, etc.)

To create a required field:

1 Click **TOOLS > REQUIRED FIELDS**. The Required Fields tab is selected by default.

2 Select the modality, if necessary.

3 Select the screen on which the required field appears. Available screens include the Case Details screen, the Sedation Flowsheet, and the ACC and ICD registry screens.

4 After selecting the screen, select the field from the Field Name drop-down menu.

5 If desired, select a resource type.

NOTE
If you assign a resource type to any field, you must assign resource types to the remaining fields in order for them to appear in patient studies.

6 Click **Save**.

To create a required menu element:

1 Click the Required Menus tab.

2 Select the modality, if necessary.

3 Select the menu in which the required element appears.

4 Chart the required element.

5 In the box below the menu, highlight the section of the line that indicates the required element. For example, if you want to make “Allergies” a required charting element, chart “Allergies: NKA” and highlight “Allergies.” If you highlight the entire phrase, the entire phrase will become the required element.

6 Drag the highlighted section to the Required Name list and release.

7 If desired, select a resource type.

NOTE
If you assign a resource type to any menu element or field, you must assign resource types to the remaining menu elements and fields in order for them to appear in patient studies.

8 Click **Save**.

9 If you do not want to specify a particular line, but just want to ensure that data is entered in the menu, click ANY DATA, then click **Save**.

After Required Fields have been set up, users are prompted to complete any missing required data elements prior to printing or closing a study. If the user double-clicks one of the items in the list, the application opens the appropriate screen and highlights the field in red. When the user enters the data and hits the **Enter** key, the application moves on to the next required field.

If you specified resource types for the required fields, the list that is presented is dependent on the user type(s) of the staff member who is logged in to the workstation. For example, if the user is a physician, he/she is presented with fields that have been assigned the Physician resource type. If a user has more than one type (e.g., Nurse, Recorder), the list presented is based on how the user has been identified in the Resources table of the study. That is, if the user was designated a Nurse on the Case Details screen, he/she only sees those fields that were assigned the Nurse resource type. If the user was designated a Recorder, the list only contains those fields that were assigned to the Recorder resource type.

If the user was not assigned as a resource in the study, the user sees all fields for his/her types (e.g., a user with both Nurse and Recorder types sees fields assigned to both Nurse and Recorder resource types).

If the missing data is a menu item, double-click the required menu item to open the indicated menu. When the user charts the required element, that element are cleared from the list, and the user may move on to the next item.

After all items have been completed, the user may print or close the study.

If the user needs to close the case prior to completion of the study, clicking **Cancel** on the required fields box allows the user to close the study and reopen it at a later time.

If you do not want users to be able to cancel Required Fields, or if you would like users to be required to enter their usernames and passwords in order to bypass the required fields, each Xper Information Management System Workstation must be configured to disable the Cancel button. Contact Customer Support for information and assistance in configuring your workstations.

NOTE
Closing a study using **HEMODYNAMICS > CLOSE CASE** automatically bypasses required fields, regardless of the workstation configuration. If you do not want users to be able to use this method to bypass required fields, you must disable the control in the user roles in Portal Designer (see *section 4.5.1 'User-Centric Navigation'*).

4.17 Coding

To access the Coding module, click **SYSTEM > CODING**. From there, you can select the particular screen you need to work with.

Tabs in the Coding Module:

- Procedures
- Procedural Codes
- Procedural Modifiers
- Diagnosis Codes
- Crosswalk
- Procedural Coding System (Tab is hidden unless opened)
- Diagnosis Coding System (Tab is hidden unless opened)

4.17.1 Procedures

The Procedures tab is where you associate your procedures with the corresponding billing (CPT) code, charge code, patient cost, and procedure group.

The Procedures table is an integral part of the system, and is used by many other modules, such as queries, kit building, billing, and transcription. The procedures you enter on this screen are used on the Case Details screen when performing studies, as well. The fields and their functions are listed in the following table:

Field	Description
Procedure	The name of the procedure (required).
Procedural Code	The CPT code associated with the procedure.
Charge Code	The charge code assigned to the procedure for billing.
Cost	The cost of the procedure that will be billed to the patient.
Type	The type of procedure: General, Diagnostic, Interventional.
Procedure Group	The group to which the procedure is assigned (see ***section 4.18.9 'Procedure Groups'***)
Provider	See ***"Insurance Providers" on page 138.***

To enter a new procedure, type the name in the Procedure field. You may also enter or choose a CPT code or charge code. Click **Save New** to save the procedure to the list.

To edit an existing procedure, highlight it in the list. Make the necessary changes and click **Update** to save the changes.

To delete a procedure from the list, highlight it and click **Delete**. You may also export the entire list to an Excel spreadsheet by clicking **Export**. The resulting spreadsheet contains all data from the table.

You can use the Criteria window to search for a particular procedure or modality. To search for a procedure, enter the name and click **Search**. If you do not know the entire name, you can enter a partial string with a wild card character (%) before or after the string, which returns all possible matches (e.g., %catheterization, Aorto%, %gram%). You can search for all procedures belonging to a particular modality by selecting the modality from the drop-down list and clicking **Search**. To clear the search results, click **Clear Criteria**.

You can sort the list by clicking on the column headers, or group the list by dragging a column header to the area at the top of the list. To undo the grouping, drag the column header back into the list area.

4.17.2 Procedural Codes

The Procedural Codes tab is where you can enter procedure codes or import the codes using Excel. You can also associate modifiers with the codes. The fields are:

- Procedural Code
- Description
- Modifier
- ID
- System-Version-Catalog

To create a new procedural code:

1 Type a code in the Procedural Code field.

2 Type a description in the Description field.

3 Select a modifier from the drop-down list.

4 If needed, select a coding system from the ID drop-down list. Note that the default coding system is the current active system.

4.17.3 Procedural Modifiers

The Procedural Modifiers tab is where you add or import procedural code modifiers.

To add a procedural code modifier:

1 Type a modifier in the Procedural Modifier field.

2 Type a description in the Description field.

3 If the modifier is applied to all procedure codes, select the Universal check box.

4 Click **Save New**.

NOTE

If Universal is set to True, the modifier will be automatically associated with all billing codes without requiring user intervention.

To import procedural code modifier, click **Import**.

4.17.4 Diagnosis Codes

The Diagnosis Code tab is where you add or import diagnosis codes.

To add a diagnosis code:

1 Type a code in the Diagnosis Code field.
2 Type a description in the Description field.
3 Select a coding system from the ID drop-down list.
4 Click **Save New**.

To import diagnosis code, click **Import**.

4.17.5 Crosswalk

Crosswalk allows you to create associations between required diagnosis codes to procedural (billing) codes. You can associate multiple diagnosis codes to a billing code.

4.17.6 Procedural Coding System

The Procedural Coding System tab is opened only when the ellipsis (three-dot) **(...)** button is clicked on the Procedural Codes tab. This is where a new coding system can be added. Insert the coding System name, version, catalog and activation date. The activation date is based on a configuration setting under Modules > Cases. The setting uses the coding system based on procedure date or admission date.

4.17.7 Diagnosis Coding System

The Diagnosis Coding System tab is opened only when the ellipsis (three-dot) **(...)** button is clicked on the Diagnosis Codes tab. This is where a new coding system can be added. Insert the coding System name, version, catalog and activation date. The activation date is based on a configuration setting under Modules > Cases. The setting uses the coding system based on procedure date or admission date.

4.18 User Tables

There are 13 User Tables which you can customize to meet your facility's requirements:

- Conditions
- Contrasts

- FFR site labels
- Lab Ranges
- Other Site Labels (Flex Cardio only)
- Peripheral Site Labels
- Physio Site Labels
- Probes
- Procedure Groups
- Races
- Resource Types
- Rhythms
- Subrhythms

To access the Table Editor, click **TOOLS > TABLE EDIT**, and select the table with which you wish to work.

4.18.1 Conditions

For each modality, users can create a list of conditions that are used to sort procedural data and calculations. To create a list, first specify the modality, then enter the condition name and click **Save New**. The condition lists are then available to operators when performing or charting procedures in a modality.

4.18.2 Contrasts

The Contrasts table contains the names of the x-ray contrasts that may be used during an invasive procedure. The contrasts appear on the Labs/Procedure data of the Case Details screen (Contrast Type 1 and Contrast Type 2).

To add a contrast, insert the name of the contrast in the Contrast description field and the limit in the Limit field. Clicking **Save New** to includes the information to the Contrasts list.

To edit an existing contrast, highlight it in the list, make the desired changes and click **Update**.

To delete a contrast from the list, highlight it and click **Delete**. You will be asked to confirm the deletion. Click **Yes** to delete the entry, or **No** to cancel.

4.18.3 FFR Site Labels

The FFR Site Labels list is a list of vessels that are used during invasive procedures to indicate where an FFR sample is collected.

To add an FFR site label:

1 Click **Clear Criteria** to clear the fields.

2 Enter the desired label in the FFR Site Description field (to display correctly, labels must be twenty (20) characters or less).

3 Click **Save**.

To edit an existing site label, highlight the label in the list, make the desired changes, and click **Update**.

To delete a label, highlight it and click **Delete**. Click **Yes** to delete the label, or **No** to cancel the deletion.

4.18.4 Lab Ranges

To set lab ranges (a case cannot be open while doing this):

1 From the **Tools** menu, select **Table Edit**, then select **Lab Ranges**.

2 Select a **Lab Label** and **Gender** (male, female or non-specific) for any lab result.

3 Type the **Low Value**, if needed. (It is possible to enter a lab range of > or < with only a high value, e.g., <50.)

4 Select the appropriate range indicator from the list (**-**, **>**, or **<**).

5 Type the **High Value**.

6 Click **Save New**.

NOTE
Lab ranges are optional. Unless lab ranges are configured for the repository, notification of abnormal values are not displayed in the lab series list in a study. If the Xper Information Management System does not recognize or cannot interpret an incoming lab value, the lab range results are displayed in the Lab Series Non Interpretable grid.

4.18.5 Peripheral Site Labels

The Peripheral Site Labels list is a list of peripheral pressure site labels that are used during invasive procedures to indicate where and what type of pressure sample is collected when the peripheral site list is checked. You may also select a color for the wave form.

To add a peripheral site label:

1 Enter the desired label in the Peripheral Site Label field (to display correctly, labels must be four characters or less).

2 Select a type from the Type drop-down list. Types include High/Low (H, marks the single highest and lowest points on a wave form), Arterial (A), Venous (V), and Ventricular (E).

3 Select a color.

4 Click **Save New**.

To edit an existing site label:

1 Click the label in the list.

2 Make the desired changes.

3 Click **Update**.

4 Click **Clear Criteria** to clear the fields.

To delete a label:

1 Click the label to select it.

2 Click **Delete**.

3 Click **Yes** to delete the label, or **No** to cancel the deletion.

4.18.6 Physio Site Labels

The Physio Site Labels list is a list of cardiovascular pressure site labels that are used during invasive procedures to indicate where and what type of pressure sample is collected. You may also select a color for the wave form and a default scale setting. The default scale setting sets the pressure scale to the indicated level when the label is applied to the pressure channel.

To add a physio site label:

1 Enter the desired label in the Physio Site Label field (to display correctly, labels must be four characters or less).

2 Select a type from the Type drop-down list. Types include High/Low (H, marks the single highest and lowest points on a wave form), Arterial (A), Venous (V), and Ventricular (E).

3 Select a color.

4 Select a default scale setting.

5 Click **Save New**.

To edit an existing site label:

1 Highlight the label in the list, make the desired changes.

2 Click **Update**.

3 Click **Clear Criteria** to clear the fields.

To delete a label, highlight it.

1 Click **Delete**.

2 Click **Yes** to delete the label, or **No** to cancel the deletion.

If you have configured your Xper Information Management System to use a language other than English, you may map the major cardiac sites with their English equivalent. Labels available for mapping are:

Label	Description
AO	Aorta
AOp	Aortic pullback
FA	Femoral artery
IVC	Inferior vena cava
LA	Left atrium
LV	Left ventricle
LVp	Left ventricular pullback

Label	Description
PA	Pulmonary artery
PAp	Pulmonary artery pullback
PV	Pulmonic vein
PW	Pulmonary capillary wedge
PWp	Pulmonary capillary wedge pullback
RA	Right atrium
RAp	Right atrial pullback
RV	Right ventricle
RVp	Right ventricular pullback
SVC	Superior vena cava

Mapping pressure sites enables Xper Information Management System to use the customized labels in calculations, such as stenotic valve area calculation.

4.18.7 Other Site Labels

The Other Site Labels list is a list of user-defined site labels in addition to the Physio Site Labels that are used during invasive procedures to indicate where and what type of pressure sample is collected. You may also select a color for the wave form and a default scale setting. The default scale setting sets the pressure scale to the indicated level when the label is applied to the pressure channel.

To add a site label:

1 Enter the desired label in the Other Site Label field.

2 Select a type from the Type drop-down list. Types include High/Low (H, marks the single highest and lowest points on a wave form), Arterial (A), Venous (V), and Ventricular (E).

3 Select a color.

4 Select a default scale setting.

5 Click **Save New**.

To edit an existing site label:

1 Highlight the label in the list, make the desired changes.

2 Click **Update**.

3 Click **Clear Criteria** to clear the fields.

To delete a label, highlight it.

1 Click **Delete**.

Click **Yes** to delete the label, or **No** to cancel the deletion.

4.18.8 Probes

The Probes list is a list of thermodilution cardiac output catheters that are used when performing thermodilution cardiac outputs during a procedure.

To add a probe:

1 Enter a name (e.g., “S-Tip Swan Ganz”).

2 Enter the manufacturer’s indicated constant for the probe.

3 Enter the volume of injectate that will be used for each cardiac output recording.

4 Enter the French size of the catheter.

5 Click **Save**.

To edit an existing probe, highlight the label in the list, make the desired changes, and click **Update**.

To delete a probe, highlight it and click **Delete**. Click **Yes** to delete the probe, or **No** to cancel the deletion.

4.18.9 Procedure Groups

The Procedure Groups table enables you to create groups for your procedures (e.g., Diagnostic, Interventional, Urgent, Elective, etc.) and to assign a priority (high, medium or low) to each group. The priority assigned may be used as a filter for the Waiting List to identify those patients whose procedures need to be performed as soon as possible (high priority), or whose procedures are less urgent (medium and/or low priority).

To add a procedure group:

1 Enter the desired group name in the **Group Description** field.

2 Click **Save New**.

To edit an existing description, highlight the procedure group in the list, make the desired changes, and click **Update**.

Click **Clear Criteria** to clear the fields.

To delete a procedure group, highlight it and click **Delete**. Click **Yes** to delete the group, or **No** to cancel the deletion.

4.18.10 Races

The Races table is a list of races that are used during invasive procedures to indicate a patient’s race or ethnicity on the Case Details screen.

To add a race, click **Add**, type in the description and click **Save New**. The new description is added to the list in alphabetical order.

To edit an existing race, highlight it in the list, make your changes and click **Save New** to accept the change.

To delete a race from the list, highlight it and click **Delete**. You will be asked to confirm the deletion. Click **Yes** to delete the entry, or **No** to cancel.

4.18.11 Resource Types

The Resource Types list is a list of specialties that can be assigned to user types (Physician, Nurse, Circulate, etc.). The specialties are available for selection when adding resources to a study.

To add a specialty, choose the resource in the Resource list, type in the description and click **Save New**. The new description is added to the list.

To edit an existing specialty, highlight it in the list, make your changes and click **Update** to accept the change.

To delete a speciality from the list, highlight it and click **Delete**. You will be asked to confirm the deletion. Click **Yes** to delete the entry, or **No** to cancel.

4.18.12 Rhythms

The Rhythms table is a list of heart rhythms that are used during invasive procedures to indicate a patient's rhythm on the vitals screen.

To add a rhythm, type in the rhythm in the Rhythms description field and click **Save New**. The new description is added to the list in alphabetical order.

To edit an existing rhythm, highlight it in the list, make your changes and click **Update** to accept the change.

To delete a rhythm from the list, highlight it and click **Delete**. You will be asked to confirm the deletion. Click **Yes** to delete the entry, or **No** to cancel.

If you have configured your Xper Information Management System to use a language other than English, you may map atrial rhythms with their English equivalent (i.e., Atrial Fibrillation or Atrial Flutter). When these rhythms are used during a procedure, A-waves are not marked on atrial rhythms.

4.18.13 Subrhythms

The Subrhythms table is a list of heart subrhythms that are used during invasive procedures to indicate a patient's subrhythm complex on the vitals screen.

To add a subrhythm, type in the subrhythm in the SubRhythm description field and click **Save New**. The new description is added to the list in alphabetical order.

To edit an existing subrhythm, highlight it in the list, make your changes and click **Update** to accept the change.

To delete a subrhythm from the list, highlight it and click **Delete**. You will be asked to confirm the deletion. Click **Yes** to delete the entry, or **No** to cancel.

4.19 Patient Billing

The Patient Billing screen allows you to review billing information for patients, to perform necessary adjustments and transmit them. To access Patient Billing, click **MODULES > PATIENT BILLING**.

4.19.1 User Settings

If set up in User Settings, Approve Patient Charges will allow users with this attribute to process patient billing for patients that they have placed in queue by entering username/ system password on the Billing Queue screen.

The attribute, Billing Override, will allow a user to process patients that have been placed in the queue by any user.

4.19.2 Configuration Settings

On the System Setup tab in Configuration Setting, there are four settings under Patient Billing

- Automatic Billing: Xper Connect or IntelliBridge Enterprise will process billing on a schedule.
- Manual Billing: User processes manually any cases checked ready for processing.
- Require Billing Approval: Credentials are needed to process billing. User must have Approve Patient Charges checked in User Administration.
- Process from pending: If checked then the queued tab is hidden and you can process from pending.

4.19.3 Patient Billing

There are three tabs on the Patient Billing screen:

- Pending
- Billing Queue
- Processed

Pending

The Pending tab shows search results (based on search criteria). You can save search parameters for reuse.

When a patient is selected, the charges for that patient display.

If you double-click on a patient, the Search Results display. You can open the selected study and make billing adjustments (pre- or post-processing).

When an audit is complete, you can click **Send to Queue** to add case to the billing queue. The screen shows that a case was added to the queue, by whom and when.

Billing Queue

Billing Queue displays the studies that were marked for an auditor to work on or process, only the studies sent by the logged-in user, not all the queued studies, are displayed.

To display the billing details in the bottom pane, click on a patient in the Queue list.

If Require Billing Approval is checked in Configuration Settings, when you click **Process**, you will be prompted for your username and password.

If you have User with Billing Override privileges, you will be able to process all studies that have been queued.

Processed

The Processed tab displays all processed studies (based on search criteria).

To display the charge details in the bottom pane, click on a patient in the Queue list.

4.20 Insurance Providers

The Insurance Provider screen allows you to enter data for insurance companies that can then be matched with procedures when different patient costs are required for individual insurance providers.

4.20.1 Creating and Maintaining a Providers List

To create or maintain a provider's list:

1 Click T**OOLS > INSURANCE PROVIDERS**.

The fields and their functions are listed in the following table:

Field	Description
Health Insurance Company Name	Enter the name of the insurance provider.
Show deleted providers	When checked, previously deleted insurance providers will be displayed in the list.
Street Address	Street address of the insurance provider.
City/Town	City or town of the insurance provider.
Zip/Postal Code	Zip or postal code of the insurance provider.
State/Province/County	State, province or county of the insurance provider.
P.O. Box	Post office box number of the insurance provider.
Country	Country where the insurance provider is located.
Phone No.	Phone number of the insurance provider.
Contact person's name	Name of the contact person at the insurance provider.
Email address	Contact's email address.
Fax No.	Fax number of the insurance provider.

Field	Description
Web address	URL of the insurance provider's website.
Group No.	Insurance plan group number.
Subscriber ID	Insurance plan subscriber ID number.
Optional data 1	Optional notes field.
Optional data 2	Optional notes field.
Optional data 3	Optional notes field.
Optional data 4	Optional notes field.
Description	Insurance plan description.
Plan Type 1	Insurance plan type.
Plan ID 1	Insurance plan ID.
Plan Type 2	Insurance plan type.
Plan ID 2	Insurance plan ID.
Tax ID Number	Insurance plan tax ID number.

To enter a new insurance provider, enter the available data and click **Save New**.

To update insurance provider information:

1 Double-click the insurance provider in the list.

2 Enter the information.

3 Click **Update** to save the changes or **Cancel** to discard them.

To delete an insurance provider, highlight the provider in the list and click **Delete**. The provider is removed from the list, but you can view deleted providers by clicking on the checkbox labeled "Show Deleted Providers."

4.20.2 Assigning Providers to a Procedure

To assign multiple providers to a procedure:

1 Open the Procedures table and select the procedure.

2 Select the provider from the Provider drop-down menu.

3 Enter the cost associated with that provider.

4 Click **Update**.

5 Repeat steps 2 through 4 as necessary for each provider.

You may also assign multiple providers when adding a new procedure. Either way, it is important that you first select the provider before entering the patient cost.

4.20.3 Assigning Providers to an Inventory Item

1 In Inventory Overview, double-click the item to which you want to add providers.

2 Click **Edit**.

3 Click the ellipse button next to Patient Cost.

4 Select the provider from the Providers drop-down menu.

5 Enter the patient cost.

6 Click **Save New**.

To ensure that a patient is billed with the correct amount for each item, you must assign the correct insurance provider on the Additional Data tab on the Case Details screen.

4.21 Case Report Configuration

The Case Report Configuration module allows you to create custom case report formats which can be selected when printing a study. For example, you may want one format for the Holding Area and a different format for the preliminary procedure report. To access the Case Report Configuration module, click **SYSTEM > CASE REPORT CONFIGURATION**. The fields and their functions are listed in the following table.

Field	Description
Description	Enter the name of a new report configuration.
Add New	Click to create the new report configuration.
Configuration	Drop-down window contains the list of available report configurations.
Delete	Click to delete a selected report configuration.
Print column	Check the box next to the report element you want to include in a report configuration.
Report Description	Lists the report elements that can be included in a report configuration.
Qty (Quantity)	Select the number of copies of a report element

To create a report configuration:

1 Enter a name in the Description window.

2 Click **Add New**. The name appears in the Configuration window below.

3 Select the elements you want to include in the report configuration by checking the box next to the element name.

4 You may set the number of copies of a given report element by adjusting the quantity.

5 You may specify the number of copies of a report by setting the Collated Copies quantity.

6 Click **Save**.

To change the order in which report elements print, highlight an element and use the Up or Down arrows at the top right corner of the list to adjust its position. The report elements and their descriptions are listed in the following table.

Report Element	Description
ACC	Prints the ACC Registry screens.
Arterial Tree	Prints any arterial trees generated during a case.
Blood Gases	Prints any blood gases worksheets generated during a case.

Report Element	Description
Case Details	Prints all elements of the Case Details and Labs/Procedure Data screens.
Case Synopsis	Prints a report of all charted elements sorted by menu title.
Charge Sheet	Prints the list of charges generated during a procedure.
Custom Screens	Prints the custom data forms for a case.
Diagnosis Codes	Prints the list of diagnosis codes associated with a procedure.
Hemodynamics	Prints a report for each hemodynamic condition recorded in a case.
ICD	Prints the ICD Registry screens.
Lab Series	Prints the list of patient's lab results.
Procedure Log	Prints the chronological procedure log for a case.
Sedation Flow Sheet	Prints the Sedation Flowsheet format of the vitals record.
Valve	Prints any valve gradient samples performed during a procedure.
Still Frames	Prints any still frames captured during a case in a 2 x 2 table format.
Vitals	Prints the vitals record for a case.
Wave Forms	Prints recorded samples, one sample per page.
Wave Forms 6 on 1	Prints recorded samples, six to a page.
Collated Copies	Specifies the number of collated reports to be printed.

If you wish to create an additional configuration, type a name in the box and click **Add New**. The previously created configuration will be saved. To exit without saving a report configuration, click **Cancel All** and close the screen. Any configurations you have created in the session will be deleted.

4.22 Level of Consciousness/Level of Pain

The Level of Consciousness and Level of Pain lists are used on the Sedation Flowsheet to indicate a patient’s level of consciousness and pain. You may customize these lists by clicking **SYSTEM > CONFIGURATION SETTINGS**. Access the Modules tab and select LOC/LOP. You man then add codes and descriptions. When the Auto LOC Prompt and Auto LOP Prompt are active during monitoring, users may select an entry from the drop-down lists. The selections are entered in the appropriate columns on the Sedation Flowsheet. To delete an entry, highlight it and click **Delete**.

To add an entry to the LOC or LOP list:

1. Click **Add** to insert a blank row.
2. Enter the desired data in the following format: code = description (e.g., A = Alert).
3. Click outside of the new row.

You may sort the LOP list by using the up and down arrows to move entries.

4.23 Patient Historical Links

When a patient has had multiple studies performed at a facility, those studies may be linked so that the historical cases are available for review when a new study is started. To configure historical links:

1 Click **SYSTEM > CONFIGURATION SETTINGS**.

2 Access the Modules tab and select Cases.

3 Check the desired criteria to create historical links.

NOTE
MRN is the default setting and may only be unchecked when another item is selected. Be careful when selecting different historical criteria. Selecting only one (e.g., middle name) will link ALL cases in which there is a match. It is recommended that you use a minimum of three criteria to create historical links.

Once your criteria are established, a patient's historical cases will be listed on the History tab on the Case Details screen.

4.24 Modality Performed Procedure Step (MPPS)

Some x-ray systems are capable of sending modality performed procedure step (MPPS) information. If your x-ray system sends MPPS information, you can configure Xper Information Management System to display up to 25 selected MPPS messages during a procedure. To configure MPPS:

1 Click **SYSTEM > CONFIGURATION SETTINGS**.

2 Access the Miscellaneous tab and select HL7 / Interface.

3 Select a desired field from the Standard Data Fields drop-down.

4 Click **Add**.

5 If you want to display a custom data field from your x-ray system, enter the x-ray system's field name in Custom Data Field and click **Add**.

6 You may change the order in which the information is displayed by using the up or down arrows to change the field order.

7 To remove a field, highlight it in the list and click **Remove**.

During the procedure, the x-ray system sends MPPS data through the Xper Connect or IntelliBridge Enterprise interface. Selected fields are displayed on the MPPS tab on the Case Details screen.

4.25 Patient Assignment

For accounts that have integrated this system with Xcelera, the Patient Assignment module allows users to merge studies admitted to this system with cineangiography studies from Xcelera. To merge a patient:

1 Click **MODULES > PATIENT ASSIGNMENT**.

2 Select an unplaced patient from the Unplaced Studies list and click **Create Patient Folder** (if a folder already exists for the selected patient, skip to merging additional patients).

3 Enter any necessary data and click **Add New Patient**. The selected patient will be removed from the Unplaced Studies list.

To merge additional unplaced patients to an existing patient folder:

1 Select the additional study in the Unplaced Studies list.

2 Select the patient folder to which the unplaced study should be merged.

3 Click **Merge Studies** to merge a study and to remove the study from the Unread Studies and/or Patient Locator list.

4 Click **Merge Study With the Following Patient Folder** to merge a study, but without removing it from the Unread Studies and/or Patient Locator list.

To unlink a merged study:

1 Open the desired patient folder.

2 Highlight the study you wish to remove.

3 Click **Unlink the Following Patient Study**.

4.26 Repositories

A repository is essentially a filter applied to menus, procedure lists, and patient studies. Repositories allow you to separate your patients into categories (e.g., Pediatrics, Adult, Radiology, etc.) and to maintain separate charting menus, inventories, and procedures for each repository within the main Xper Information Management System database.

Every Xper Information Management System has a default repository. To create additional repositories:

1 Click **SYSTEM > ADMIN > REPOSITORY MAINTENANCE**.

2 Enter a three-character abbreviation and a description.

3 Enter a facility name, if desired. The facility name that corresponds to a repository will print on case report headers and footers.

4 Click **Insert**.

The new repository is now available. Access to repositories must be assigned to each user through the User Administration screen. When users log on, a Repository drop-down list is available. Users only see the repositories to which they were assigned access.

Once a user has logged into a repository other than the default, the repository abbreviation appears next to the user name to indicate which repository the user is logged in.

Each repository may have its own menus, inventory and list of procedures. Studies admitted to a repository are only accessible when logged in to that repository.

5 Preventive Maintenance

5.1 Monitor Mounting Integrity

On a *monthly* basis, confirm monitor mounting integrity, including, but not limited to, boom assembly mounts, wall mounts, and rolling stand mounts.

5.2 Monthly Maintenance

On all Xper Information Management System Workstations:

1 Perform Scandisk.

2 Perform Defrag.

3 Clear all Windows event log files.

4 Delete the contents of C:\XIMS\LOGS (excluding Xper Connect, DataCenter, and Central Station).

5 Delete the contents of **X:\datacenter\bin\logs** (DataCenter only).

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6 Messages and Troubleshooting

6.1 Full System Reset

To perform a full system reset:

1 Power the front end off and back on.

2 Terminate the Xper Information Management System application on the workstation.

3 Click **START > SHUTDOWN > RESTART**. Allow the workstation to reboot into Windows.

4 Log on to the workstation. If necessary, relaunch the application (it may be set to relaunch automatically).

If problems still persist after a full system reset, contact Customer Support.

6.2 Troubleshooting Power and Video Issues

6.2.1 No Power to Workstation

1 Turn device on. If no response:

2 Check power cord connection to the back of the unit and to the wall receptacle.

3 If the workstation will still not power on, contact Customer Support.

6.2.2 No Power to Monitor

1 Turn monitor on. If no response:

2 Check power cord connection to the back of the unit and to the wall receptacle.

3 If the monitor will still not power on, contact Customer Support.

6.2.3 No Display on One Monitor

If a monitor is on, but there is no display:

1 Verify workstation is powered on.

2 Check video cable connections on the monitor and workstation.

3 If there is still no display, contact Customer Support.

If one monitor displays images, and another monitor does not:

1 Verify the monitor is powered on.

2 Swap video cable between the monitor displaying images and the blank monitor. If the blank monitor displays an image, change the video cable.

3 If the monitor does not display an image after swapping the video cables, contact Customer Support.

6.3 Troubleshooting Audio

If an alarm condition is displayed on the monitor, but no audible tone is heard:

1 Verify the speakers are powered on.
2 Verify the volume is turned up.
3 Verify the audio is not muted.
4 If the speakers are external, verify the audio cable is connected to the correct jack.
5 If audio is not restored, contact Customer Support.

6.4 Troubleshooting Network Connection

When a workstation cannot connect to the network, a “Netfail” message is displayed in red. To reconnect to the network:

1 Hold down the **Ctrl** key and hit F10.
2 If connection is not restored, check the network cable. Make sure it is connected to the network card in the workstation PC and to the correct network wall outlet. It may be necessary to restart the workstation to restore network connection.
3 Check to see if other Xper Information Management System workstations have network connectivity. If not, your Datacenter may be down. Contact your facility’s IT department, or contact Customer Support.

NOTE
If network connectivity cannot be restored, you can still continue with a study. Data such as charting, vital signs and waveform samples will be stored on the local workstations, and will be automatically uploaded to the server when network connectivity is restored. However, remote stations, such as the Nurse Station or Central Station, will not be able to display or control patient monitoring and vitals data if no network connectivity is available.

NOTE

Rarely, problems with network connectivity can exist whereby the network is not fully disconnected but a connection with the Datacenter cannot be established. This can lead to a delay of several minutes for the workstation to go into “Net Fail”. If this occurs, Net Fail can be induced by disconnection of the network cable or disabling of the network interface card. Under these circumstances, please contact your local IT support or call Philips customer support for assistance.

6.5 Monitoring Control Screen

The Monitoring Control Screen has one error message that is displayed on the Patient Monitoring screen if an error is detected.

- Error Message: **OFF**

This message indicates that communication with the front end device has been lost. Verify the front end is powered on. Check for airflow from the fan at the back of the unit. Make sure the power cord is tightly connected. If the cord is properly connected but you cannot feel airflow or hear the fan, contact Customer Support. If there *is* airflow, use the Windows Shut Down routine to restart the Xper Information Management System workstation. If signals are still not restored, contact Customer Support.

Customer Support Contact Information

For assistance with your Xper Information Management System, please contact your local Philips Healthcare representative.

In the U.S. and Canada, contact Philips Healthcare Customer Support: +1.800.669.1328.

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7 Product Disposal

7.1 Introduction

This section of the Instructions for Use is directed mainly at the body with legal authority over the medical device software and the IT equipment on which it is installed. Other users are not usually involved in disposal, except in the case of certain batteries.

7.1.1 Passing the Product on to Another User

If this medical device software and the IT equipment on which it is installed are passed on to another user, then it must be passed on in its complete state. In particular, the existing user must make sure that all the product support documentation—including this Instructions for Use—is passed on to the new user.

A new user should be made aware of the services that Philips Healthcare provides for installing, configuring and maintaining the medical device software and IT equipment on which it is installed, and for the comprehensive training of users.

It must be noted by all existing users that passing on medical device software to new users may create serious technical, medical and legal risks. Such risks can arise even if the device is given away. Existing users should seek advice from their local Philips Healthcare representative before committing themselves to passing on any devices.

When the device has been passed on to a new user, a previous user may still receive important safety-related information, such as bulletins and field change orders. In many jurisdictions, there is a clear requirement that the previous user communicates such safety-related information to new users. Previous users who are unable or not prepared to do this should inform Philips Healthcare about the new user, so that the new user can be provided with safety-related information.

7.1.2 Final Disposal of the Product

Final disposal is when the medical device software and the IT equipment on which it is installed are disposed of in such a way that they can no longer be used for their intended purpose.

CAUTION
With respect to disposal, follow the instructions in the documentation of the IT equipment on which the medical device software has been installed.

7.1.3 Fitting, Removing, and Disposing of Batteries

With respect to the fitting, removing, and disposal of batteries, the instructions in the documentation of the IT equipment on which the medical device software has been installed must be followed.

8 Technical data

8.1 System Description

The system contains a number of modules that collect and process cath lab clinical and administrative information, making it a powerful data management tool.

8.2 Specifications

The tables that follow represent the minimum specifications for the devices described.

Xper Information Management System Workstation

Specification	Value
Hardware (*minimum* specifications)	CPU: Intel iCore3 dual core Memory: 4 GB Operating System: Microsoft Windows 7 (32 bit) Video Card: 1280 x 1024 Hard Drive: 1 TB DVD/Blu-Ray Reader 1 Gb LAN Network Card (can be on-board)

File Server

Specification	Value
Hardware (*minimum* specifications)	CPU: Intel Xeon dual core Memory: 12 GB Operating system: Microsoft Windows 2008 Server Video Card: 1280 x 1024 Hard Drive: 1 TB (should be in at least RAID 1 - mirrored) DVD/Blu-Ray Reader 1 Gb LAN Network Card (can be on-board)

Hospital Interface Broker

Specification	Value
Hardware (*minimum* specifications)	CPU: Intel Xeon dual core Memory: 8 GB Operating system: Microsoft Windows 2008 Server Video Card: 1280 x 1024 Hard Drive: 1 TB (should be in at least RAID 1 - mirrored) DVD/Blu-Ray Reader 1 Gb LAN Network Card (can be on-board)

A Appendices

A1 Network Safety, Security, and Privacy

A1.1 Customer’s Role in the Product Security Partnership

Philips recognizes that the security of Philips Healthcare products is an important part of your facility's security strategy. However, these benefits can only be realized if you implement a comprehensive, multi layered strategy (including policies, processes, and technologies) to protect information and systems from external and internal threats.

The customer is responsible for setting up and maintaining a secure and stable IT environment according to general IT standards.

Following industry-standard practice, your strategy should address:

- Physical security (e.g., do not allow unauthorized people to use Xper Information Management System)
- Operational security (e.g., make sure that any sensitive information left on the system—such as exported files—is removed; make sure that users of Xper Information Management System do not leave the open system unattended)
- Procedural security (e.g., create awareness with regard to the dangers of social engineering; every single user should be given a separate account; do not forget to remove an account when it is no longer needed)
- Risk management
- Security policies (e.g., make sure that the Xper Information Management System Service Documentation and media are securely stored)
- Contingency planning.

The practical implementation of technical security elements varies by site and may employ a number of technologies, including firewalls, virus scanning and anti-spyware software, authentication technologies, network segmentation (VLAN—Virtual Local Area Network), etc.

As with any computer-based system, protection must be provided such that firewalls and/or other security devices are in place between the medical system and any externally accessible systems.

Although the system incorporates state-of-the-art protection mechanisms to protect it against the intrusion of malware (for example, viruses), a remote possibility remains that a system can become infected. System safety remains guaranteed in all circumstances, but the user might notice unfamiliar system behavior and/or performance. If this happens repeatedly, e.g. also after the system has been switched off and on again, the user is advised to contact a Philips Healthcare service representative to have the system checked and, if needed, to remove the malware.

The USA Veterans Administration has developed a widely used Medical Device Isolation Architecture for this purpose. Such perimeter and network defenses are essential elements in a comprehensive medical device security strategy.

Additional security and privacy information can be found on the Philips Healthcare product security web site at http://www.philips.com/productsecurity.

If you are interested in overviews of validated Security Patches:

- subscribe to the RSS Feed on this subject
- request an account that enables you to download documents illustrating the validation status for Xper Information Management System and other Philips Healthcare products (to do so, navigate to the “Vulnerability Tables” section of the site).

Antivirus software is not provided with the Xper Information Management System Workstation. To protect the data stored in the Xper Information Management System Workstation, Philips recommends that you run antivirus software on any Xper Information Management System server and all workstations, and keep the antivirus software up-to-date on any Xper Information Management System server and all workstations.

WARNING

Philips Healthcare is not responsible for the installation or maintenance of antivirus software or for the integrity of the Xper Information Management System infected with a computer virus.

Philips Healthcare has qualified the following antivirus applications as being compatible with the Xper Information Management System software:

- McAfee 8.8 Antivirus Scanner

Contact your Philips Healthcare service representative for information about qualified versions and configuring these applications so they do not affect Xper Information Management System functionality or performance. For more details on security, please refer to the Appendix, Network safety, security and privacy in the Systems Administrator Guide.

WARNINGS

- **When disposing of the hard drive, erase all sensitive privacy information.**
- **Media such as CDs, DVDs, and printouts need to be disposed of in a secure manner when they are no longer needed, since they might contain sensitive privacy information.**
- **It is the responsibility of the users to keep their password secret.**
- **It is advised to use TLS to secure the communications over TCP/IP networks.**
- **It is advised to enable Windows Auditing and to inspect the audit log file on a regular basis to detect possible security threats.**
- **Users should guard their sessions and log off when they leave the Xper Information Management System Server and/or Workstation.**
- **Keep rooms where the Xper Information Management System Server and/or Workstation are located locked.**

- **Make sure that in the BIOS of the Xper Information Management System Server and Workstation the option to boot from CD is disabled.**
- **Make sure that a BIOS password is configured for the Xper Information Management System Server and Workstation.**
- **It is the responsibility of the user to guard removable media at all times.**
- **Make sure (patient) data is encrypted before transporting it out of the hospital facility.**
- **Philips recommends installing the validated and published security patches.**
- **Philips recommends making backup copies of configuration data, the database, and the archive as described in the System Administrator's Guide.**
- **Trained users are recommended to be careful when deleting patient or study data.**
- **External circumstances can influence the availability of the clinical data, e.g. network failure, power failures, environmental disasters, etc.**

A1.2 Security and Privacy Requirements

It is the policy of Philips Healthcare to adhere to all the required standards and regulations. To assist the hospital in fulfilling the Health Insurance Portability and Accountability Act (HIPAA) requirements, introduced by the United States Department of Health and Human Services, the following functionality has been added to the Xper Information Management System:

Access Control

Intended to restrict access to the system to authorized users only:

- customizable on/off, a user Log-on/Log-off procedure is required to gain access to the system. Take care that a suitable password procedure is used to log on to your IT equipment, for instance:
  a Use a mixture of upper- and lower-case letters, digits, and special characters.
  b Change the password frequently.
- Access to the system is granted according to a customizable list of authorized users.

Network Time Synchronization

Intended to synchronize system time to an external time-standard:

- Uses a standard Network Time Protocol (NTP).
- The coupling is configured by Field Service during system installation.

Computer systems cannot be guaranteed to be safe in an insecure network. The user should provide some level of network protection e.g. installing firewalls.

Field Service

Field Service is used to enable the following configuration items based on information supplied by the hospital:

- authentication and encryption

- time synchronization
- configuration of any other programs

HIPAA Security and Privacy rules

HIPAA defines a number of physical and technical safeguards which are either required or addressable. Some features, that could implement these functions, are differently implemented or not implemented, for reasons mentioned below:

Backup Procedure

It is not the intended use of the system to permanently store electronic personal health information. Information should be exported to a storage device as soon as possible.

Emergency Access Procedure

The system supports a generic emergency account. However, the user should be aware that the knowledge of this generic account and access to the system should be restricted to avoid unwanted access to electronic personal health information.

Automatic Logoff

The system supports automatic activation of the logoff function with administrator adjustable expiration time.

A2 Hemodynamic and Lab Value Conversion Calculations

A2.1 Hemodynamic Calculations

The following equations for the calculation of hemodynamic parameters are taken from William Grossman's *Cardiac Catheterization and Angiography*, 3rd Ed., Philadelphia: Lea & Febiger, 1986.

Body Mass Index (BMI)

- BMI = (Weight kg)\((Height2 cm) \ 10000)

Body Surface Area (BSA):

- BSA (m^2) = 0.007184 * weight $^{0.425kg}$ * height $^{0.725cm}$

Assumed O2 uptake:

- O_2 (assumed) = K * BSA (K derived from LaFarge table)

Where 133 is a sample value that will be input from the LaFarge tables, as published by LaFarge CG, Miettinen OS: The estimation of oxygen consumption, Cardiovascular Research 4:23, 1970.

In addition to the values derived from standard formulas, the Xper Information Management System contains a number of computer calculated values, such as dp/dt, Vpm, Vmax, valve

mean gradient, and valve period that are the result of digital wave form analysis. Their values are more the result of definition than equation.

Oxygen Content:

- ml O_2 / L Blood = Hgb * 1.36 * 10 * % Saturation

Systemic Venous O_2 (Flamm's Equation):

- SV O_2 = (3(SVC O_2) + 1(IVC O_2))/4

Oxygen Saturation Pressure Location Priority	
Systemic Venous O_2/Pressure	RA (right atrium)* RV (right ventricle) IVC + SVC (Flamm's equation) IVC (inferior vena cava) SVC (superior vena cava)
Systemic Arterial O_2/Pressure	FA (femoral artery)* AO (aorta) LV (left ventricle) LA (left atrium)
Pulmonary Venous O_2/Pressure	PV (pulmonary vein)* PW (pulmonary capillary wedge) LA (left atrium) LV (left ventricle) AO (aorta)
Pulmonary Arterial O_2/Pressure	PA (pulmonary artery)* RV (right ventricle) RA (right atrium) SVC (superior vena cava)
*Default locations used for pressure/saturation priority	

If RA, RV, or PA saturation is collected and is lower than the result produced using Flamm's equation, the lowest saturation is used for systemic venous O_2.

A-V O_2 difference:

- A-VO_2 = systemic arterial O_2 content - systemic venous O_2 content

V-A O_2 difference:

- V-A O_2 = pulmonary venous O_2 content - pulmonary arterial O_2 content

V-V O_2 difference:

- V-V O_2 = pulmonary venous O_2 content - systemic venous O_2 content

Pulmonary flow:

- Pulmonary flow (Qp) = Assumed O_2/(PV O_2 content - PA O_2 content)

Systemic flow:

- Systemic flow (Qs) = Assumed O_2/(SA O_2 content - SV O_2 content)

Effective flow:

- Effective flow (Qe) = Assumed O_2/(PV O_2 content - SV O_2 content)

Cardiac Index:

- CO/BSA

Fick Cardiac Output:

- CO_{FICK} = Assumed O_2/(A - V O_2 difference)

If CO_1 is set to Fick cardiac output or if CO_1 and CO_2 have no value, saturation data will take precedence over other cardiac output data in the calculation of flows, shunts, and resistances.

Left to right shunt:

- L > R (L/min) = Pulmonic Flow Qp - Effective Flow Qe

Right to left shunt:

- R > L (L/min) = Systemic Flow Qs - Effective Flow Qe

Shunts will be calculated if sufficient saturation data is present and an oxygen saturation step of 3% to 7 % occurs, depending on the location of the step up in oxygen content.

Oxygen Step Limits	
Chamber Locations	**Significant O_2 Step**
SVC to RA	7% step in O_2 content
RA to RV	5% step in O_2 content
RV to PA	3% step in O_2 content
PV to LA	5% step in O_2 content
Other locations	5% step in O_2 content

NOTE
Shunts that constitute less than a 10% flow difference are not reported unless a custom shunt threshold is set.

Pulmonary Vascular Resistance:

Dynes units (dyn/sec/cm^5):

- PVR = ((Mean PA Pressure - Mean PV Pressure)/Pulmonary Flow Qp) * 80

Woods units (HRU):

- PVR = (Mean PA Pressure - Mean PV Pressure)/Pulmonary Flow Qp

Systemic Vascular Resistance:

Dynes units (dyn/sec/cm^5):

- SVR = ((Mean SA Pressure - Mean SV Pressure)/Systemic Flow Qs) * 80

Woods units (HRU):

- SVR = (Mean SA Pressure - Mean SV Pressure)/Systemic Flow Qs

Total Systemic Vascular Resistance:

Dynes units (dyn/sec/cm^5):

- TSVR = (Mean SA Pressure/Systemic Flow Qs) * 80

Woods units (HRU):

- TSVR = Mean SA Pressure/Systemic Flow Qs

Total Pulmonary Vascular Resistance:

Dynes units (dyn/sec/cm^5):

- TPVR = (Mean PA Pressure/Pulmonary Flow Qp) * 80

Woods units (HRU):

- TPVR = Mean PA Pressure/Pulmonary Flow Qp

Stroke Work Index:

- SWI = (13.6 * $CO_{L/M}$ * $LV_{SYSTOLIC}$)/(HR * BSA)

Valve Area (mean gradient):

- A (cm^2) = (CO / (HR * PRD in seconds))/(K * $\sqrt{meangradient}$)

Where:

a The valve constant K = 37.7 for the mitral valve and K = 44.3 for the aortic, pulmonic, and tricuspid valves, and

b Stroke volume is defined by CO / (HR * PRD (seconds).

NOTE
Cardiac Output is in milliliters (ml).

Fractional Flow Reserve:

- FFR = (P_D - P_V) / (P_A - P_V)

Where:

- P_D = mean distal pressure
- P_A = mean aortic pressure
- P_V = mean venous pressure

Contrast Limit field (Case Details screen):

- Kg body weight x manufacturer's recommended contrast limit (cc/kg).

Contrast Total Max field (Case Details screen):

- Contrast Total Max = 5cc x Kg of body weight/creatinine

Creatinine Clearance (Cockcroft-Gault formula for GFR estimate):

- Male GFR = ((140 - age) x (weight)) / (sCr x 72)
- Female GFR = ((140 - age) x (weight)) x 0.85 / (sCr x 72)

A2.2 Lab Value Conversions

The following equations for the conversion of lab values from standard American units to standard international (SI) units are taken from "Implementation of SI Units for Clinical Laboratory Data," Donald S. Young, M.B., Ph.D., *Annals of Internal Medicine*, Vol. 106; No. 1, January 1987.

Blood Urea Nitrogen, mmol/l

- (BUN mg/dl) x 0.357

Creatinine, µmol/l

- (Creat mg/dl) x 88.4

Creatinine Clearance, ml/s

- (Creat. clearance ml/min) x 0.0167

Glucose, mmol/l

- (Glu mg/dl) x 0.0555

Hematocrit, %

- (Hct) x 0.01

Hemoglobin, g/l:

- (Hgb g/dl) x 10

Hemoglobin, mmol/l:

- (Hgb g/dl) x 0.6206

A3 Monitoring Site Abbreviation Definitions

The following is a list of cardiac and peripheral vessel and chamber labels used in Xper Information Management System.

Abbreviation	Definition
AAO	Ascending aortic artery
AO	Aortic artery
AOm	Aortic artery monitoring
AOp	Aortic artery pullback pressure
AOpo	Aortic artery pullback outflow
AoRt	Aortic root
Art	Arterial pressure
Atrm	Atrium
Azyg	Azygous vein
BLAL	Blalock, Taussig
C/S	Coronary sinus
ComV	Common venous
Cond	Conduit
Cuff	NIBP Cuff pressure
DAO	Descending aortic artery
DLPA	Descending left pulmonary artery
DMPA	Descending mid pulmonary artery
DRPA	Descending right pulmonary artery
FA	Femoral artery
FAC	Femoral artery compensation
FV	Femoral vein
GLEN	Glenenatimosis
HepV	Hepatic vein
HIVC	High inferior vena cava
HLA	High left atrium
HRA	High right atrium
HRV	High right ventricle
HSVC	High superior vena cava
InnV	Innominate vein
IVC	Inferior vena cava
LA	Left atrium
LAxA	Left axillary artery

Abbreviation	Definition
LBA	Left brachial artery
LCA	Left coronary artery
LCCA	Left common carotid artery
LCIA	Left common iliac artery
LEIA	Left internal iliac artery
LFA	Left femoral artery
LFV	Left femoral vein
LIJV	Left internal jugular vein
LIVC	Lower inferior vena cava
LLA	Lower left atrium
LLPA	Lower left pulmonary artery
LLPV	Lower left pulmonary vein
LPA	Left pulmonary artery
LPOP	Left popliteal artery
LPV	Left pulmonary vein
LPW	Left pulmonary wedge
LRA	Lower right atrium
LRNA	Left renal artery
LRV	Lower right ventricle
LSCA	Left subclavian artery
LSVC	Lower superior vena cava
LUPA	Left upper pulmonary artery
LUPV	Left upper pulmonary vein
LV	Left ventricle
LVA	Left ventricular apex
LVO	Left ventricular outflow
LVp	Left ventricular pullback pressure
LVpo	Left ventricular pullback outflow
MIVC	Mid inferior vena cava
MPA	Mid pulmonary artery
MPV	Main portal vein
MRA	Mid right atrium
MSVC	Mid superior vena cava
PA	Pulmonary artery
PAp	Pulmonary artery pullback pressure
PLPA	Proximal left pulmonary artery

Abbreviation	Definition
PMPA	Proximal mid pulmonary artery
PRPA	Proximal right pulmonary artery
PT	Pulmonary track
PV	Pulmonary vein
PVW	Pulmonary venous wedge
PW	Pulmonary wedge
PWp	Pulmonary wedge pullback pressure
RA	Right atrium
RAp	Right atrial pullback pressure
RArt	Right arterial
RAxA	Right axillary artery
RBA	Right brachial artery
RCA	Right coronary artery
RCCA	Right common carotid artery
RCIA	Right common iliac artery
REIA	Right external iliac artery
RFA	Right femoral artery
RFV	RIght femoral vein
RHV	Right hepatic vein
RICA	Right internal carotid artery
RIJ	Right internal jugular
RIJV	Right internal jugular vein
RLPA	Right lower pulmonary artery
RLPV	Right lower pulmonary vein
RPA	Right pulmonary artery
RPOP	Right popliteal artery
RPV	Right pulmonary vein
RPW	Right pulmonary wedge
RRNA	Right renal artery
RSCA	Right subclavian artery
RSVC	Right superior vena cava
RUPA	Right upper pulmonary artery
RUPV	Right upper pulmonary vein
RV	Right ventricle
RVOT	Right ventricular outflow tract
RVp	Right ventricular pullback pressure

Abbreviation	Definition
SMV	Superior mesenteric vein
SpO2	Pulse oximetry site
SPV	Splenic vein
SubC	Subcutaneous
SVC	Superior vena cava
SysV	Systemic venous
UA	Umbilical artery
UV	Umbilical vein
Ven	Venous
Vent	Ventricular
VenV	Ventricular venous
VV	Venous ventricle

A4 LaFarge Table

Reprinted from *Cardiovascular Research* 1970, 4, p. 27.

Age	Heart Rate (beats per minute)												
	50	60	70	80	90	100	110	120	130	140	150	160	170
Males													
3				155	159	163	167	171	175	178	182	186	190
4			149	152	156	160	163	168	171	175	179	182	186
6		141	144	148	151	155	159	162	167	171	174	178	181
8		136	141	145	148	152	156	159	163	167	171	175	178
10	130	134	139	142	146	149	153	157	160	165	169	172	176
12	128	132	136	140	144	147	151	155	158	162	167	170	174
14	127	130	134	137	142	146	149	153	157	160	165	169	172
16	125	129	132	136	141	144	148	152	155	159	162	167	
18	124	127	131	135	139	143	147	150	154	157	161	166	
20	123	126	130	134	137	142	145	149	153	156	160	165	
25	120	124	127	131	135	139	143	147	150	154	157		
30	118	122	125	129	133	136	141	145	148	152	155		
35	116	120	124	127	131	135	139	143	147	150			
40	115	119	122	126	130	133	137	141	145	149			
	50	60	70	80	90	100	110	120	130	140	150	160	170

Age	Heart Rate (beats per minute)												
Females													
3				150	153	157	161	165	169	172	176	180	183
4			141	145	149	152	156	159	163	168	171	175	179
6		130	134	137	142	146	149	153	156	160	165	168	172
8		125	129	133	136	141	144	148	152	155	159	163	167
10	118	122	125	129	133	136	141	144	148	152	155	159	163
12	115	119	122	126	130	133	137	141	145	149	152	156	160
14	112	116	120	123	127	131	132	133	143	146	150	153	157
16	109	114	118	121	125	128	132	136	140	144	148	151	
18	107	111	116	119	123	127	130	134	137	142	146	149	
20	106	109	114	118	121	125	128	132	136	140	144	148	
25	102	106	109	114	118	121	125	128	132	136	140		
30	99	103	106	110	115	118	122	125	129	133	136		
35	97	100	104	107	111	116	119	123	127	130			
40	94	98	102	105	109	112	117	121	124	128			

NOTE

The LaFarge table is not intended to be used for patients under three years or over 40 years of age.

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