PULMONARY

HYPERTENSION

MANAGEMENT

SOFTWARE

User Manual

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Installation Instructions for PHMS

PHMS is a server-client application. This means there is a server part and a client part of the installation. The server will store the data and it only should be installed in one location. You will use the client to input, fetch and interact with the data. You will need to install this part on each computer you wish to have access to the database. The client and the server parts may reside on the same computer.

NOTE: Your access to the database will be determined by the network and any of its components that lies between you (the client) and the server.

Server Requirements: Windows 2000, XP, 2003 Server
Client Requirements: Any version of Windows and a minimum 1152x864 screen resolution.

The PostgreSQL database server is also available for UNIX and Linux. Mac OS X is also available from third parties.

The client software is available for Linux and should be available for Mac OS X soon.

If you cannot follow or do not understand these instructions, please get your IT department to install and configure the database for you.

Contents

Overview

The basic operation of PHMS is centered around the server-client model as seen in Figure 1. To paraphrase, the server is the data storage mechanism. Data is not saved in files or in "shared" folders - it is stored by the server. On the other hand, the client is responsible for retrieving a given set of data from the server and presenting it to the operator in a human friendly way. Multiple clients may interact with the data on the server simultaneously.

The most important requirement is that the database server be installed on one and only one machine. You will not be able to share data if you have more than one database server installed.

There is no requirement for the server and the client part to be installed on separate computers. Actually, the most straight forward installation is for the client and the server to reside on the same machine.

Figure 1: Basic Installation

Secondly, there is no requirement that the server is installed on a computer running special "server" version of Windows. Any regular computer will do. What is recommended is that the database server is deployed on a machine with redundant storage. For example, a RAID 1 hard drive configuration is a perfect choice. It allows for hard drive failure without any downtime or data loss.

Finally, the is no requirement that the computer running the server is a dedicated machine. On the contrary, it would be wasteful to have a dedicated machine if you already have another computer that can do the job. In a normal environment, the database server will use very little resources and thus if you already have a file server with redundant storage, it makes sense to also use that computer as the PHMS database server.

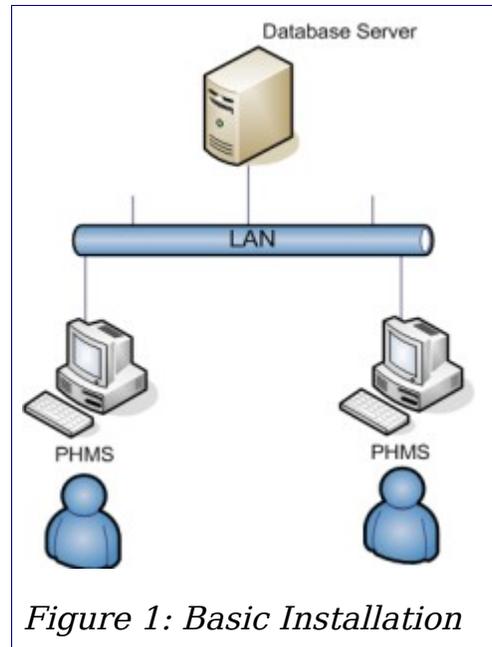The only requirement that must be satisfied for PHMS to work is that it must be able to connect with the
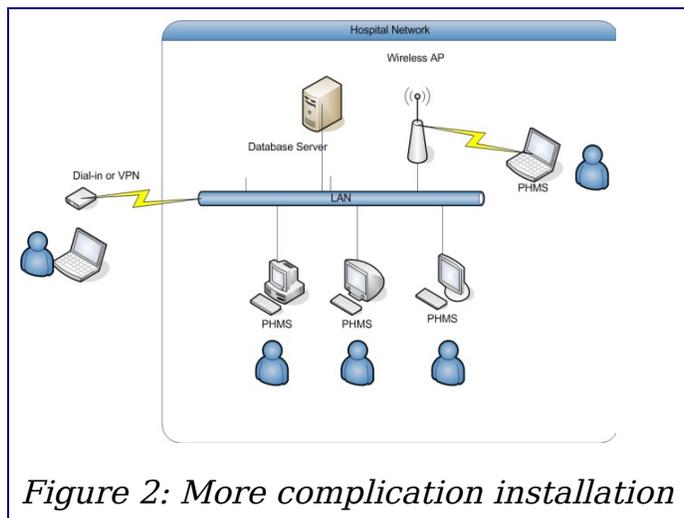
Figure 2: More complication installation

database server to retrieve data. There is no "local" or "remote" automagical sense built-in to PHMS. If it cannot access the server, it cannot retrieve, edit, or even login to the database. There is no requirement on how the connection is to be made between PHMS and the database server. For example, Figure 2 shows a little bit more complicated interface to PHMS than in Figure 1. There may be multiple PHMS users, some connected to the database over wireless LAN or VPN (Virtual Private Network) or even dial-up. The solution that would be ideal for your center is beyond this short overview, but your IT department should be able to provide you with a secure remote or local connection between PHMS and the database server.

In conclusion, an ideas server will be,

- **secure** - a computer with relatively good physical security (not a laptop). If your server gets stolen, so does your entire patient database.
- **reliable** - redundant storage should be used to minimize the chance of downtime and data loss in case of hardware failure.
- **accessible** - all computers running PHMS must be able to access this server for their data.
- **backup** - please, backup your data. Your server can blow up, crash, catch on fire, corrupt its file system, etc. There is no excuse for not setting up an automated backup. For more information see [Setting up Automated Backup](#).

The PHMS client is just an interface between you and the server. Protect the server as that is where you data resides. On the other hand, PHMS client software is 100% replaceable.

If you would like to have multiple PHMS clients installed on different computers having access to the database server, the database server must have a static IP.

Prerequisites

Before installation, you will need to have Microsoft Windows Installer 3.1 or later installed. Client installations on Windows 98 and Me will require Installer version 2.0. Systems that do not have these prerequisites will either receive an error message that the installer is too old, or the *.msi* files will not be recognized at all.

Windows 2000 and XP users can also get the latest version of the installer from the Windows Update website.

Windows Version	Download Site for MS Installer
98/Me	Microsoft Website
NT/2000/XP	Microsoft Website

If you are unable to begin installation after starting the Windows Installer file (.msi file) and you are running version of MS Windows older than XP then it is likely that you need to update the Windows Installer before continuing. Proceed to the prerequisite section to download and install the necessary files from Microsoft.

Installing the Server

Database Server Installation Instructions

The server installation consists of installing the backend database server called PostgreSQL. Checked and verified installation files may be downloaded from http://www.galacticasoftware.com/postgresql

1. Download PostgreSQL installation zip file from http://www.galacticasoftware.com/postgresql/postgresql_8.0.3.zip and save it.
2. Extract the zip file into a temporary location. After successful installation, you may delete all of these files as well as the zip file downloaded in Step 1 If you are installing on MS Windows 2000 or older, you will need a compression utility to extract the zip file. If you do not have one installed, we would recommend 7-zip. You may download version 4.23 from here.
3. Go to the location where you have extracted the files and click on the **postgresql-8.0.msi** file.
4. This is the first window of the installation. Select the language for the installation and click **Start** button.
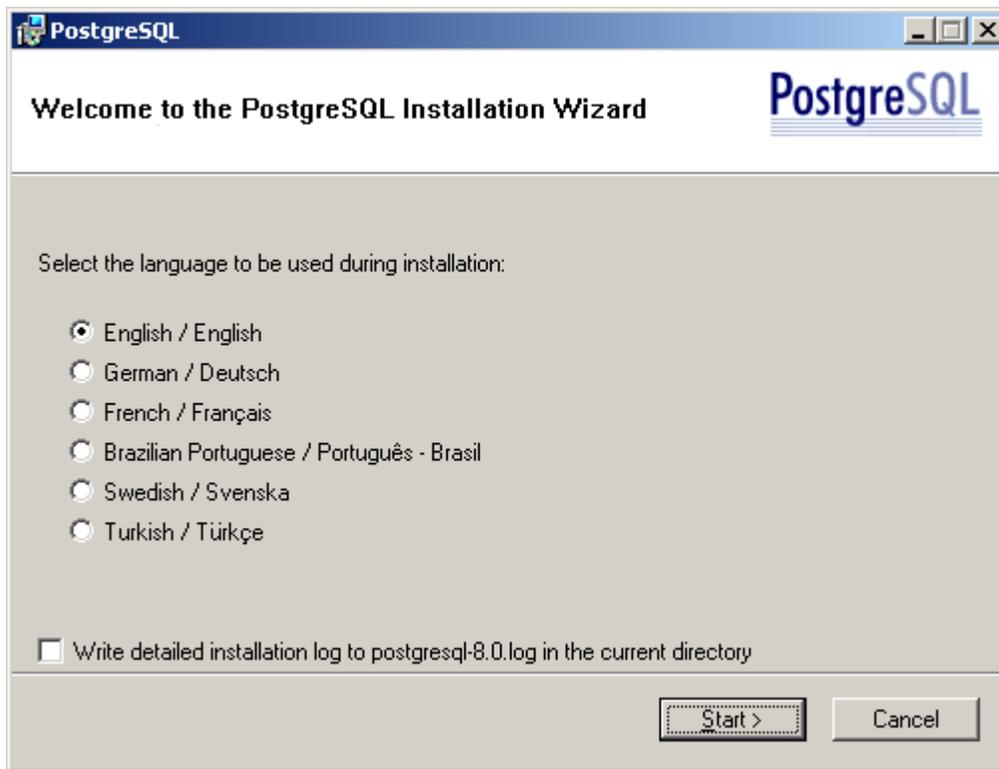
5. On the introduction screen that follows, click the **Next** button to proceed.
6. The following window will display the *Installation Notes*. You may read them! The most important bit here is to install PostgreSQL on a computer with a NTFS file system. All modern computers that came with pre-installed versions of Windows 2000 or XP will be running on an NTFS. Click the **Next** button to proceed.
7. In this window as seen here, don't change anything. Just click the **Next** button to proceed.
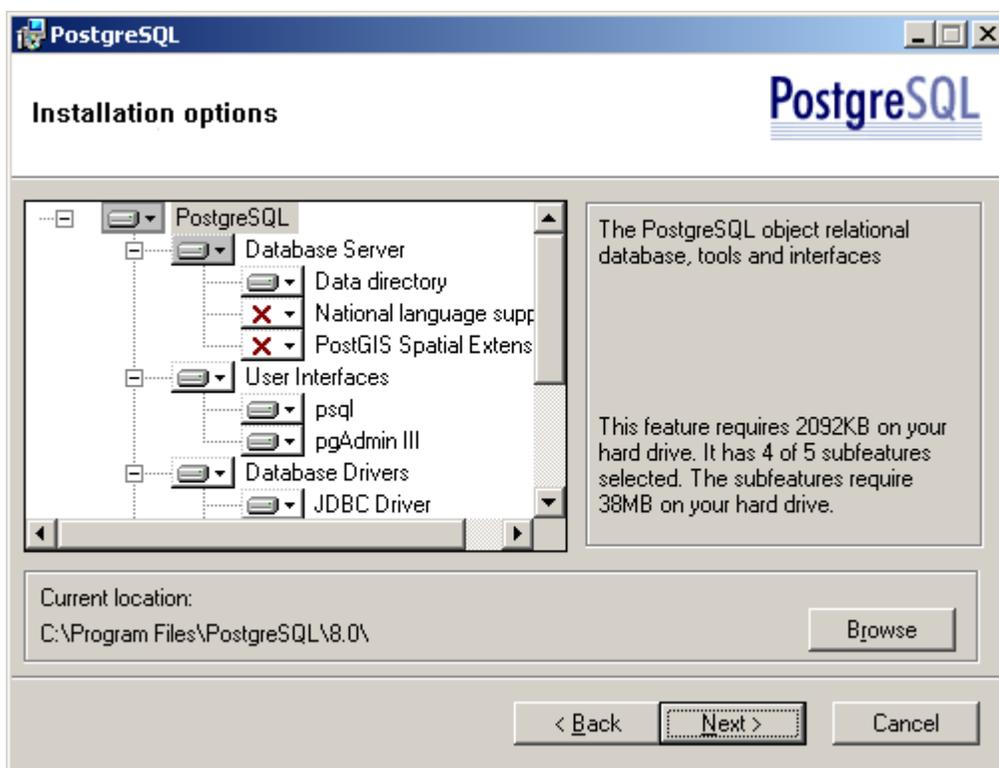
8. Here, you do not need to change anything. Just hit the **Next** button.
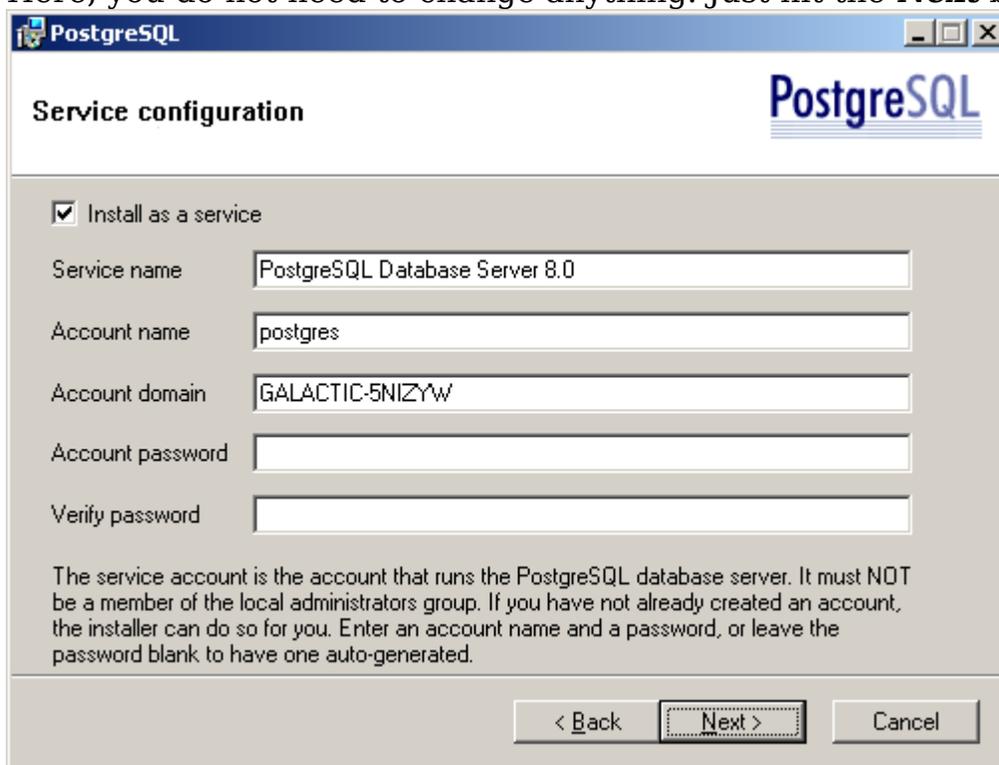
A number of dialog boxes may appear about creating a user account. Just

click OK to accept. When a random password is presented to you, you do not need to write it down. You will never need to use it.

9. After the server account was setup, you are now ready to configure the database server. The next step should look like the window here.

In this window, before continuing, you will need to specify a password you will remember. You will need this password so don't forget it (If you do forget it, there is a way to recover it. **DO NOT reinstall** PostgreSQL or you may lose data that was already entered).

Another important thing to note here is the "Accept connections on all address, not just localhost" checkbox. If you are only going to be using PHMS on the computer where you are installing PostgreSQL, leave this unchecked. If you plan to access the database from other computers (ie. install the client on computers other then the server), make sure that you check this checkbox.

After you entered the password, click **Next** button.
10. In the next window, make sure that PL/pgsql is selected (it should be by default) and click the **Next** button.
11. In the contrib. modules window, leave the defaults and click the **Next** button.
12. Click **Next** to start the installation.
13. After the installation is complete, you may click the **Finish** button to close

the installer. Congratulations, you have now installed PostgreSQL database server.

Database Initialization Instructions

After installing the database server, you need to create the empty database to store the data.

1. Go to the folder where you have unpacked the zip file in the Database Installation Instruction section.
2. Start `InitializeDatabase.bat` and follow the prompts.

Now you may go to the *Installing the Client* section to install your client software.

Installing the Client

This document is about installing or upgrading to version 1.1.14 or later. If you are installing an older version (not recommended), the installation instructions are [here](#).

> If you are unable to begin installation after starting the Windows Installer file (.msi file) then it is likely that you need to update the Windows Installer before continuing. Proceed to the [prerequisite](#) section to download and install the necessary files from Microsoft.

The client needs to be installed on each and every computer that you wish to access the database. To install or upgrade the latest version of PHMS, all you need to do is,

1. Login as Administrator
2. Download the latest version of PHMS
3. Double click on the installer* and follow the prompts. It is recommended to install PHMS in the default location.

If you do not specify the IP address of the computer hosting the database server, local computer address (localhost) will be assumed. To change the IP address after installation you may use the tool in **Programs→PH Management System** to set the IP address.

On application's first execution after an upgrade, you may receive a warning that the database structure will need to be upgraded as well. The application does this automatically, but it is advisable to [backup](#) your database *before* allowing PHMS to do such modifications.

If this is your initial installation of PHMS, please go on to the configuration section of this documentation and read it carefully. The "out of the box" installation is generally not ready to accept data until after it has been configured for your site.

Configuring Database Server for non-local connections

The default configuration of PostgreSQL only allows you to connect from the same machine that the server is running on. To configure the database allowing you to connect from other computers, you will need to add the IP addresses of such computers to the configuration file and then restart the database server.

1. Go to **PostgreSQL 8.0→Configuration files→Edit pg_hba.conf**. from your **Start** menu.
2. At the bottom of the file, add line

   ```
   host        phms        all        IPaddress/mask        md5
   ```

   replacing ***IPaddress/mask*** with a CIDR notation IP addresses that will be connection to the database. You may add more than one line, if required.
3. Save changes and exit notepad
4. Go to **PostgreSQL 8.0→Configuration files→Edit postgresql.conf** from the **Start** menu.

5. Under "Connection Settings" make sure that the **listen_addresses** line reads

   ```
   listen_addresses = '*'
   ```

   and is not commented out (no **#** at beginning of the line) as the default settings is equivalent to listening on 127.0.0.1 socket.
6. Save changes and exit notepad
7. Go to **PostgreSQL 8.0** group from **Start** menu and restart the PostgreSQL service.

You should now be able to connect to the PostgreSQL database from all IP addresses you have added to the pg_hba.conf file. You may add more than one line in Step 3, as needed. The IPaddress/mask format is a normal CIDR notation. For example,

- 123.123.123.123/32 - will add 123.123.123.123 IP address only
- 123.123.123.123/24 - will add 123.123.123.0-123.123.123.255 addresses

You will only be able to connect from the added IP addresses (or networks) only.

Backup and Restore the Database

> WARNING: The database server, PHMS and most of the software are trivial to replace. Your data is not. Please, make sure you have a safe backup location. Ideally, multiple backup locations are preferable to one, but any backup and better than any. Don't play Russian Roulette with your data - backup *daily*.

Summary

1. [Local backup](#) (*not recommended as sole backup method*)
2. [Local server backing up to Report file system](#)
3. [Remotely initiated backup](#)
4. [Restoring database from backup](#)

Local backup

Local backup, by definition, is not very reliable. It will protect you from such errors as bugs in the database software that result in corrupted database or a user deleting 2 years worth of data. On the other hand, local backups are less beneficial against catastrophic software failures (operating system corrupts the file system) or hardware failures.

To set up a local database backup, all we need is access to the database *without* a password. To accomplish this, we first need to alter the configuration file. On the computer running the database server, go to **Start→All Programs→PostgreSQL 8.0→Configuration files→Edit pg_hba.conf**. This should bring up a text editor with the configuration file. Go to the end of such a file and alter the line that reads,

host all all 127.0.0.1/32 md5

to read,

host all all 127.0.0.1/32 trust

The change from *md5* to *trust* results in all connections from localhost, or 127.0.0.1, to be trusted. Now restart the **PostgreSQL** database service by going to **Start→All Programs→PostgreSQL 8.0→Reload configuration**. You should now be able to connect to the database using any account from the local computer without using a password.

The second step is to create a backup directory on your hard drive. Go to **C:** and

create a folder called **backup**. Now, download this <u>local backup batch file</u> and save it in this directory. If you have installed PostgreSQL in a non-default directory, you may need to change the paths in this batch file.

Finally, go to the Control Panel and setup a *daily* Scheduled Task to run the backup batch file on daily basis.

Local Server to Remote System Backup

The local to remote system backup is the recommended method of saving your data. Ideally, you do not want to have the remote backup machine in the same room, building or even city to counteract some of the potential disasters that could occur (fire, water, electrical spikes, etc). Of course, any machine physically separated from the server may be used.

To configure backup to the remote machine, your will need to make sure that users on the server machine can log into the database without a password. The procedure for doing that is listed in the above section about <u>Local backups</u>.

The second step that is needed is to create a directory on the remote machine where the backups are to be stored. This directory must be accessible over the Windows Network to the server. Now, download this <u>back file</u> into that directory. You will probably need to alter the backup path in this batch file if it is not *Remote Server**Backup*. To do this, open the batch file using Notepad and change the BACKUP_PATH accordingly.

Finally, just like with local backups, go to the control panel of the server and set up a Scheduled Task to run the remote_backup.bat batch file on a daily basis. Once a Scheduled Task is configured, verify that the command will actually backup the database correctly.

Remotely Initiated Backup

Another possible type of backup is the remotely initiated backup. A remote machine connects to the database server and backs up all of the databases onto its own hard drive.

For this type of backup to be possible, the remote machine must have at least a copy of the Command Line Tools installed. To install the command line tools, follow the instruction for the <u>Database Server</u> with the exception that,

- in Step 7, do not install the Database Server or the Database Drivers. You only need the User Interfaces (more specifically, the *psql* user interface) installed.
- do not do any database initialization, etc.. as you are not installing the database, just the client tools

NOTE: Some of the steps in the installation instructions might not occur since the database is not being installed.

After the command line tools are installed on the remote machine, create a backup directory (for example, `C:\Backup`) and download the following <u>batch file</u> and save it into that directory. You will then need to edit this file using Window's Notepad to reflect the configuration of your database. More specifically, you at least will need to change the `REMOTE_DATABASE_SERVER` setting to the IP address of the database server

Thirdly, you will need to alter the configuration file of the database server to allow connection from the remote backup machine without a password. You will need to add a line at the end of the configuration file. If the IP address of the remote backup machine is 123.123.123.123 then the access line should look like

host all all 123.123.123.123/32 trust

After the database configuration is changed, restart the service on the database server and test if the backup works on the remote machine. If the backup succeeds, you can configure a Scheduled Task to execute the backup batch file every day.

Restoring Database From Backup

To restore the database from a given backup file, copy a backup file to a location accessible by the database server. For the sake of this document, it is assumed that the backup file will be called `C:\backup.sql`.

Install the database server as per the <u>Database Server Installation Instruction</u>. DO NOT initialize the database server as the backup restore will perform this function.

After a new database was installed, open the command line client from ***Start→All Programs→PostgreSQL 8.0→Connect to template1***. Once you logged in to the database, on the prompt enter,

`\i 'c:/backup.sql'`

or whatever the backup file is called. A large number of lines should scroll by indicating the progression of the restore process. After the restore is completed, enter **\q** followed by Enter to exit the command line.

WARNING: The backup file may contain and set the superuser's password. If this happens, the restore will not complete due to permission errors. Thus when restoring data from a backup file, either
1. install the new database and specify the same password for the postgres user as before, or,
2. disable password authentication for the super user when accessing the database from the same computer as the server.

To disable password authentication for the local computer (localhost), follow the procedure listed on page 14 when setting up local backup.

Tutorial

The aim of this tutorial is to allow you to understand the purpose of PHMS, to use its basic functionality to enter data as well as to allow you to fetch basic reports. Everyone using or planning to use PHMS should read this tutorial to become familiar with the software. You should allow a few hours to read the tutorial and become familiar with the software.

This tutorial is divided into four parts. The first part deals with basic concepts behind the use of the database. Everyone must read and understand this section to use the database successfully. The second deals with data entry and data integrity checks included in the software. We will go through examples of data entry and its various pitfalls. The third section is an overview of various available reports with examples. In the final section, we conclude with cleanup of the database such that other people may go through this tutorial.

- Basic Concepts
- Data Entry
- Reports
- Final Remarks and Cleanup

If you have any questions or comments regarding this tutorial, please contact your email support address

Expected Problems

All expected error messages are listed in the Common Problems and Solutions page of this manual.

Unexpected Problems

If you receive an unexpected error message (ie. not an expected error message), copy it down exactly and email your technical support. We will attempt to assist you.

Basic Concepts

What is a Networked Relational SQL Database?

The data store of PHMS is [PostgreSQL](#) 8.0 networked relational SQL database. This means that the database server **must** be installed in one and only one location only (ie. on one computer). All of its database clients (a.k.a. PHMS software) will access it through your network (LAN). It is not a file, or a webpage, but a specialized application allowing multiple clients (PHMS) to access the contents of the database through the network. Your IT department should be able to install, configure and maintain your database server for you.

Since it is not possible for database servers to share data amongst each other, if you do install the database server in more than one location, data entered on one PHMS will not be accessible from another installation. If you do have more than one database server installed, please contact your IT department to install the software properly and tell them to read the [overview of how the database works](#).

Configuration Data

All configuration data, except for the hospital id, is stored in the database. This means when someone changes the configuration in installation of PHMS client on one computer, the changes will be reflected on another computer. You may have to restart PHMS for the changes to take effect.

Data Entry Methodology

There are three different data record types available for entry. These are,

- Assessment/Followup
- Vasodilator Challenge
- 6-minute Walk

While the purpose of the later two is self-explanatory, the Assessment/Followup can stir up confusion as to which one to enter - a Followup or an Assessment. The reason why they are written as Assessment/Followup instead of separately is because they are essentially the same with the following exceptions.

- Assessment holds more data than a Followup.
- A Followup must come after an Assessment *(for historic reasons)*

Sample data entry order for a given patient
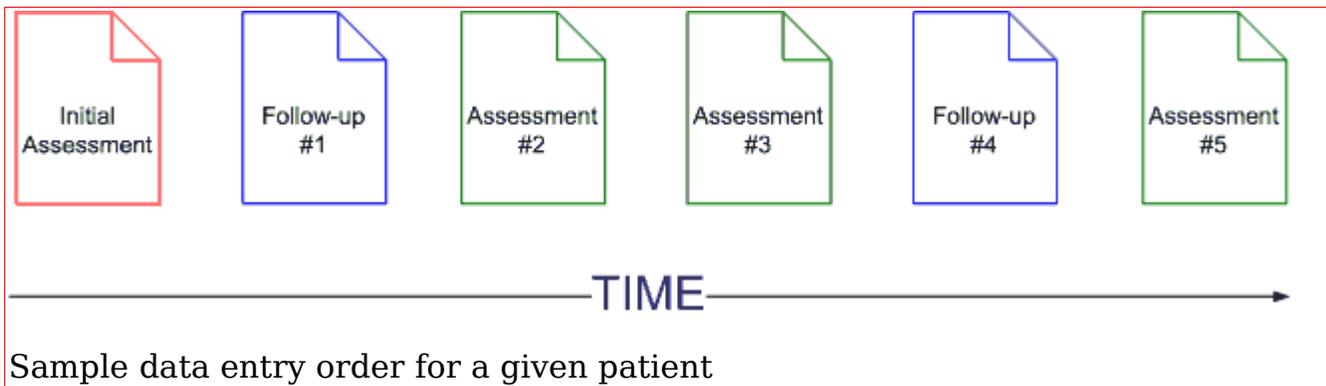
For example, if you have data for a patient that only fits in an assessment, enter an assessment. If the data does not need an assessment (eg. medication adjustment or lung function tests) then enter a followup.

Basic fields

There are two basic fields that must be entered **first**, before anything else. These are the *study date* and the *patient ID*.

The patient ID is a unique identifier associated with a given patient. It is assigned to a patient by your institution. The format is set in the Preferences window.

> IMPORTANT: When entering data, ***always*** make sure you enter the Patient ID ***first***. Make sure that the Patient ID is accepted by the database which means you should no longer be able to change it (ie. the field will become read-only). If you made a mistake entering the Patient ID, click Cancel and re-enter the record.

The study date is the date associated with a given record. For example, in 6-min walk or vasodilator challenge, the study date is the date that the given test was performed. For assessment or a followup, this probably should be the date of the doctor's visit. This date is important to establish a trend to patient's results and it is important it is entered correctly.

There is currently no easy way (and no way in PHMS) to change a given record's Patient ID or Study Date field once entered. The simplest way is to reenter the data for the affected record(s).

Data Entry

Only one person may enter the data as part of this tutorial at a given time. The entered records must be deleted as illustrated in the cleanup section for another person to follow the tutorial.

There are four types of records that are represented in this software. They are:

- 6-minute walk
- Assessment
- Follow-up
- Vasodilator Challenge
- Editing Previously Entered Data

In ALL cases, when entering data, you **must** enter Study Date and Patient ID *first*. The Patient ID **must** be "locked" (ie. the field is "locked" when you cannot modify it anymore - it is read-only). This only occurs when Patient ID is of the correct format as configured for your site in the configuration.

When the Patient ID field is "locked", the patient's demographic data (as well as medication as of the study date and few other fields, if applicable) are loaded if a given Patient ID was already entered before.

We will start this tutorial by entering a basic 6-min walk test and then progress to other types of records. Please read them in order since we will build on the ideas from the previous examples.

6-minute Walk

Start the program and log-in. You should see the main window. Now go to *Patients → 6-min Walk → Room Air* to enter a room air 6-min walk test. A small window asking you for the study date will appear. It will have today's date in it (or whatever date is set on your workstation). Accept it. Now you should see an empty 6-minute walk window as in the following screenshot.

Enter a Patient ID of all zeros. The default format of the Patient ID is "7 digits - 1 digit" so "0000000-0" should work. If someone has modified the patient id format for your site, enter a Patient ID of all zeros in your site's format. You will know when the Patient ID format is accepted when you can no longer change it (eg. delete any part of it).

After the Patient ID format is accepted, a window should be displayed asking you if you are entering a new patient (ie. that patient was never entered before). Click Yes to accept. A demographics window should now appear as seen in the following screenshot:

Enter some values. You must enter a minimum of Patient ID (all zeros!), Race, First Name, Last Name, Sex and Birthdate for the OK button to be enabled. You may enter some other data as well. When done, click OK to save your data

You should now be back in the 6-min walk window, but now some patient data was already filled in, like patient's name and age. Now enter the following test data:

Baseline Heart Rate: 80
Baseline O2 Saturation: 90
6 Minute Heart Rate: 100
6 Minute O2 Saturation: 77
6 Minute Walk Distance: 512
Height: 177

Weight: 80
Max BORG: 3

You data window should now look similar to the following screenshot

Now you are now ready to save your data into the database. Click OK.

If you did not receive any errors, you should now be back on the main window with your data safely on the database server. If you did receive any errors, please go back to the input window (Press Cancel in the error to cancel the save operation) and verify you have only entered the above data. Then attempt to retry the save operation once more. If problems persist, please contact our technical support.

You now have entered a Room Air 6-min walk. For our second example, we will enter a 6-min Walk where the patient receives 3 liters of oxygen per minute. Click on *Patients → 6-min Walk → Oxygen*. When the study date window comes up, just accept the current date like before. On the data entry screen, enter the same 0 based Patient ID as before (in the default case, it will be "0000000-0"). When the patient ID is accepted (ie. the field will become read-only) you should immediately notice one difference from before. The patient demographic data, and some latest data were entered for you automatically based on the latest records in the database. Height and Weight are now set to the values you set in the earlier 6-min walk.

Now, let's enter some data! Please enter the following data in order. Yes, include the obvious error.

Baseline Heart Rate: 100
Baseline O2 Saturation: 1000
6 Minute Heart Rate: 8
6 Minute O2 Saturation: 90
6 Minute Walk Distance: 692
Height: 177
Weight: 81
Max BORG: 2
Oxygen: 3

You probably noticed there is something funny in this data as seen in the following screenshot

When entering data, almost all of the numeric data entries you enter will have a label with the units for this field. During data entry, this field can turn three different colours. These colours based on the value entered and the settings of that field in the preferences window. The meaning of these colours is as follows,

- BLACK indicates the value is in range and should be accepted by the database
- BLUE indicates the value is outside "normal" range but it is still a valid entry.
- RED indicates the value is outside allowed data entry range. This could indicate a data entry error.

Now, click OK to save the data. The data should be accepted by the database

Assessment

Once again, you should now be located in the main window. Now, let's enter an assessment by selecting **Patients → Assessment** from the main menu. A study date window will now appear. Enter the date of July 15, 2002 and click on the OK button. You are now in the assessment window. As always, let's first enter the same Patient ID number we did for our 6-min walk exercises ("0000000-0"). As soon as the Patient ID format is accepted, the Patient ID field will become read only and the demographic information for our patient will be loaded from the database. Also, since this is the first assessment in the database for this patient, a window will pop-up asking you if the assessment you are entering should be considered the first assessment that will be entered into the database.

Once you enter a "First Assessment", you will NOT be able to enter any assessment data prior to study date of the "First Assessment". For example, if you enter an assessment dated 2000-01-01 and specify that it should be considered as a "First Assessment", you will not be able to enter an assessment dated prior to 2000-01-01.

Let us assume we will enter the First Assessment for this patient and answer yes. The "Initial Assessment" data tab will become editable - it is only editable for the First Assessment. (definition: tabs are the little text labeled "buttons" used to change your currently visible data entry page).

Data entry should be quite straight forward. Just a bunch of numbers and some text. The only exception we did not get to is the Treatment page. Click on the Treatment page. You should now see the following window:

In the Treatment page, you will see the Medications control. All medication changes are done with the controls on the right of the medication list. You enter the medication on the top combobox, specify the daily dosage and the units of the daily dosage, the drug route and when was the medication began. If you do not know when the patient began his/her medication, leave the default Start Date which will be the study date. We then click Add to add the medication. Please note that dosage, units and drug route are optional entries.

In our example, let's write that our patient was on the following medications:

Medication	Dosage
MED A	100 mg
MED B	1.232 mg

In this example, start date should be the same as the date of the assessment. After entering the data, the medication part should look like

Now, let's assume we made a little mistake. Our patient is actually on 101mg of MED A, not 100mg. To correct this,

1. Click on MED A in the medication listing for the patient. The data we entered should now appear on the right hand side.
2. Change 100mg to 101mg on the right hand side.
3. Click the Add button

What you should see now is that the dosage of MED A has been changed. This is how you should modify dosage and drug route of a given medication. The database will automatically alter the medication for the patient on the start date of the new dosage and/or drug route.

You will notice some control buttons other than *Add* in the medication control. They mean:

- **Add** - Adds medication or modifies drug route/dosage of a given medication
- **Stop** - Indicates that a patient has stopped taking the drug on the study date. The drug will be removed from the current medication list (current as of the study date).
- **Del** - This is a more dangerous cousin of the Stop function. This will remove a given medication from patient history records completely.

There is only one reason to use the Del button and that is to correct spelling errors associated with medication names. Let us assume that MED B is wrong. There is no MED B. It should have been MED C. To correct this error, follow this procedure exactly:

1. Add MED C medication with a 1.232 mg dosage (and the same start date and drug route)
2. Click on MED B on the patient's medication list, and hit Del

MED B is now erased from our patient's medical records.

You should now have an idea how medication is added, modified, stopped and even spelling mistakes corrected. Now, let's go on to the Secondary Diseases and Allergies entry sections of the Treatment page. You should notice that they look very similar to the Medications section and you will be correct. They work exactly the same except there is no Dosage, Drug Route or Start Date. As an exercise, add that our patient is Allergic to WATER.

At this point, please look through all of the data entry pages in the Assessment.

Now, click OK to save our first Assessment. You should be back on the main screen.

Now, let's enter another assessment, this time dated 2003-01-01. Click on **Patients → Assessment** and enter the study date of 2003-01-01. Now, enter the zero only patient id as before and the patient demographics should be loaded. In addition, go to the Treatment page. You will notice that the database has also loaded our patient's medication and other data.

For this assessment, let us do the following things:

- Stop MED C medication.
- Enter 120 as the Na in the Lab page

Now click OK to save the new assessment. You should now be back in the main window.

Follow-up

So far we have completed two 6-min walks and two assessments for our test

patient. Before we enter a followup, let's explain the difference between a followup and an assessment. In a nutshell, there is almost no difference between a followup and an assessment except that a followup only has a subset of the functionality of a full blown assessment. For example, if a patient visits a doctor and only has his/her medication adjusted then that is a followup. On the other hand, if the patient visits their doctor and has blood work or other tests completed that are not part of a followup, then that is an assessment.

Now, let's go enter a followup for our test patient. Go to **Patients→Followup**. For the study date, enter 2005-01-01 and click OK to proceed. You should now see an empty followup window. Enter our all-zero Patient ID. You should now see a followup window like the one in the following screenshot.

For our followup, let's just enter some symptoms that the patient has, nothing else. Check the following symptoms and then click OK to save our followup.

- Loud P2
- Chest Pain

There is nothing new in the followup that we have not covered in the Assessment section above.

Vasodilator Challenge

By default, Vasodilator Challenge is empty and not configured. You will need to configure the dosages and what tests you perform as directed in the <u>Vasodilator Challenge</u> configuration section.

After Vasodilator Challenge is configured, you may enter its data by going from the main window to **Patients→Vasodilator Challenge** and then specifying the date of the test as the study date. When the window appears, enter the Patient ID field first (as always). You will then be able to specify the drug and the data. After data entry is completed, click on the OK button to save your test.

Editing Previously Entered Data

Now that we have entered some data, we may want to edit it. To edit patient data go to **Patients→List All** to list all of your patients. A widow with all entered patients will appear. Data is by default sorted by Patient ID. Now, locate the all zero patient ID we have been using to enter our test patient data in the above sections and click on the little plus sign [+] to view the complete list of the records we have entered. It should look similar to the following screenshot
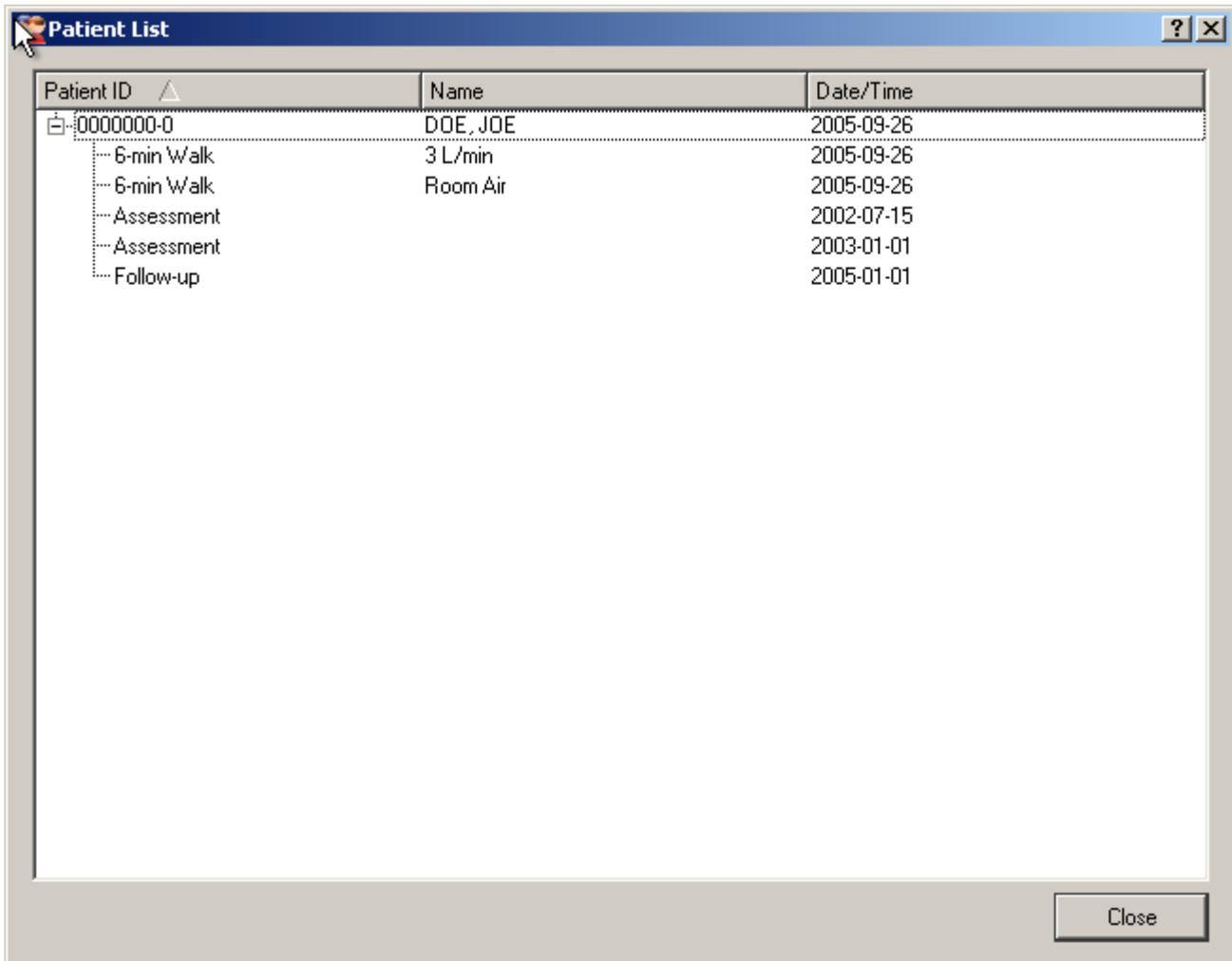
To edit any of the given records, right click on it and select the edit function specific to the test. For example, let's edit the 6-min walk data on Room Air. Right click on the record and select "Edit 6-min Walk". A 6-min walk entry window will appear with the patient data we have entered earlier. Now, change the Baseline Heart Rate from 80 to 85 and click OK to save the data. You will be back in the Patient List window with your modifications saved to the database.

You are now ready for the basic reports tutorial.

Reports

There are two basic types of reports available in PHMS,

- Individual Reports
- Trends

Both of these reports are available directly from the Patient List window. Just to repeat what what said in previous tutorial, to get the the Patient List window, go to **Patients→List All** from the main window. Go there now. Locate our zero based patient ID and expand their record (click the little [+] next to their patient id).

Individual Reports

Individual reports are specific to each record type. For example, right click on any of the patient's 6-min walks and select Preview Report from the popup menu. Now close the report. Right click on an assessment and select Preview Report. You should see a difference from the report for the 6-min walk.

For each of the record types you can preview a report and/or you can print it.

Trends

You should now be in the Patient List window and be looking at our zero-based patient ID. Now, right click on a 6-min walk test and select 6-min Trend. A window should popup that should look like the one in the following screenshot.

This trend is a summary of all the 6-min walk tests entered for our patient. After looking around the trend window, close it to go back to the Patient List window.

Another type of trend is the general trend. To access it, right click on our patient and select Trend. This will popup a window that should look like the following screenshot.

This trend will list all of the numeric data from Assessments, Followups and 6-min Walks. The data is listed in reverse-chronological order - the latest data on the left and the oldest towards the right. Each column is dated with a single letter in front of the date. The lettering refers from where all (or most) of the data in that column came from (an Assessment, a Followup or a 6-min Walk). As you can see, it is quite empty because we have not entered much data in this tutorial.

An important function of this trend is that it will enable you to graph arbitrary data. To graph data, simply select the rows you wish to graph just like on a spreadsheet (select multiple rows by holding down Ctrl and clicking). Then press graph to graph the data.

For the graph to be displayed, you will need to have at least two data points

Concluding Remarks

This concludes our short tutorial. You should now be able to enter data, edit it and produce basic reports. There is only one thing to be done to conclude this tutorial and that is to clean up the database from our test patient. Go the the Cleanup section.

Cleanup

To cleanup the database from our test patient, go to the Patient List window (Patients → List All from the main window). Locate a Patient ID with all zeros. If you cannot, then the test patient doesn't exist and you are done. If you can see a test patient, right click on their Patient ID and select Delete. A confirmation dialog box should appear asking you if you wish to remove the test patient. Click Yes to confirm. The patient and all of its data in the database should now be removed.

To confirm that the delete worked, reopen the Patient List window (close it and open it again). You should not be able to find our test patient.

Configuration

Most of the customizations for PHMS reside in the Preferences window accessible from the Options menu. Virtually all of the preferences data is stored in the database in the *preferences* table. The sole exception to this rule is the *Hospital ID* while is stored in the registry key
`HKEY_CURRENT_USER\Software\GalacticaSoftware\PHMS Database Client`
Other options that are also stored at that registry key include window positioning and sizes.

As most of preferences is stored in the database, any change in the preferences will have global implications. That is, a change in the preferences will affect ALL installations of PHMS at a given site. For these reasons, only database superuser (postgres) may be able to affect these settings.

Reports are configured from the Options -> Reports menu.

- General Options Tab
- Field Types
- Vasodilator Challenge (Response Tab)
- Formulae
- Advanced Options
- Reports

General Tab

The General tab in the Preferences dialog box represents all of the options that cannot be grouped with other options found in this Window.

Summary

- Hospital ID - a unique ID that identifies a given site
- Patient ID Format - specifies the format of the patient ID using Regular Expressions
- Patient ID Test - allows one to test the patient ID format changes before they are committed site-wide
- Site Template Path - location where local templates are stored
- Printer Header - an HTML header that is printed as the #header# element of each and every report
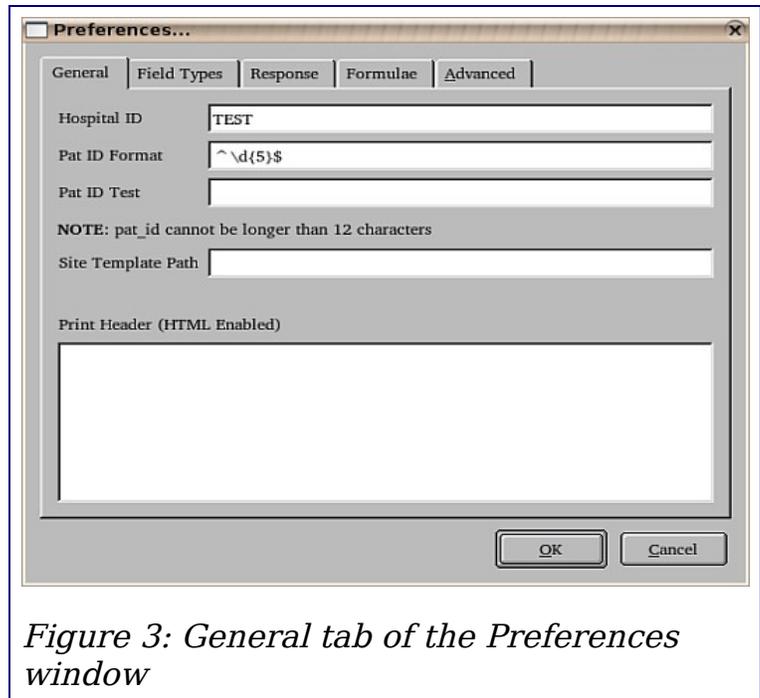
Figure 3: General tab of the Preferences window

Hospital ID

Identifier for the hospital or installation site. Programs using different Hospital IDs will not be permitted to share patient data, even if using the same database server. Hospital ID is limited to 5 characters.

Pat ID Format

Patient ID format specifies the allowable form of any patient id using a *regular expression*. Regular expressions are used extensively to describe match conditions. PHMS uses regular expressions to evaluate whether or not a given patient ID has an acceptable form. For example, during data entry, when a valid patient ID is entered, PHMS will search the database for that given patient and whether data for that patient may be entered.

Paraphrasing, regular expressions are a set of special characters that represent either a group of symbols or the symbols themselves.

Element	Meaning
a	Any character represents itself, unless it has a special meaning in regular expressions. Therefore **a** matches the character *a*
\a	Any special character that follows a backslash matches that character. Therefore, \^ matches the ^ symbol. A list of special characters follows this table.
\t	Matches the TAB character
\d	Matches any digit
\D	Matches any non-digit
\s	Matches any whitespace
\S	Matches any non-whitespace
\w	Matches any word character
\W	Matches any non-word character

The following listing of special notation that is used to match a given set. If a patient ID needs to match a special character, like {, that character must be escaped as in \{.

Special character	Meaning
.	Matches character
[...]	Matches any of the characters in the square brackets. For example, *[a|d]* matches a character *a* or any digit character
a{n}	Matches character *a* *n*-number of times. *n* is an integer and *a* can be any character or set of characters, including a set of characters described by [...] brackets.
^	Matches the beginning of a string. If used inside the [..] brackets, right after the opening first bracket, it negates the set. This means [^abc] will match *anything* but *a*, *b*, or *c*.
-	If used in [...] set, matches a range of characters. For example, [4-7] matches 4, 5, 6, and 7 while [a-c], matches a, b, and c.
a?	Matches 0 or 1 occurrence of character *a*.
a+	Matches 1 or more occurrences of character *a*.
a*	Matches 0 or more occurrences of character *a*.
$	Matches the end of a regular expression.
(expr1| expr2)	Matches characters in either expression. For example, (test|mail| room) will match *test* or *mail* or *room*.

Some simple examples of regular expressions are:

Expression	Meaning
^\d{7}-\d$	matches 7 digits, followed by a - followed by another digit.

^\d{5}$	matches 5 digits
^\d{2}\w{3}\d $	matches 2 digits, followed by 3 word characters, followed by 1 digit
^[A-F]{5}$	matches five characters from set A,B,C,D,E or F.

> Changing the format of the patient ID to a format that is not compatible with the format of the previous patient ID used will prevent new data to be appended to those affected patient IDs. For example, old assessments will be available for edition, but it will not be possible to enter new assessments for affected patient IDs.

Patient ID Test

This field enables one to test the Patient ID Format before a site-wide deployment. The field label will be red when the test patient ID does not satisfy the new Patient ID Format, and it will be black otherwise.

Site Template Path

This is the search path for all of the statistical and user templates. It will be searched prior to the installation directory. This path may be a share path where given templates are located. Even for single computer installations, if you choose to alter or add new report templates, please put them in a separate folder and specify the path here. The installation directory will be overwritten upon software upgrades and you may lose your custom templates.

When specifying a remote share path, make sure that all of the computers running PHMS may access that share. For example, if the template files are located on a computer *Computer1* and path *template_path* that is mapped to drive Z: on your computer, you should specify the path as *\\Computer1\template_path* instead of *Z:*. The reason is not all of the computers may have *Computer1* path *template_path* mapped as drive Z:

Print Header

The print header replaces the #header# data field in all of the report templates with its text. The contents of this field are up to you, but they are HTML enabled allowing you to add some formatting. For example, to add the following the following header to your reports,

Hospital ABC Inc.

Respiratory Medicine
123 Evergreen Ave.
Happy Town, Manitoba R3T 1A1
tel. (555)555-5555

You write,

```
<b>Hospital ABC Inc.</b><br>
Respiratory Medicine<br>
23 Evergreen Ave.<br>
Happy Town, Manitoba R3T 1A1<br>
<i>tel.</i> (555)555-5555
```

Where *
* takes place of a line break. In HTML, *Enter* does not signify a line break. Text enclosed between *<i>* and *</i>* gets marked *italic* and text enclosed by *<b>* and *<b>* causes it to be displayed in **bold** lettering. For more in-depth description of HTML consult your nearest HTML book, online tutorial or the World Wide Web Consortium.

Field Types

The Field Types tab of the Preferences window is used to set the data ranges, format and units of any numeric data entry field in the database.

Summary

- [Table Name & Field Name](#) - define the field for which constraints are to be defined
- [Field Units](#) - units of a given field
- [Normal Range](#) - data within this range can be considered normal
- [Absolute Range](#) - data entered outside of this range may be considered an input error
- # of digits after decimal - specifies the precision of the data field **(Obsolete - No longer used by the software)**
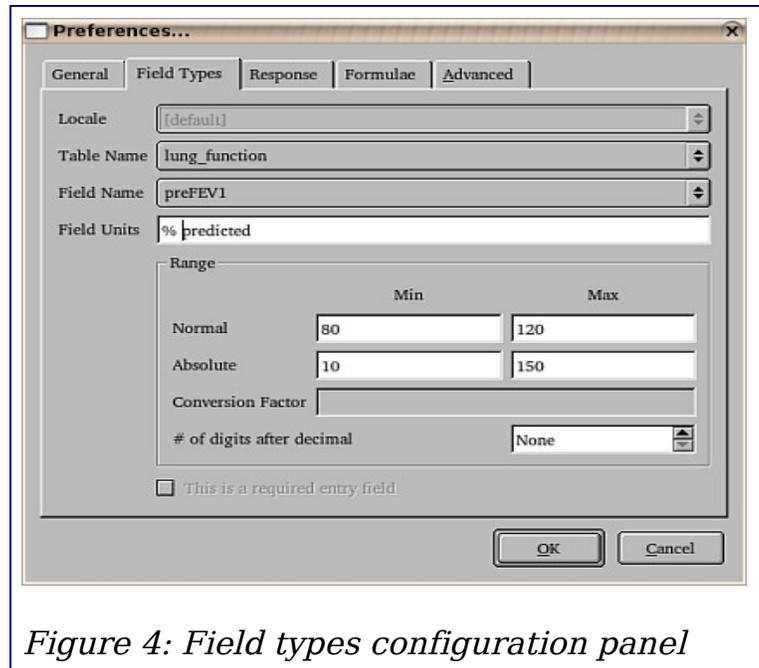
Figure 4: Field types configuration panel

Table Name & Field Name

These two lists specify uniquely a field name in the database. Only numeric fields may be found here as non-numeric fields do not have units or ranges associated with them.

Field Units

Defines field units of a given field. These units are HTML enabled to allow more precise formatting so `mg/s<sup>2</sup>` will result in mg/s^2 being printed on reports and used in the data entry windows.

Normal Range

Defines the normal data range for the given data field. Data entered within this range will appear black in the data entry windows. Data entered outside of the normal range, but within the absolute range will appear in blue.

Absolute Range

Data entered outside of the absolute range will appear red in the data entry window and may be considered an operator error.

Vasodilator Challenge

This configuration tab is used to define which tests and dosages may be used during a vasodilator challenge. The allowed dosages must be a comma separated list.**All** values must be numeric, but do not need to be integers. For example,

1, 1.5, 2.754
is allowed, but
1 mg, 2 mg
is not.

Changing allowed tests and/or test dosages does not affect tests that were already entered.

No tests will be allowed until they are defined here.
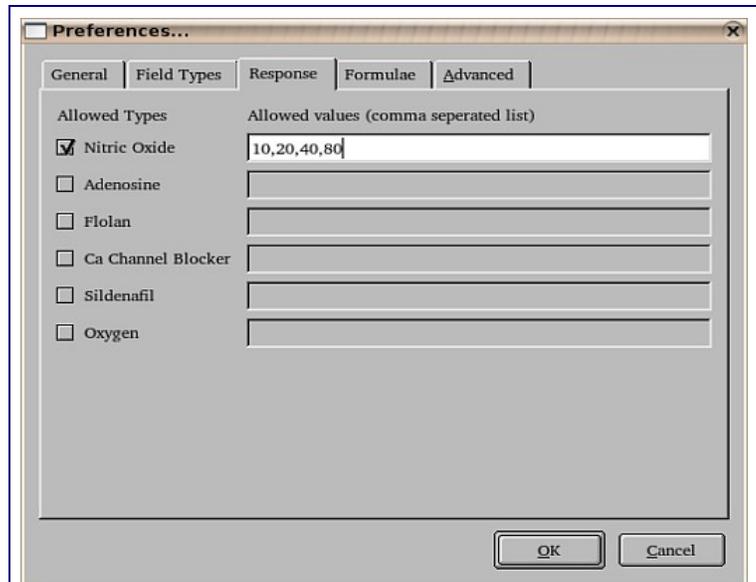
Figure 5: Sample Vasolidator Challenge configuration panel

Formulae

Some parts of PHMS use specific formulas to display some information. Currently these include the Ideal Body Weight (IBW) as well as 6-min predicted distance given age, height and possibly weight. Almost any operation may be specific using normal operands. These include,

- **+** - Add
- **-** - Subtract
- ***** - Multiply
- **/** - Divide. Do not confuse with \
- Parenthesis ( )
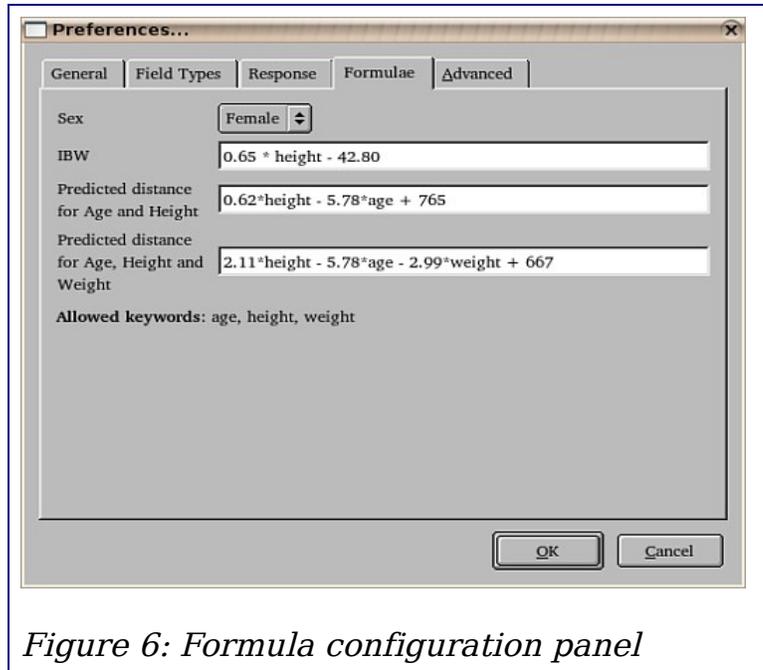
Figure 6: Formula configuration panel

Advanced Options

Advanced options tab contains more advanced settings of PHMS. These
should probably not be changed without good reason.</p>

Using **timestamps as study date** means that records will have a DATE and TIME values associated with them instead of just a DATE. Please note that to change this value, you will require superuser privileges to the database as most of the data tables will require modifications to accommodate the additional TIME entry.

Figure 7: Default Advanced options tab

Additionally, when changing from a DATE and TIME database back to a DATE only setup, none of the records must share a date with another similar record. Failing that, the database will fail to change its internal structures and will revert back to using DATE and TIME. An error indicating a duplicate key error will be displayed.

Date Order indicates the order of the date entry fields. The default setting is to use Day/Month/Year but any may be selected. Please note that this change, as all others, is a site-wide change and all users of your database will be affected.

Date Print Format is used to setup the format of the printed date in reports. Not all areas of the program will display the date in the given format. For example, the Patient List window will always display the date in the ISO format as that is the only format that allows sorting (eg. listing patient records in chronological order).

Reports

The reports that may be defined and edited from the Preferences window are only the statistical reports. The report templates (the printouts) for user and statistical reports are defined in the Report Templates of this manual.

Summary

- New - adds new reports
- Edit - edits the currently selected report
- SQL - displays the SQL statement that is equivalent of the selected report

SQL Display

NOTE: This should be used by advanced users familiar with the intricacies of SQL.

The SQL statement is the question that the database server will receive. The answer to this question is then the report that will be displayed to the user. Users familiar with SQL may copy&paste this statement, modify it and execute to generate their own reports manually from the database.
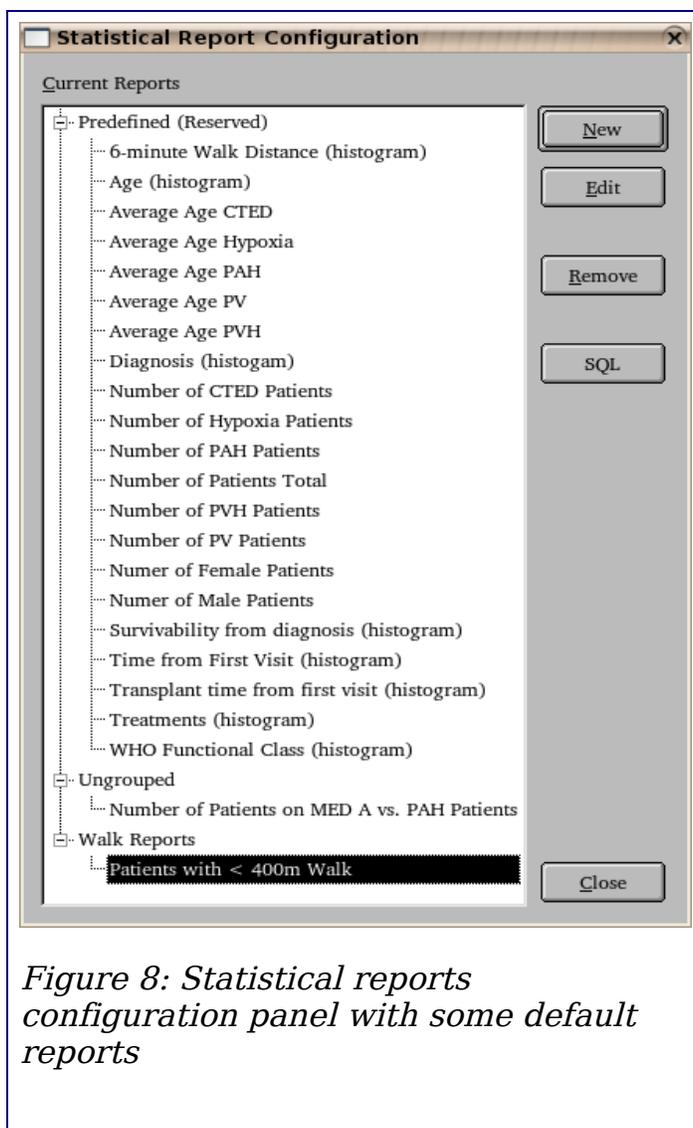
Figure 8: Statistical reports configuration panel with some default reports

Custom Report Definition

After selecting New to create a new report, or Edit to edit the current selection, a window displayed in figure below should appear.

Name & ID

This should be a descriptive name of a given report. In the above example it is defined as "Number of Female Patients" as that is what this functions does. It counts the number of patients whose sex is Female.

The ID field defines the function name that PHMS will search for in its custom reports to replace with the value of this function. For example, to print the number of female patients, specify `#fnumpat#` in that report. This is a more advanced function and does not need to be defined if you do not use custom report templates.
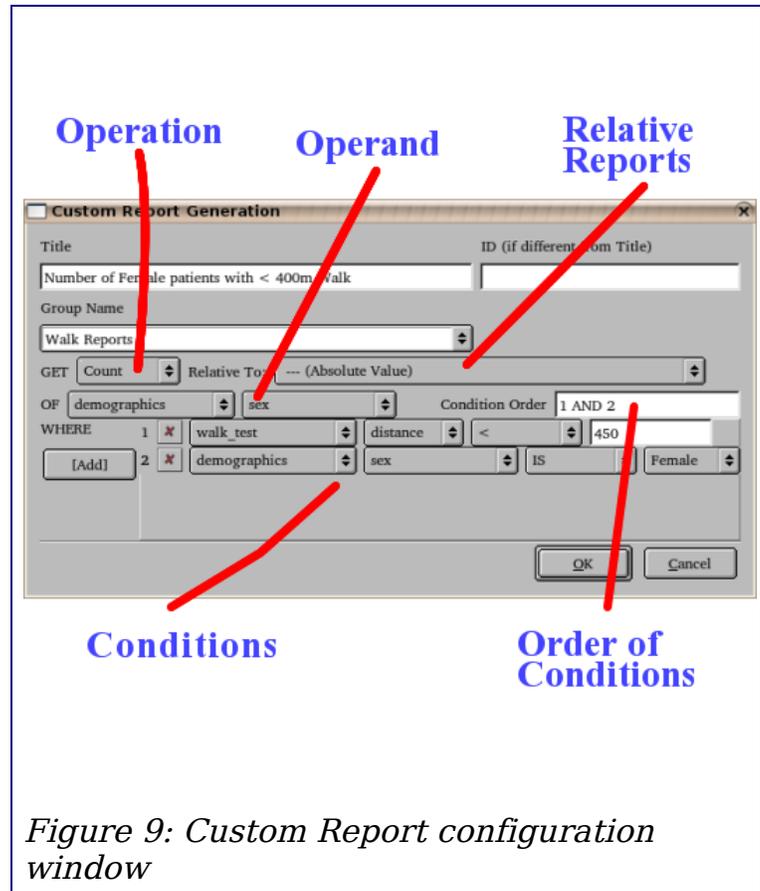
Figure 9: Custom Report configuration window

Operation, Operand & Conditions

The operation is what should be performed on a given field given a set of conditions. In figure above, the function will count the number of records from `demographics.sex` given the constraint that such a record belongs to Female patient.

No matter what the operation is selected, the data that the operation will be performed upon is always the latest available data for each patient.

The following is a summary of the available operations,

- Count counts the number of records. This also effectively counts the number of patients.
- Average calculates the mean value

- Min fetches the minimum value of a record
- Max fetches the maximum value of a record
- Range retrieves the range and is analogous to specifying two reports, one for Min and one for Max value
- Histogram will create a histogram of the data instead of a numerical result

Each of the conditions (selection rules) for a given report has a number associated with it. In the above example, the condition limits the count to only the records where demographics.sex is Female and that condition has a number 1. Now, let's assume that you wish to count the number of Female patients that have a WHO class of 3. You then need to click the [Add] button to add a secondary condition and specify that lung_function.who_class = 3.

The data used in the report constitutes of the latest available patient data that satisfies the supplied conditions.

Condition Order

Now you have a report that counts the number of Female patients with WHO class of 3. Let's assume you with to count the number of Female patiets OR number of patients with WHO class 3. This is where the Condition Order entry field comes into play. The default joining action between separate condition clauses is the AND statement which just means that all of the conditions must be satisfied for a given piece of data to be used in the report. To specify the OR condition between 1st and 2nd conditions, write **1 OR 2** in the Condition Order field. If you wish, you may specify the AND statement in the Condition Order field as well by writing **1 AND 2**

You may add as many conditions as you wish and the Condition Order field can be as complicated as needed. You may use parenthesis to help you specify the evaluation order of more complicated conditions. For example, the following conditions are all valid for queries with 4 or more conditions.

- 1 OR 2 OR 3 OR 4
- 1 OR (2 AND 3 AND 4)
- (1 OR (2 OR (3 AND 4)))
- 1 OR 4

The last statement only contains the 1st and the 4th conditions, yet it is still valid. The reason is the missing conditions will be appended with an AND so 1 OR 4 is equivalent to (1 OR 4) AND 2 AND 3

> Specifying conditions that do not exist will result in invalid questions. For example, if you have 2 conditions and write 1 OR 2 OR 3 in the Condition Order field, the statement will be invalid and will produce no output.

Relative Reports

Relative reports are just like regular reports except the resultant values are relative to another report's results. For example, with a non-relative or an absolute value report, you may ask,

- How many patients are on medication A?
- How many patients have WHO class III?

With a relative report, you may now ask "What is the fraction of patients on medication A in WHO class III of patients as compared to the number of all WHO class III patients?"

To ask a relative question, one must first define the absolute value part of the question in a separate report (if it doesn't yet exist). In the above case, this report will count the the number of patients in WHO class III.

After constructing the absolute report, to construct a relative report, set up the report to ask the number of patients that are on medication A with WHO class of III. Then from the drop down list, you may select the title of the report that counts number of patients in WHO class III.

The reason why the relative report requires the medication condition as well as the WHO class condition is because we are asking for the number of patients on medication A in WHO class III relative to all the patients in WHO class III. If we did not specify WHO class in the relative report, we would be asking for the number of patients on medication A relative to all patients in WHO class III. Stated more clearly, we want

$$\frac{\text{\# of Med A patients in WHO group III}}{\text{number of WHO group III}}$$

and not

$$\frac{\text{\# of Med A patients}}{\text{number of WHO group III}}$$

Relative reports may be relative to other relative reports. This may or may not be useful!

Histograms

There are two types of histograms available. These are,
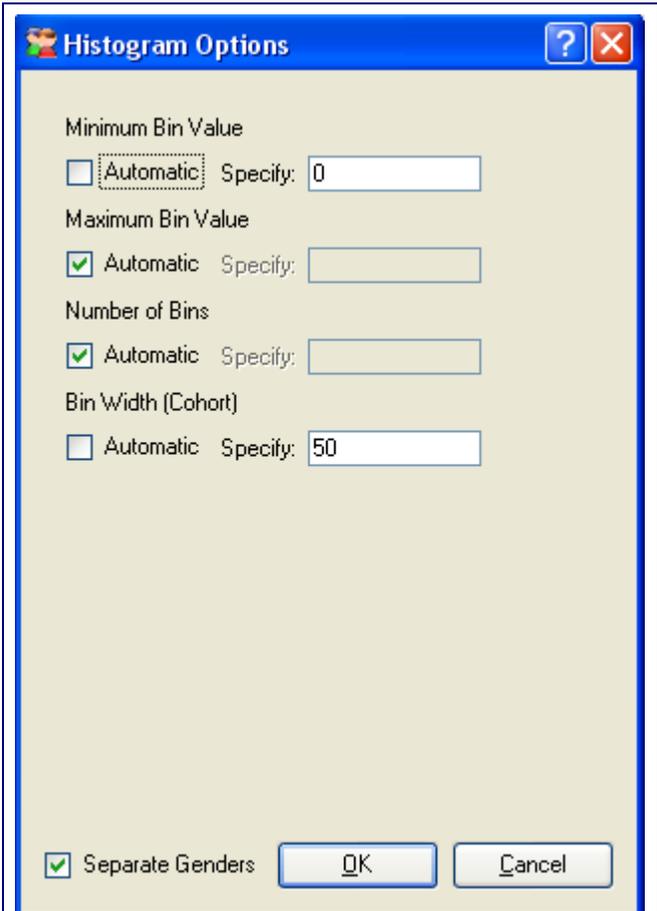
- Numeric histograms, and
- Text histograms

Numeric Histograms

Numeric histograms are histograms that bin numeric data fields, like Age or Na lab results or 6-minute walk results. Histogram Options window for these types of fields is to the right. The following options are available:

- Minimum Bin Value, if not set to auto, specifies the minimum value of the first bin. Values from the database below this threshold will be ignored.
- Maximum Bin Value, if not set to auto, specifies the maximum value of the last bin. Values from the database greater than this threshold will be ignored.
- Number of Bins, if not set to auto, specifies the number of bins that the histogram should be divided into. Any non-negative integer value is permitted, but it is recommended to keep this value in the 5-15 range.
- Bin Width, if not set to auto, specifies the width of each of the bins.
- Separate Genders, when checked, will result in a histogram that is split between Male/Female/Both. If unchecked, only the Both bar will be present in the histogram

Figure 10: Numeric Histogram Options configuration window for the 6-minute Walk Distance histogram

You cannot specify any combination of the above fields. For example, you cannot specify Number of Bins at the same time you specify the Bin Width.

Text Histograms

Text histograms are used to match non-numeric fields. This includes fields like medication, ANA Pattern lab results, and others. Unlike in numeric histograms where we need to specify binning criteria based on numeric data ranges, here we can only specify distinct bins as in the sample Treatment histogram to the right.

To **Add** a text bin to the histogram, locate the text in the drop down list to the right of the **Add** button. In case of medication, if you cannot find a given medication's name, you may enter it manually but please note that all the medications entered into the database are in the drop down list. After a given text criteria is found in the list, click on it then click on the **Add** button to add it to the list. This will remove the item from the drop down list and insert it into Matching Strings list (ie. the binning criteria of the histogram).

Figure 11: Histogram Options configuration window for the Treatment histogram

To delete a bin, or to move it from Matching Text back to the drop down list, select it and then click the **Del** button

You may also use the **Up** and **Dn** buttons to move selected bins up and down in the Matching Text list. The order of this list determines the order of the bins in the histogram. The first item listed will be the left-most bin in the histogram

To specify a specific combination of Matching Text, select the two or more items from the list and click the **Com** button. This will create a new bin that will be a specific combination of the items. To specify an arbitrary combination, just check the boxes in the Combinations field. For example, in the Treatment histogram in Figure 11 above, Any 2 bin will match (BOSENTAN AND FLOLAN) OR (BOSENTAN AND SILDENAFIL) OR (FLOLAN AND SILDENAFIL).
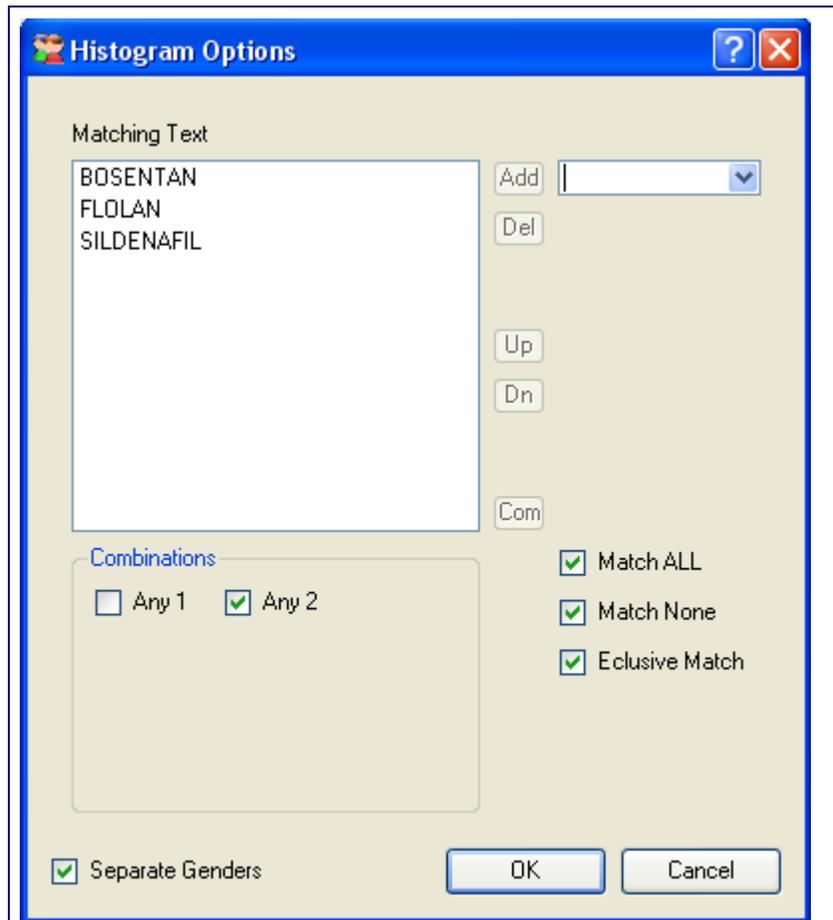
Match ALL checkbox is a bin that is an equivalent of a combination of ALL the items in the Matching Text.

Match None will match only if none of the bins in Matching Text match the data. In our example in Figure 11, Match None will match all patients that are not on BOSENTAN, FLOLAN or SILDENAFIL.

Exclusive Match is a very important option and needs to be understood to successfully use text histogram feature. A number of data fields (all with checkboxes and medications) can have more than one value. For example, a patient can be on more than one medication. When Exclusive Match is checked, data in the histogram is binned as follows:

- If data matches one and only one of the bins in Matching Strings, it is then added to that bin. Otherwise,
- If data matches any of the Combinations as per checkboxes, then it is added to that bin. Otherwise,
- If data matches ALL of the of the Matching Strings and **Match ALL** is selected, then it is added to that bin. Otherwise,
- If **Match None** is selected, it is added to Others bin

If **Exclusive Match** is not-checked, then bin matches are not exclusive. For example, patient on BOSENTAN and FLOLAN would be added to the first bin and to the second bin in Figure 11 example. That patient would also be added to the Any 2 combination bin and possibly to None bin if the patient was on other medication than in Matching Text. So when is it right to have **Exclusive Match** unchecked? For example, you wish a histogram of the number of patients that had Chest Pains, that had Elevated JVP and had Loud P2 in their latest followup symptoms. If you do not check **Exclusive Match** then a patient with Loud P2 and Chest Pains will be added to both bins in the histogram. Then the histogram will represent number of patients that had

- Chest Pains
- Elevated JVP
- Loud P2

If **Exclusive Match** is selected, the histogram will display all patients that

- had Chest Pains, but didn't have Elevated JVP nor Loud P2,
- all patients that had elevated JVP but no Chest Pains and no Loud P2 and
- and all patients that had Loud P2 but no Chest Pains and not an Elevated JVP

Whether or not you have **Exclusive Match** selected, the proper setting depends on the nature of question you wish to ask.

As in the numeric histogram, **Separate Genders**, which checked, will split the histogram based on gender.

Data Entry

Data entry into PHMS database should be relatively straightforward. All of the regular data entries for,

- assessments,
- followups,
- vasodilator challenge, or
- 6-minute walk

are accessible from the **Patients** menu in the main window. Of course, there are a few things to keep in mind which will be outlined below.

Data entries are relatively independent of each other with the exception that an *Assessment* **must** precede either a *Followup Report* or *Vasodilator Challenge*.

For more information, please see the Tutorial

Medication/Allergy/Secondary Disease Data Entry

When entering patient medication, secondary diseases or allergies, the *Add*, *Stop* and *Del* buttons have the following meanings:

- **Add** - Adds current item to the patient's "chart"
- **Stop** - Indicates that the current item is stopped. For example, if a given patient had an XYZ secondary disease this indicates that the patient was cured as of this study.
- **Del** - Indicates that addition of the item was a mistake and should be deleted. For example, if a given patient had an XYZ secondary disease, this indicates that the person actually never had it in the first place and its entry onto the record was a clerical error.

Vasodilator Challenge

Vasodilator Challenge first requires that the tests used and dosages used are configured in the Preferences window. Please see the configuration documentation for further details.

Statistical Error Checking

A statistical error checking tool is included under the **Tools -> Error Check** menu. This tool will scan the database and attempt to locate any errors using a statistical method.

To find errors, each numeric field is scanned. If it contains more than 10 data points, a standard deviation is calculated of about the middle 75% of the available data. Then the database is searched for any data that is more than 50 standard deviations away from the calculated mean.

Reports

There are two types of reports available,

1. individual reports, and
2. statistical reports.

If you are looking to modify the format of individual or statistical reports, go to the section Editing Reports.

Individual Reports

Reports for individual patients are accessible from the Patient List (Patients→List All from the main menu). Each patient is associated with multiple records (Assessment, Followup, Response and 6-min Walk). Right clicking on any of these will bring up a menu as seen in the figure above. Reports associated with that particular record are accessible by either the **Print Report** or **Preview Report** functions.

6-min walk trend is accessible by right clicking on any 6-min walk record and selecting **6-min Trend**.

General trend is accessible by right clicking on any of the patient records, including his/her name and selecting Trend. The trend window will appear where the value are listed in reverse chronological order - latest data is on the left. The column are labeled with type of record data is coming from and date of that record. The acronyms are A for Assessment, F for Followup and W for 6-min walk.

Figure 12: Individual report access point in the Patient List window

Graphs may be generated of one or more data sets by selecting the rows you wish to graph (hold down Ctrl or Shirt buttons to select more than one row) and then clicking the **Graph** button.
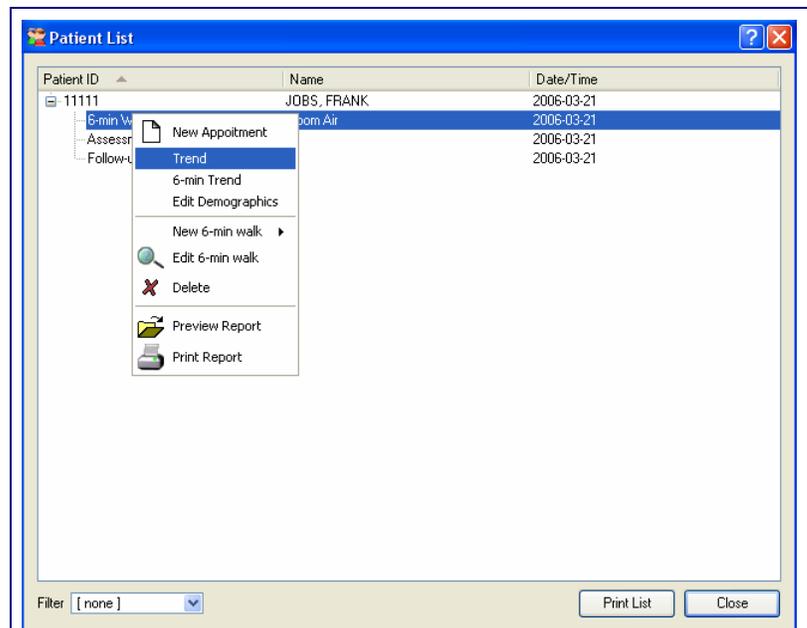
Statistical Reports

To access statistical reports, go to the main window and select **Patients→Custom Report Summary**. A report window with calculated numeric values will appear as in the Figure 13 to the right. All histograms are accessible by right clicking on their rows and selecting **View Histogram**.

Each of the reports may have conditions that limit the number of patients that are used in such reports. To list these patients, right click on report and select **List Patients**. For example, the count of the number of female patients has a condition where demogprahics.sex must be Female. Right clicking on the

	Name	Value
1	6-minute Walk Distance (histogram)	[histogram]
2	Diagnosis (histogam)	[histogram]
3	Number of CTED Patients	0
4	Number of Hypoxia Patients	0
5	Number of PAH Patients	1
6	Number of PV Patients	0
7	Number of PVH Patients	0
8	Number of Patients Total	1
9	Numer of Female Patients	0
10	Numer of Male Patients	1
11	WHO Functional Class (histogram)	[histogram]

Figure 13: Sample statistical reports

Number of Female Patients report and selecting List Patients will list all of the female patients.

Statistical Report generation and listing a large number can take a some time
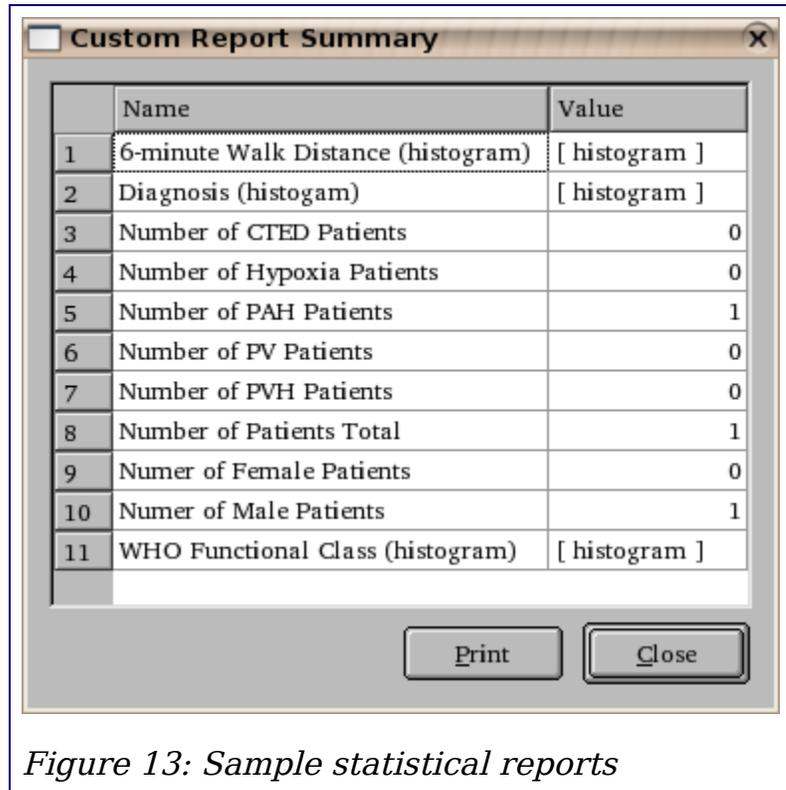
Appointment Management

Appointments are displayed in the opening main window. Highlighting an appointment ad clicking the *Go...* button, or simply double-clicking on an appointment entry, will open a data window for the patient. Right clicking on an appointment allows for,

- rescheduling a given appointment,
- creating a new appointment for that patient,
- canceling that appointment, or
- entering data

Appointments window also incorporates an icon set that allows for easier management. These icons include,

Icon	Meaning
	An appointment is less than 30 minutes away or is overdue
	The appointment is has been completed within the last 30 minutes.
	The appointment has been canceled within the last 30 minutes
	The appointment is overdue for over 30 minutes

After an appointment has been completed, it can be edited from the main window for 30 minutes until after the appointment.

Appointments are updated from the central database every 30 seconds. This that any additions or changes to a given appointment will be visible to everyone using PHMS within 30 seconds.

Common Problems and Solutions

The following is a list of common errors, problems and questions that may and/or will arise during your use of the software. Please read them before contacting support.

Where is File→Save? Where is the data saved?

Please read the <u>Overview</u> page of the installation section of this manual. Pay attention to the diagrams. If need be, please consult your support department to explain the concepts in more detail.

Please also read the tutorial

What is Patient ID?

Patient ID is a unique numeric identifier of a patient for your site. For information how to set the format, please read the <u>configuration</u> section of this manual

Please also read the tutorial

I'm entering assessment data, but can't click the OK button to save

You've probably not entered all of the necessary demographics data. Items in RED must be filled in and the Patient ID must of the correct format. Only then will the OK button be available.

What is "Initial Assessment"?

Initial assessment is **the** first assessment of the patient. This is the first data entry (chronologically by study date, not necessarily in data entry order) for the patient's history. Please note that once you enter an Initial Assessment, you cannot enter another assessment with the study date *prior* to that of the Initial Assessment.

An initial assessment allows you to enter some additional patient data. For example, Past Surgical History prior to the patient's arrival at your facility.

There is no requirement that you do enter an Initial Assessment.

What is "study date"?

This is the date under which the data you are going to enter will be filed. You can only have ONE assessment, ONE follow-up, ONE response, ONE oxygen 6-min walk and ONE room-air 6-min walk per "study date" or "data date"

After I entered data and pressed OK I get an error "The database operation failed with the following error:.... duplicate key violates unique constraint....". What is wrong?

You cannot enter the same patient test for the same day. There can only be one patient type of data saved per patient per date. That is, there can only by one assessment, one followup, one vasodilator challenge, one oxygen 6-min walk and one room air 6-min walk for a single study date.

After I entered data and pressed OK I get an error "The database operation failed with the following error:.... numeric field overflow....". What is wrong?

Upgrade to version 1.1.13 or later.

My database computer died! All my data is gone! Database got corrupted! Help!

Please read the [Backup & Restore](#) section of this manual for instructions on how to restore from backup. If you have not setup backups for your database, we cannot help you.

I REALLY think I found an error in the program. How can I get it fixed?

Please send the error condition with any error messages to the support email address. If possible, please describe ALL the steps needed to **duplicate** the problem. If we cannot duplicate the problem, we are less likely to be able to find it and fix it.

If we determine the problem is caused by our software and are able to reproduce it in our facility, we will provide you with an updated version in a timely fashion.

Furthermore, if you do notice errors, even small spelling errors in error messages, please report them such that they can be fixed and the program be better for everyone.