Hospital Health Information Management System

Open Source Software for Electronic Medical Records

User Handbook version 28 (revised 10/7/15) – for use with HHIMSv2

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General features

HHIMS is free and open-source software that can be used to store and retrieve a simple patient medical record. It was based on software (MDS) produced by the WHO Country Office for Sri Lanka in 2005 and further developed by the Swiss Red Cross from 2006-2009. The open source version was programmed by staff of NetCom Technologies in 2010 for the Regional Director of Health Services, Kegalle (RDHS) and sponsored by the Information and Communication Technology Agency of the Sri Lankan Government (ICTA). Following this project, the staff of NetCom was transferred to Lunar Technologies (Pvt) Ltd, which carried out the subsequent development. Further information is available on www.lunartechnologies.net

The server computer

When installed on a server computer in a hospital, the patient medical records can be accessed via a local area network in the out-patient department, the Clinics, the wards and other places such as laboratories, medical records and hospital administration departments. The server for a small network can be just a large personal computer (PC) with the database to store all the information. For large hospitals, a dedicated computer built as a server with special hardware features is necessary. No patient data is stored on the workstations spread around the hospital - everything is stored on the server computer. The actual server should not be used by the staff for entering patient data as it is a critical component of the network and the hardware is not optimally designed for using it as a workstation.

Because the data is centrally stored in each hospital, it can be shared by all the computers connected to the server. Using workstation computers, staff throughout the hospital can see the previous patient's record when they come again, print visit slips and discharge letters for patients to take home, and prepare quarterly statistics and infectious disease notifications. The software can be used for recording admitted patients as well as in out-patient departments and Clinics to improve documentation and to streamline patient flow.

Your workstation

The workstation is a normal PC. As well as accessing the *HHIMS* database you can use it for everything a PC can do like text-processing or e-mails. For these tasks it stores files on the hard disk inside its own CPU (Central Processing Unit) and not on the server. Some workstations have a CD/DVD writer for downloading data and for doing backups of your work on the PC. You are responsible for the data that you store on your workstation and should do your own backups. If you share the same computer with other staff, arrange with them to store their files in different locations on the hard disk so that yours will not get deleted by accident. The System Manager can arrange for different users to have their own password-protected locations on the workstation.

The main patient database is not stored on the workstation. They are only used to access it via a network cable or a WiFi. You don't need to backup your patient data – this will be done automatically when the server is backed up. For professional and technical reasons, users are strongly advised not to use the workstations in the hospital for entertainment and not to put pictures on the screen as a screen-saver. We recommend the Ubuntu *LINUX* operating system (OS) on workstations for its ease of use, freedom from viruses and low cost, but any OS can be used. The system has been fully tested to work with the *Google-Chrome* browser. It may work with other browsers but this is not recommended.

Hot keys

From any screen Alt+N goes to the new patient screen

From any data entry screen Alt+S will save the data

From anywhere using Alt+F you can open a patient record by typing the number or using a bar-code reader

Switching different functions

After the initial *HHIMS* version was completed, some users asked for changes to the distribution system adapted to the special needs of their institution. Where the developers considered these changes to be of be of general benefit to users, they were implemented into the *HHIMS* distribution. For those changes that were considered likely to be appropriate for one set of users but not for all, switches were provided to choose between the various variants. These allowed different institutions to choose which variants they prefer. The switches affect all users in one hospital in the same way (switches are found in *System Tables→Hospital Settings*, page 43).

Individual user access

- For access to the different functions of the system, all users are alloted to a *User Group*. Each group has its own home page and its selection of menu items. It is also possible to define the page to which users in the group will be redirected when a patient number is selected using a bar-code reader. Standard defaults for these are included in the distributed system but can be changed by the System Manager who has access to the *Linux* file system. The *User Table* is described in more detail in the *Login* section. The access file needs to be maintained by the System Manager.[1] There are more details in the Administration Handbook.
- *Groups* that are not pre-defined in the standard system can be newly defined and given the full set of privileges and the full set of *Menu* functions. The list can then be reduced ig necessary by the System Manager as described above.

Visit types

Different types of visits are pre-defined in the distribution system and additional ones can be defined.

- Although there is only one list of medications stored in the database, an unlimited set of drug stocks can be defined. After defining a new drug stock, it is possible to choose which stock will be used for which type of visit (and also for which ward).
- *Questionnaires* are related to specific types of visit. There is a standard set of *Questionnaires* supplied in the basic system and additional ones can be defined in each institution (see the section “*Creating new screens*”, page 10).

1 In the hhims_access_config.php file you can give view/edit/create access to the tables in DB for user groups. eg:

```
$config["table"]["patient"]["can_view"] = 'All';
$config["table"]["patient"]["can_edit"] = array("Programmer","Doctor");
$config["table"]["patient"]["can_create"] = array("Admission","Programmer");
```

here "patient" is the name of the table.
"can_view" ,"can_edit","can_create" are type of access.
"Programmer","Doctor" are the user groups,
"All" means for all user groups.

explanation:
patient information can be viewed by all, (*Patient overview* screen)
patient information can be edited by only *Programmer*, *Doctor*
new patient can be created by user group *Admission*, *Programmer*

Drug configuration

The list of available drugs included in the standard system is taken from various sources and stored in the drug table. Each individual hospital must edit this list by deleting, adding or modifying drug properties. For example:

- The default dosage and frequency seen by the prescribing doctor can be entered or changed (except for duration). **Note:** Doctors can override these default values when prescribing;
- The default duration for each drug is set at 3 days (MoH standard that cannot be changed by users).

Lists tailored to individual institutions

The system lists that can be edited by users (page 42) are:

Users/Groups/Permissions	Lab tests
Institutions	Wards
Complaints	Villages (users can add missing villages but not delete)
Treatments	

Questionnaires

A useful function of *HHIMS* is its ability to create patient information screens containing specialized information without any programming changes necessary. There are several of these screens in the standard system and others can be defined by users. More details on the creation and use of these questionnaires is given in the section "*Creating new screens*" (page 10).

Switches stored in the Hospital settings table

- *Prescription* settings (display stock, display zero stock, count tablets to dispense, display previous prescription);
- *Patient registration* settings (one field for name, calendar for DOB, instant validation, NIC number only);
- *Visit* settings (add *ICD* diagnoses, add *SNOMED* findings).

Note: *License information* cannot be changed by the user – contact www.hhims.org to get a different license if necessary.

UPS (Uninterruptible Power Supply)

A UPS is a battery which is charged from the mains current and supplies AC power to your workstation when that fails. It is essential to have one to protect your workstation from short power failures (except laptops, which have their own battery). If the power fails, the battery in the UPS takes over and the UPS will start to beep. Finish what you are doing and wait for a few minutes. If the power doesn't come back, shut down the computer. Small UPSs will run your workstation for about 5 minutes.

If this happens a lot, it is possible to install an inverter with larger batteries to supply mains voltage for longer periods. For example an inverter with two truck batteries each 70 KWH will keep one PC running for about 8 hours. It can also supply enough current for a light.

Note: some UPSs have an on/off switch at the back. Ensure that this is always switched to "On" otherwise it will not take over when the current fails. Test your UPS (by switching off the mains while the computer is switched on but not being used) about once every month to ensure it is still working. A UPS will normally last about 3 years depending on how much it comes into use.

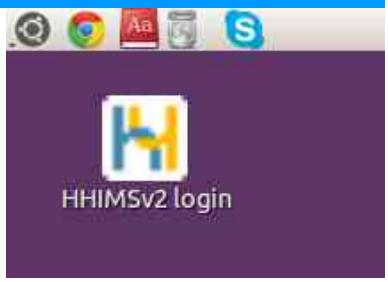
Printers

Although the system makes many of the paper patient records unnecessary, there are occasions when it is necessary to print a document. Printers can be connected to the network or directly to individual workstations. Connection to the network is best as the printer is always available and can be shared with everyone on the net. Directly connected printers can also be shared but only when the workstation is switched on. POS-printers can also be used for printing small items such as appointment tokens or OPD prescriptions. they will generally need specialized drivers to run on *LINUX*.

Getting a copy of *HHIMS*

To obtain a copy of *HHIMS,* go to the Internet site www.hhims.org. Here you will also find useful information on the services provided by the *HHIMS* Software Foundation. It is strongly recommended that you take out a maintenance contract for the software with a private computer company. The Foundation will indicate various companies offering such a service.

How to use the system



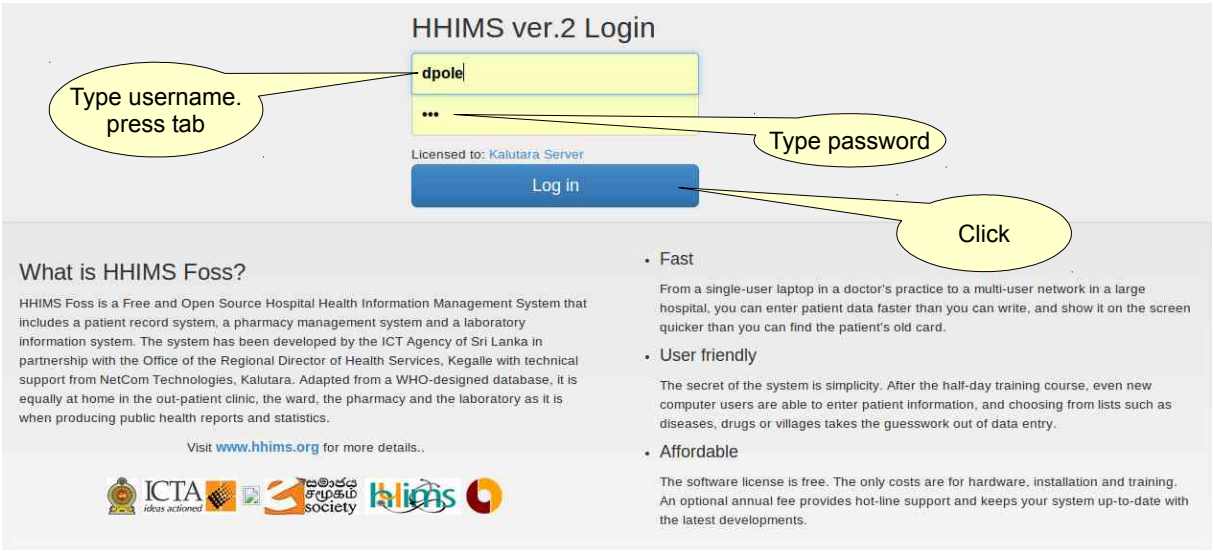
Start your computer and double click on the *LOGIN* icon on the desktop:

If you accidentally delete the icon, go to the browser and simply choose the *IP* number of the server (usually 192.168.1.2). The System Manager will show you how to restore the icon from the browser back to the desktop.

Note: some hospitals may use a different server *IP* number.

In order to use *HHIMS* you need to be registered as a system user. You will be provided with a *User-name* and *Password* by your System Manager. This is like your signature as it proves to the computer that you are personally entering the data. For this reason, always log on with your own user-name and do not leave the computer without logging off. This is standard computer practice.

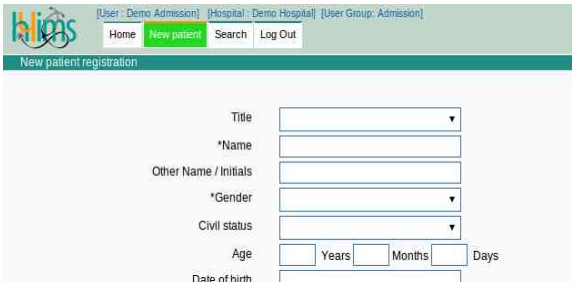
Enter these two items into the corresponding boxes on the *Login* screen then click on the green *Login* button. You can go from one box to the next by pressing the *Tab* key.



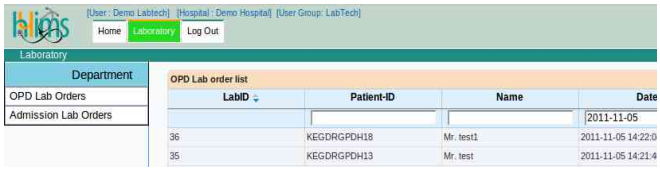
If the details entered are correct the computer will take you to your user group's particular *Home* page of the *HHIMS* database. If you do not use the computer for about ten minutes, you will be automatically logged off. Simply enter your u*sername* and p*assword* again to continue working with the system.

Different Home pages

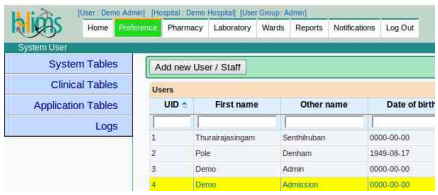
Admission staff (New patient screen):



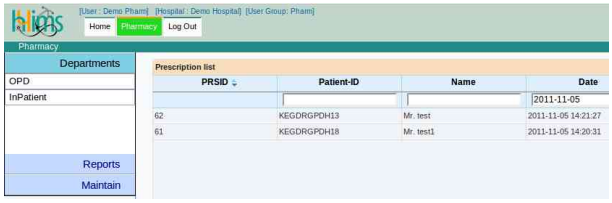
Laboratory staff (Pending lab tests to be done):



Administrators (User table):



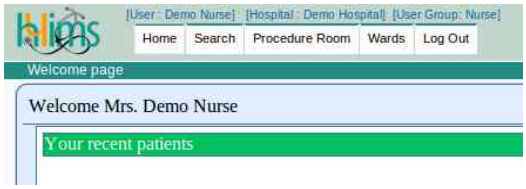
Pharmacy staff (Pending prescriptions to dispense):



Doctors (List of recent patients seen):

Procedure room staff (Pending procedures):

Nurses (list of recent patients):



Programmers (User table):

The link *User Group* to *Home page* is set in *Preferences→System Tables→Add/Edit Group*.

Connecting users to functions

In order to edit existing user information or to register a new user and provide them with access to specific functions, you must have access to the *System Tables*. In the distribution system this is provided to the *Programmer* group but can also be added to the permissions of other groups if required. The functions that you will use are in the *Preferences* menu: *Add/Edit Users, Add/Edit Groups, Permission allocation* and *Menu Bar. At least* one person in the hospital must also have access to the LINUX file system – normally the System Manager.

Groups

All users of the *HHIMS* system are members of a group from which they obtain their privileges. The distribution system already has some groups for you to use (*Admission*, *Nurse*, *Doctor* etc.) but you can add more using the *Add/Edit Groups* function and clicking the button "*Add new user group*". Then:

1. On the screen that opens enter a new group with a meaningful name that is not already in use.
2. For *Home page* (the page users in this group see when they first log on) enter one of the following screens: search, preferences, patientlist, ward, laboratory, pharmacy, patient, procedureroom.
3. For *Scan redirect page* (the page to see when a patient number is typed into the Alt-F box or when a bar-code is scanned) enter one of the following screens: Patient Overview, Labtests, Prescriptions, Treatments.
4. Save the new group.

Permissions

Permissions are stored in the *LINUX* configuration file hhims-access-config.php (page 3). Normally it is not necessary to change this file. However, if you create a new group you will have to give this group permission to access various *HHIMS* functions by editing the file referred to. This editing will normally be done by the System Manager who will be provided with special training during the implementation.

For those who have less experience with the intricacies of *LINUX*, there are editing and file-management tools that are easy to use. This function can also be used for changing the permissions given to existing groups. Just open the configuration file and change the corresponding entries.

Before a group can use the system it must also be given its menu items. This is done using the *Menu Bar* function:

1. Select the name of the menu item to be given by clicking on the appropriate row in the table.
2. Give this menu item to the new group by clicking on the box next to the group.
3. Ensure that there is a menu bar for all the functions permitted for this group (all groups will need "*Home"* and "*Log out"*).
4. Save these menu bar choices.

Note: the *Menu* items cover a number of functions (for simplicity) so there may be functions under a *Menu* item for which this group does not have permission. In that case an error message will be given when a user in this group tries to use that function.

Users

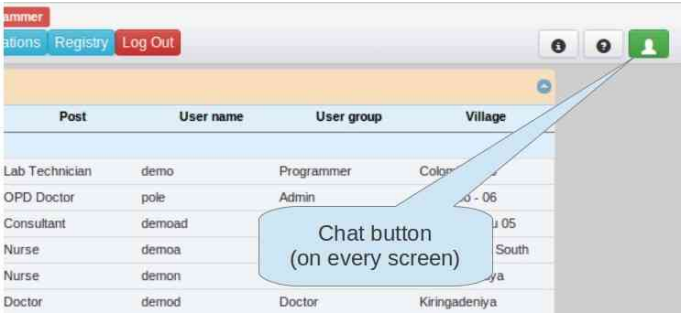
You can create users from the staff of the hospital (or visitors) or modify existing users using the *Add/Edit Users* function in the *Preferences* menu. Click on the button "*Add new User/Staff* " then fill in the personal details.

Post is the official personnel-designation of the staff, their job-description. This is used by the system to separate the different type of staff who share membership of the same user group. Currently it does not influence user access to any of the *HHIMS* functions. You can add more posts by clicking the "*User post"* button on the *System user* screen.

User Group is the only field that influences what the user sees and does with the software. A user whose Post is "N*urse*" can be in the group "*admin"*, a doctor can be in the group *programmer* etc. but they will be able see and carry out the same set of functionality as the other members of that group. Their home screen will also be that of a programmer etc., not that of a doctor or a nurse.

Chat to other users

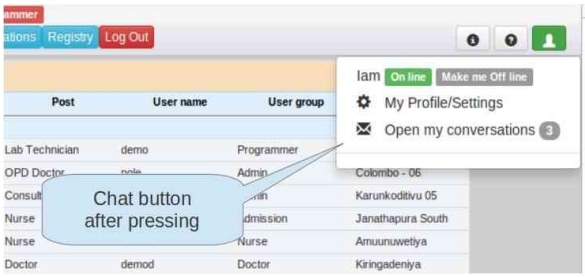
Users who have used the "Chat" function of Google or Skype, will know how convenient it is to be able to type a short message to another person who is logged in to the same program and to receive an almost instant reply if they are also on-line at the time. This function is also available in *HHIMS* for chatting to authorised users who are simultaneously logged in to the same *HHIMS* server – normally those within the same health institution. It does not require a connection to the Internet and it automatically shows which staff are currently logged in.



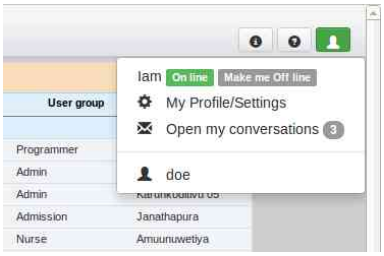
On every screen in *HHIMS* there are three small buttons in the top-right corner as shown:

The functions of these buttons are as follows:

- the "i" button shows the open-source license currently in force for the software;
- the "?" button links to an on-line version of the user handbook;
- the button with the person-icon opens the chat function.



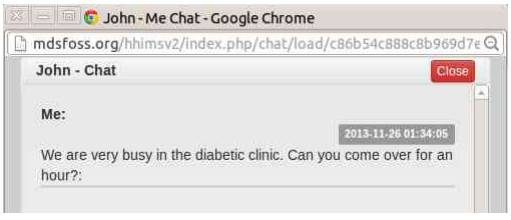
When the third button is pressed, You can see any chats that have been directed to you and you can mark yourself as "*On line*" or "*Off line*" (if you do not wish to be disturbed). After pressing "*Open my conversations*", you will see a list of messages sent to you by other users and your replies. The last 50 messages are shown. Others can be retrieved from the server if required.



A list of the other users currently logged in to your server is shown below these two functions:

This is the list of their user-names – to see their full name hover the mouse over the name to expand.

Choosing one of the users listed will allow you to send them a message in a pop-up window:



Their replies will also show in the same pop-up window.

If your correspondent ends the chat you will see this notification:

Creating new screens

The first version of *HHIMS* was completely "hard-coded" meaning that all the screens were of fixed design. The production of new screens therefore required the services of a programmer. In version 2 it is possible for users to create their own screens and to insert them into the patient medical record at suitable points.

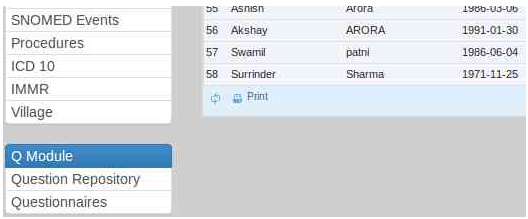
Screens that can be produced are built up from a list of possible questions (the *Question Repository*) that, when selected and grouped together, form a *Questionnaire*. Questionnaires can be linked together to form a set so that each screen does not become too crowded. At the end of each screen in a set, there a link can be added that takes you to the next screen. The same question can be re-used in different Questionnaires.

Collections of questions and screens developed in different institutions are, in principle, available to all users of the *HHIMS* system. For this reason the code-name of the questions and the screens that developed in different institutions should be chosen with care.

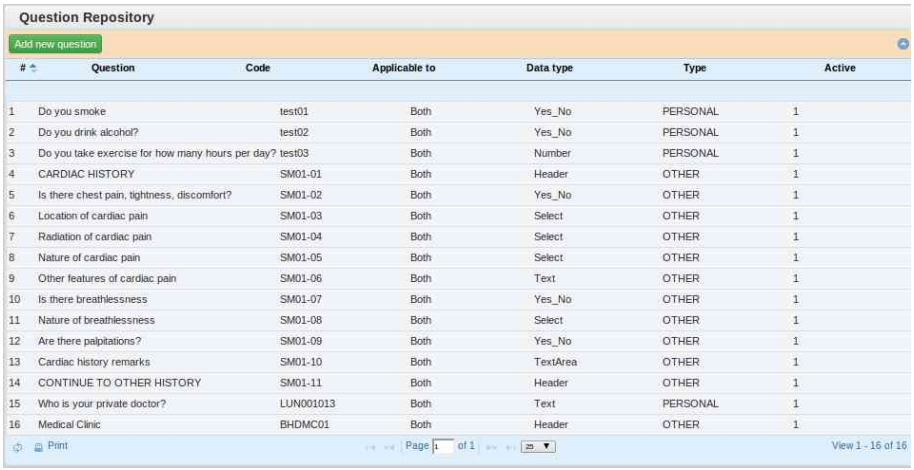
The Question Repository

Each installation of HHIMS has its own *Question Repository*. In order to add questions to this repository requires *Programmer* privileges.

On the left of the *Preferences* screen there is the sub-menu *Q-module* ("Questionnaire Module") where two menu items are available, the *Question Repository* and *Questionnaires*:



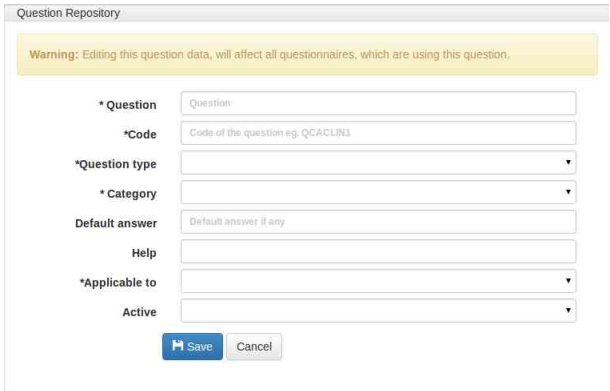
Selecting *Question Repository* will open a screen where existing questions are listed:



Your system will have more questions than this – the illustration was taken during system development.

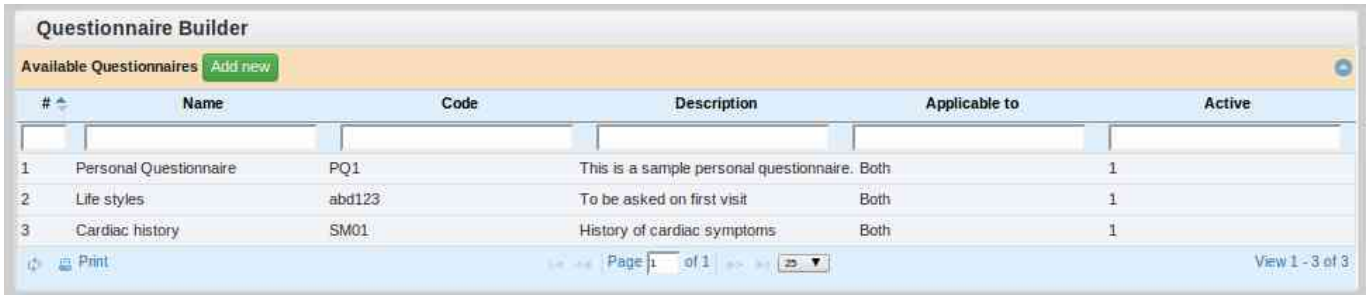
You can create a new question to add to this list from the green button at the top of the screen.

A pop-up window opens where you can define a new question for subsequent use in Q*uestionnaires*:



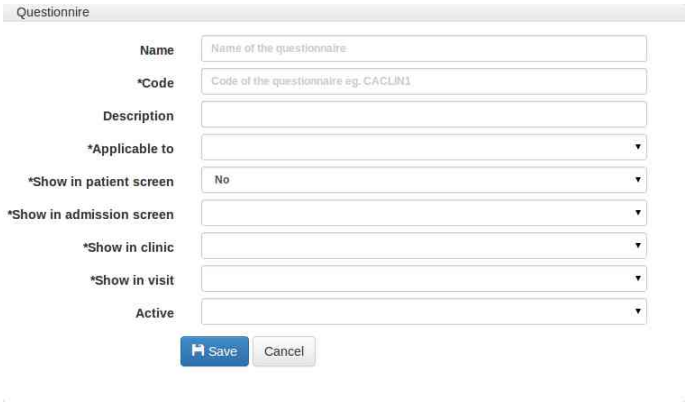
Production of a questionnaire

On the main *Privileges Screen* (*Programmer* access), choosing the menu item *Questionnaires* opens a screen showing a list of currently available questionnaires:



Your system will have more questionnaires than this – the illustration was taken during system development. In particular it will have the four examination screens that were commissioned in the current project (Cardiovascular, Respiratory System, Abdomen and Central Nervous System). It is recommended that you look at these questionnaires to get an idea of how the screens are built up. These screens can also be tried out with actual or test patients (see next section page 11).

The first step in creating a questionnaire is to add a new one by pressing the green button at the top of the *Questionnaire Builder* page.

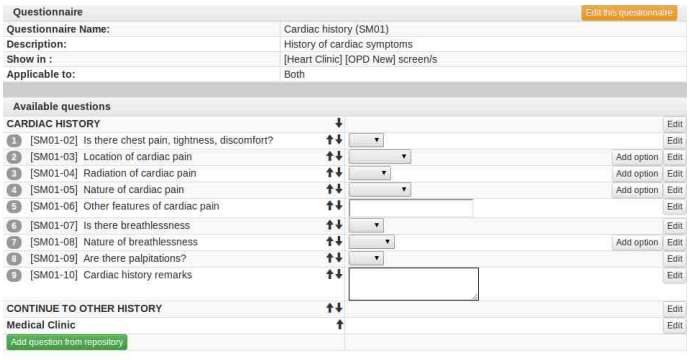


This will open a general description screen that you can fill in:

The field *Code* identifies this screen on the list of screens and can be used as an aid to grouping the screens into modules. For example the *Cardiology Clinic* module has 6 screens linked together – 2 for history and 4 for examination of a new cardiology patient. Their questionnaire codes all start with “SM”.

Once a screen has been created, you can add questions to it from the *Question Repository*.

The illustration on the right shows one such screen as produced by the system developer module:



You can use the screens provided in the standard distribution or make your own. *Questions* can be added (additional questions can be created if needed) or deleted from screens, or the order in which the questions show can be changed. Screens can be linked together by using the special question type *Footer*. Currently only forward-linking is supported.

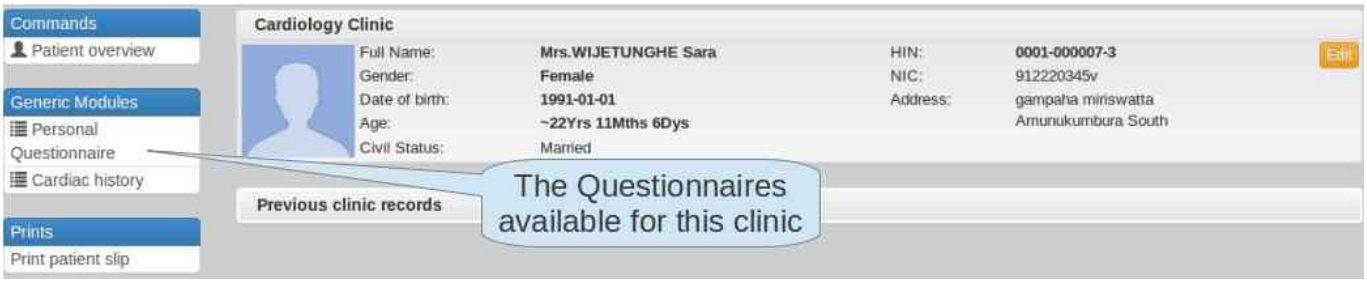
Using the questionnaires

As will be noticed from the meta-data defined when a new screen is created, the screens can be shown in the left menu of different sections of the patient record; as part of patient demographic data (the *Patient Registration Screen*), as part of an admission, and as part of the

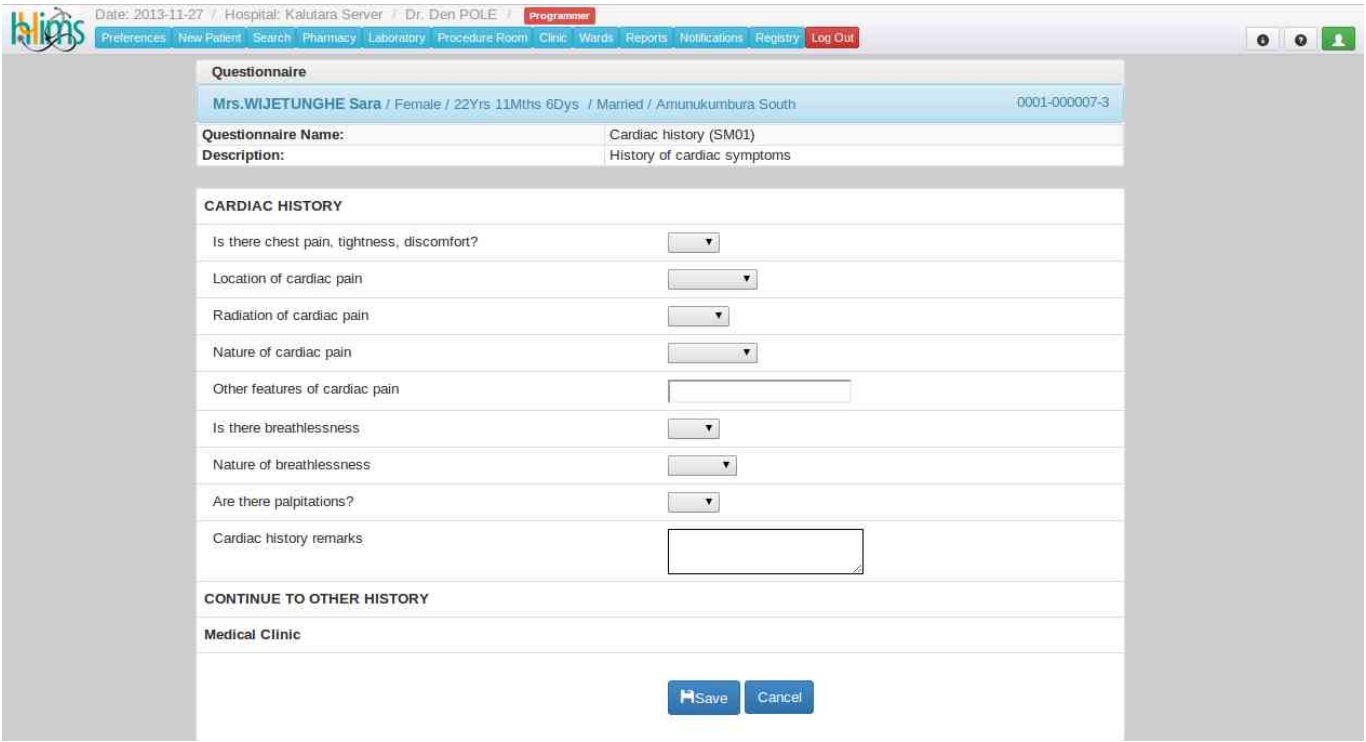
record stored on certain Clinic or OPD visits. These latter include *Emergencies*, *OPD new* visits and *OPD follow-up* visits. Any particular questionnaire screen can be shown in more than one place in the patient record.

The data in the screen, if opened and saved in the patient record, will be incorporated into the rest of the *HHIMS* data hard-coded into the system. It will appear in the appropriate reports and can be used for statistical analyses using Business Information (BI) software. An analysis module is not currently programmed into the *HHIMS* software, but the database has been designed so that it can be added at a later date. The fields from the questionnaires are named in the database after the code of the question. For this reason certain codes that clash with existing codes cannot be used (they will give an error message).

An example of the use of a questionnaire is shown here. It has been prepared for use in the Cardiology Clinic and therefore appears in the left menu of the Cardiology Clinic screen:



When the *Cardiac History* questionnaire is chosen, it looks like this:



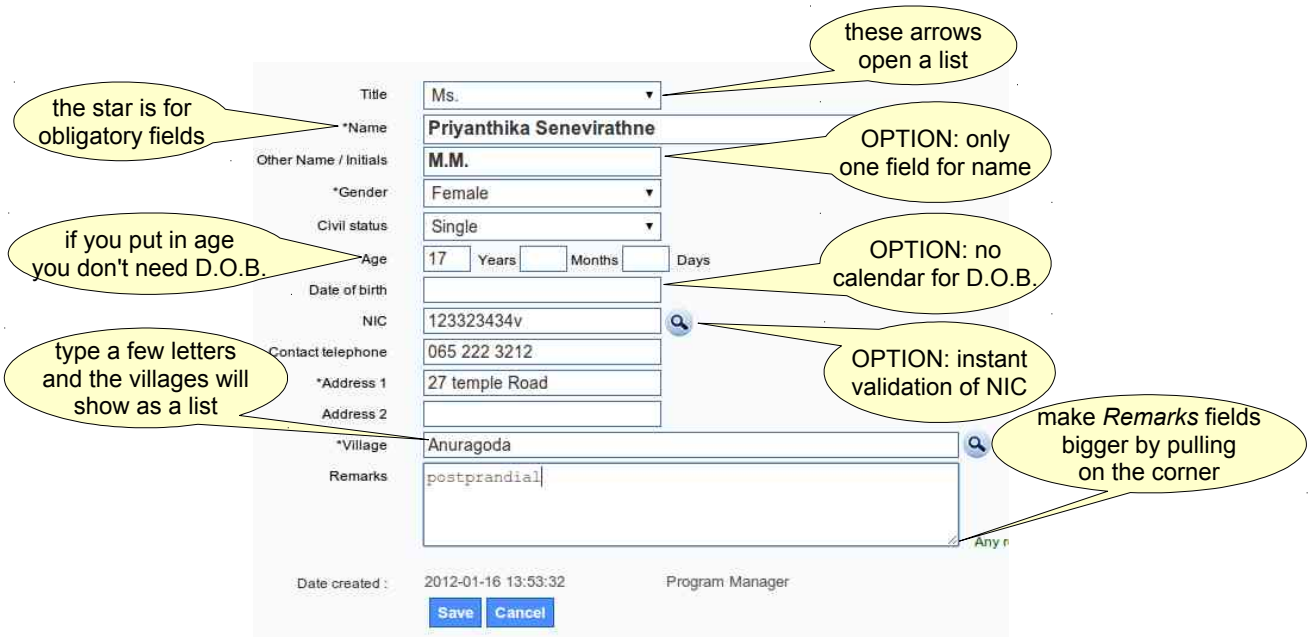
As can be seen, these screens are fully integrated into the *HHIMS* medical record. As well as the possibility of choosing a screen by the user, it is possible to order that a screen be opened automatically under certain circumstances. This saves time in opening frequently-used screens.

How to register a new patient

A patient must first be registered before they can be admitted or given an OPD/Clinic visit. Each patient gets a number from the computer that they keep forever. This number is shown on all the screens and the printed forms. There are some options for this screen (depending on the settings of the switches in the system table *Hospital settings*).

If the patient is already registered, they should not be registered a second time. To help avoid such duplicate entries, when you save the form a warning will be given of patients with similar details. Check on the search screen before making a new entry especially if the patient thinks they have been entered before. If you find a previous entry for this patient, you can stop registering the patient again and use their previous entry.

DO NOT REGISTER THE SAME PATIENT A SECOND TIME



Title

The form of address used on official forms or letters to the patient.

Name

This is full name used by the patient on official forms (ID card, taxation form etc.). Enter the name in capital and simple letters in the usual way for your hospital. If possible check the name on the NIC card or an official document that uses Roman letters.

Other Name

Other names or initials used by the patient such as "R.M.A.". Not normally used in official documents. If you prefer not to use this second field for names, ask your System Manager to change the default for this hospital.

Gender

Choose from the pop-up or put in a letter "F" or "M".

Civil status

Choose from the pop-up or put in the first letter.

Age

This is an alternative to entering *Date of Birth*. Years, months and days can be entered (or all three). For an adult you can just put in the number of years. For a child you can just put in the months or for a baby just the days. The approximate date of birth will be calculated by the computer. **Do not enter both *Age* and *Date of Birth*.**

Date of birth

Enter the date as DD/MM/YYYY (for example 22/02/1992). If the patient does not know the exact date it is easier to enter the age. The computer will convert one to the other. If you enter the *Date of Birth*, the computer automatically calculates their *Age*.

NIC

Sri Lanka National Identity Number (NIC). Currently, each NIC has a unique 10 character number, in the format nnnnnnnnna (where n is a digit and a is a letter). The first two digits of the number are the year of birth (e.g.: 88nnnnnnna for someone born in 1988). The final letter is generally a 'V' or 'X'. There are no spaces in the number. You can look up whether the same *NIC* number is already in the database by pressing the magnifier icon. Check that you are not trying to enter the same patient twice or have the wrong NIC number.

If you prefer not to use the letter in the NIC number, ask your System Manager to change the default for your hospital.

Contact telephone

The patient's phone number – area code followed by the number (spaces are allowed for example: 060 222 2222). If you prefer not to use spaces in the phone numbers, ask your System Manager to change the database default for this hospital.

Address 1 and Address 2

The standard for addresses in Sri Lanka is two lines. The first line is obligatory, the second line is optional. It is the postal address where the patient can be reached by letter or visited by public health workers. Some advice on finding the house can be put into the *Remarks* field. If you prefer to use one line for the address, ask your System Manager to change the default for this hospital.

Village

All the villages of the country are stored in the computer and can be looked up by typing a few letters in this field. You can also look for villages by District, Division and GN Division.

Remarks

This is a free-text field - you can enter any information on the patient that you wish. For example some helpful information to find their house will be useful for public health workers who may need to visit them.

Abbreviations are stored in the database – they start with a “\”. For example “\nfa” expands to 'No fixed address”. A list of abbreviations is available from the maintenance module. Go to the Clinical table *Canned text*. You can also add more abbreviations to use in this hospital.

Save

Stores the new record you have just entered or the changes you have made to an old record. Any errors detected by the computer in your input will be shown and have to be corrected before the patient data can be stored in the computer. You can also save the record from anywhere in the screen by typing *Alt-S* at the same time. Hold down the *Alt* key then press 's' at the same time.

If there is a duplicate patient (same name, gender and village) a warning will appear. You can ignore the message and over-ride the warning if you wish.

After the data has been saved, the computer will show the *Patient overview* screen. There you can choose different printouts for this patient such as the *Patient slip* or a *Patient cards*.

Cancel

Leave the screen without changing the computer database.

Printing a card for the patient

Cards like this can be printed from the *Patient Overview* screen:

The patient number used is the '*HIN*' (Health Identification Number) managed by the Health Ministry. There are 11 digits in this number, broken up into three sections as follows:

nnnn – nnnnnn – n

- the first section is a 4-digit number identifying the health institution that allotted the number to the patient. This number is provided on request by the Health Ministry,
- the second section is a 6-digit running number. When HHIMSv3 is used to replace earlier versions of *HHIMS*, this number will be made the same as the previous '*Register number*' so that the previous records can be linked to the new ones,
- the third section is a single check-digit (allotted automatically by the computer).

An example of a number allotted by the Point Pedro Base Hospital might be:

0105 – 002468 – 7

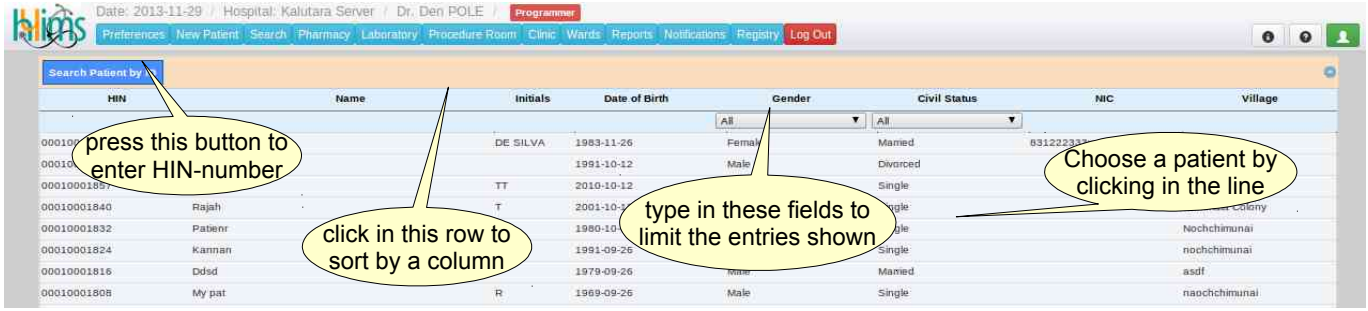
How to create a patient visit

There are two types of encounter for which clinical information can be recorded in *HHIMS*: an OPD visit (appointment is optional) and a Clinic visit (appointment is obligatory). For admissions to the hospital, see the separate section (below). Both types of encounter are created from the *Patient overview* screen.

If you know the patient you are dealing with, choose them from the *Search* screen or type Alt-F followed by typing their HIN-number or using a bar-code reader to open this screen. If a patient link has been sent to you via the chat module, you can also click on that link to open their *Patient overview* screen. The patient can also be searched for in the *Clinic Appointment* list (accessed via the main menu-item *Clinic*) and in the *Ward* list (accessed via the main menu-item *Ward*).

The procedure for creating an encounter is different in each of these cases (see below).

Patient search screen



The *Search* screen lists all the patients who have been registered in the computer. You can move around in this list using the navigation buttons on the bottom row where you can show up to 100 patients on one screen.

The top row of the screen has details about the person currently logged in followed by a language choice button. Each user can decide on the language in which to show prompts on the screens. At present these are Sinhalese and Tamil – more languages may be added in the future. This choice is remembered next time you log on.

The second row of the screen has a set of menu buttons that show the main modules of the database. Choosing one of these menu items will take you to another module in the system.

The easiest way to find the correct patient is to type in their HIN-number. If this is not known it is possible to search for the patient by name, date of birth, residence village etc. As you start to type letters or numbers, the screen will show a selection of patients that contain those characters no matter where they appear in the list. At the bottom of the screen, there are buttons that allow you to choose the number of rows shown on the screen. If you choose fewer rows the system runs quicker. With a fast connection, you can show more rows.

HIN number

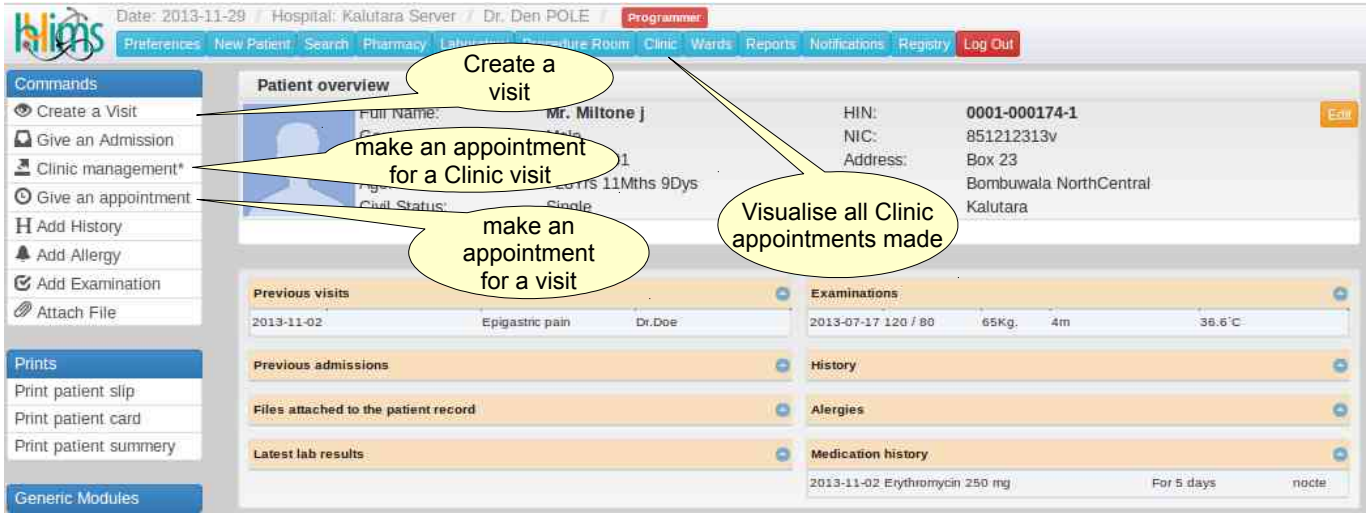
Following Health Ministry policy, the patients stored in the hospital database are given a HIN-number provided by the first government institution where they were entered. Each patient will keep this number on future visits to the hospital. It never changes. The quickest way to enter this number is to type Alt-F (simultaneously) and to enter it from the keypad or by using a bar-code reader on a patient document such as the *Patient card*.

Patient personal information

The fields shown on the search screen provide enough information to choose the correct

patient. When the screen first shows, the rows are sorted by Patient *HIN-number*. To sort by other columns, click on the field name. A second click sorts in the reverse order. Select a patient from the search screen or with Alt-F, to show the *Patient Overview* screen.

Patient overview screen



This gives an overview of all contacts between the patient and the hospital and allows you to make new encounters. It also shows the salient features of the medical record; previous visits and admissions, examinations, past history, allergies, files attached to the record, lab-tests and medications. In the menu on the left of the screen there are *Commands* to record some of these activities for this patient. This is followed by *Prints* which allows you to print reports referring to this patient (but not prints related to a specific encounter) and any questionnaires that have been created at the patient-level.

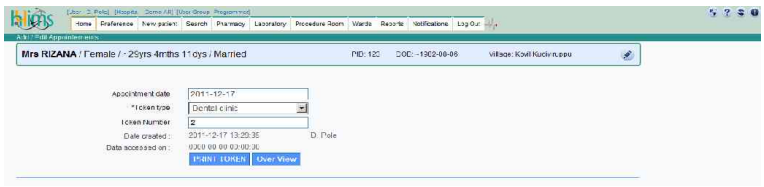
In this example the test patient with HIN-number 0001-000174-1 has had 1 previous visit but no admissions. In order to see more detail on the previous visit, click on the corresponding row. To open any other of the details that might be shown for other patients, click on the corresponding line.

Giving an appointment

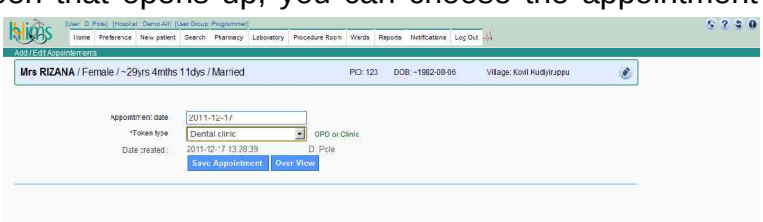
It is possible to give a patient an optional OPD appointment by choosing the menu item from the list on the left of the screen. In order to give the obligatory Clinic appointment you need to open the Clinic Management option first. Appointments can be made for the future. The earlier the appointment is made, the lower the appointment number.

Making an OPD appointment

Although it is not obligatory, it is possible to make an appointment for OPD and to print it on a POS-printer. Choose the menu item '*Give an appointment*' on the left of the screen.



Enter the appointment details on the screen that opens up, you can choose the appointment date (default date is today) and the room for which the appointment should be made then press *Save*:



An additional field shows giving the sequence number of the patient in the OPD/Clinic that you have chosen. You can either tell the patient what their appointment number is or you can print the token on a POS-printer. This is useful if the doctor has a bar-code reader.

Making a Clinic appointment

Choose the menu item '*Clinic management*' on the left of the screen.

The following screen opens (it will differ in your institution depending on the number of Clinics available):

It shows the clinics of the hospital together with brief details about them. The Maternity Clinic does not show as this patient is male and the pediatric Clinic also. To make an appointment click on '*Refer to this clinic*'.

On the screen that opens, you can make an appointment (for today or a day in the future):

Saving this appointment shows the previous screen with the appointment details recorded:

If the appointment is for today, you can go proceed directly to recording the clinical details of the visit.

Printing the Clinic record

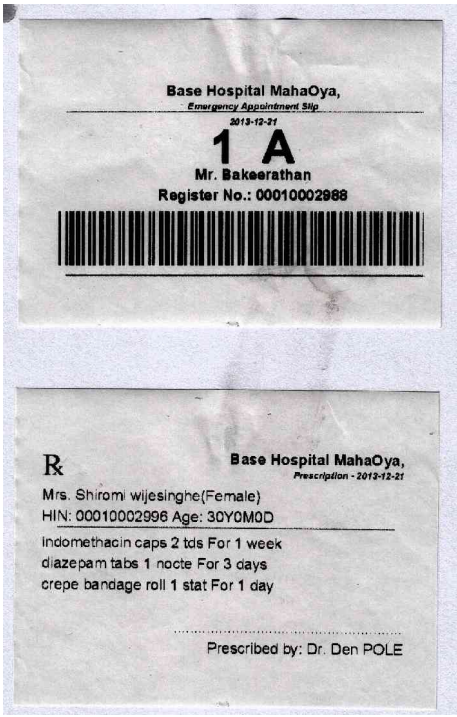
For hospitals without a specialized passbook-printer, the Clinic reports must be printed on normal A5 paper and stuck into the Clinic book. Hospitals with passbook-printers can use them to print in the Clinic book directly. Choose the menu item in the left menu of the clinic visit record.

To use the passbook-printer, you will need to get special booklets that have a spine that is sewn, not stapled. DO NOT USE BOOKLETS THAT ARE STAPLED OR THICKER THAN 0.54mm AS THESE MAY DAMAGE THE PASSBOOK PRINTER. The HHIMS Foundation (www.hhims.org) can advise on companies that provide suitable booklets.

Examples of some of the printouts available in the Clinic module are shown on the following page:

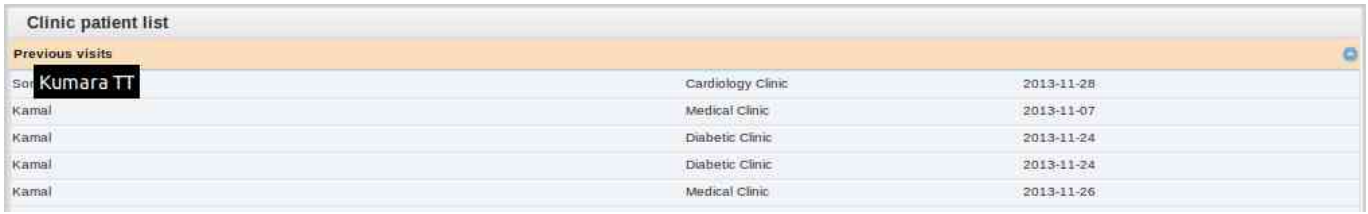
Example of a low-cost Clinic book with a Clinic record printed by a Citic PB2 passbook printer:

Examples of an appointment token and a prescription printed on a Zonerich AB-T88 POS-printer is shown here:



Visualizing all Clinic appointments

The Clinic appointments are stored in a table in the database that can be visualized and searched similar to the *Patient Search* screen. This screen looks as follows:



The list can be sorted by patient name/number, Clinic, or date and can be selected on these 4 fields.

Clicking on one of the rows in this table initiates a Clinic visit and the entry is removed from the appointment list. More details are available on Clinic visits in the section 'Entering visit information' (below).

Entering visit information

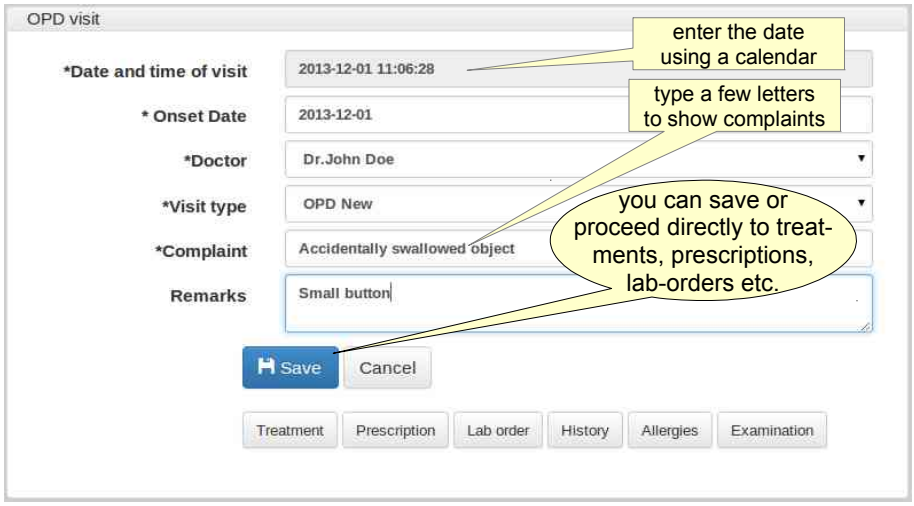
OPD visit information screen

When you choose a previous visit, the *Visit information* screen opens:

This screen gives an overview of all the information stored for one visit (Complaints, Examination, Lab-tests, Prescriptions and Treatments) as well as Past history and Allergies. Each set of information is shown in a separate window. Each of these windows can be opened to edit the data by clicking on the icon on the right of each window. If the visit was today, data can be changed, but after one day it is fixed and cannot be changed. The only exception to this rule is that *Remarks* can be added.

The menu on the left of the *Visit Information* screen has *Commands, Questionnaires* and *Prints* for entering or outputting the information for the single visit chosen.

Entering OPD clinical data



After choosing to view a previous visit or to enter a new one, the screens that appear look the same. The difference is that data for visits on previous days can only be viewed but not changed apart from *Remarks*.

The date of the visit is recorded as well as the onset date for the complaint. You can choose clinical data from 3 lists – common complaints, ICD-10 diagnoses or SNOMED findings. If the complaint or ICD term is one of the notifiable diseases, it shows in red and the patient can be notified to the patient's Medical Officer of Health. This linkage is provided by the Epidemiology Department of the Health Ministry. If you never use these detailed fields, you can remove them in the system table *Hospital Settings*.

Another option on this screen is to enter free text remarks in English, Sinhalese or Tamil. Abbreviated text blocks may also be called (text blocks can be stored in the database).

Date & time of visit: this is the current time when the visit is registered. Ensure that the time in your computer is correct.

Onset date: the day the complaint first started. This defaults to the current date when the visit is registered but can be changed by clicking in this field then choosing a date from the pop-up calendar.

Doctor: this is the name of the doctor responsible for the patient on this visit. The computer shows the person who is logged on as a default value. If a name is not in the list, it can be added in the *Preference* module *Users* table.

Visit type: the type of visit or the clinic can be entered. Additional entries can be added in the system table *Visit type*.

Complaints / Injury: the reasons the patient gives for coming to the hospital can be chosen by typing in a few letters of the complaint. You can also open a pop-up list with the magnifier icon if you prefer. This list can be changed in the *Preference* module *Complaints table*. The complaints can be chosen according to the type of term. As well as simple complaints, all the notifiable disease are included - they show in red in this pop-up window.

ICD / SNOMED: optionally, diagnostic terms from the ICD or findings from the SNOMED-CT terminology can be selected by clicking on the magnifier icon for the corresponding field.

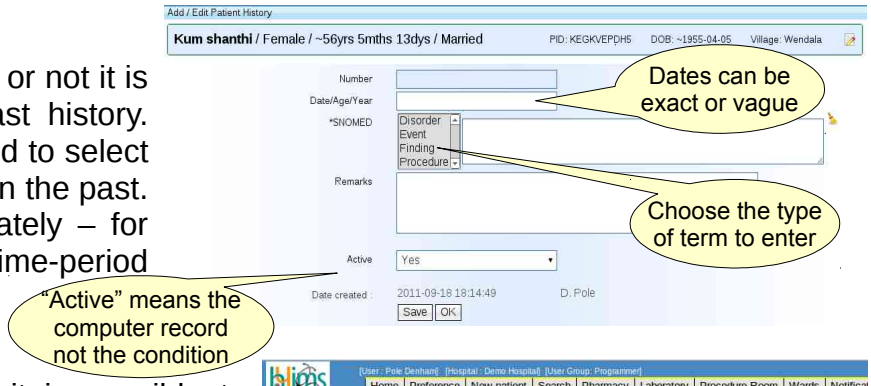
Remarks: free text can be entered in this field. There are no restrictions on the text that can be entered. Canned texts can be used by entering a slash '\' followed by the abbreviation. To enter text in Sinhalese or Tamil letters ask your System Manager to install the appropriate keyboard App. When installed, press Ctrl-Space and the letters will change to the chosen language. Fields with a gray triangle in the bottom-right corner can be enlarged by dragging it with the mouse.

Save / Cancel: Store the visit you have just entered with *Save*. If you want to enter further information, you can bypass the *Save* button and go straight to lab-test ordering, drug prescribing etc. The bottom row of buttons saves the patient first before carrying out these functions.

Recording additional patient info

Add past history

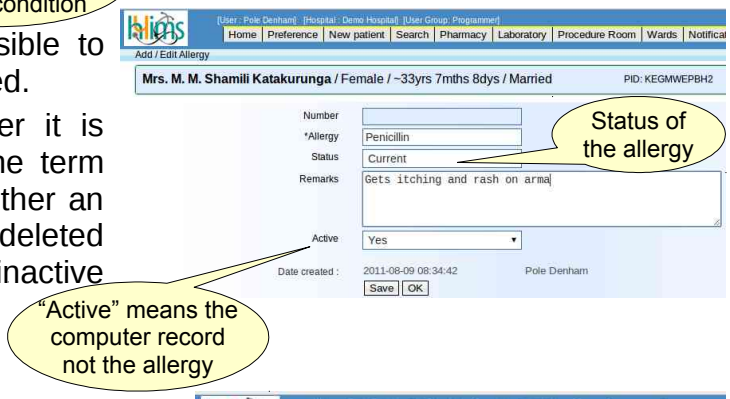
Whether a visit has been recorded or not it is possible to record an item of past history. The SNOMED-CT database is used to select an event or disease that occurred in the past. The date can be given approximately – for example just the year or a text time-period such as “at school”.



Add allergies

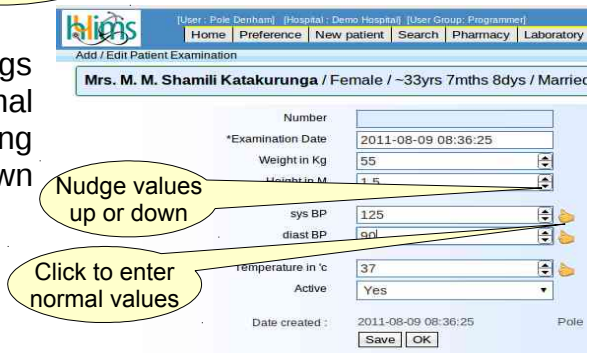
Once a visit has been recorded it is possible to record an allergy. Currently free text is entered.

The “Status” of the allergy means whether it is currently active or just a historical fact. The term “Active” is used in this system to show whether an item should be ignored. No data is actually deleted from the database but is just shown as inactive (scored out on the patient overview screen).



Add an examination

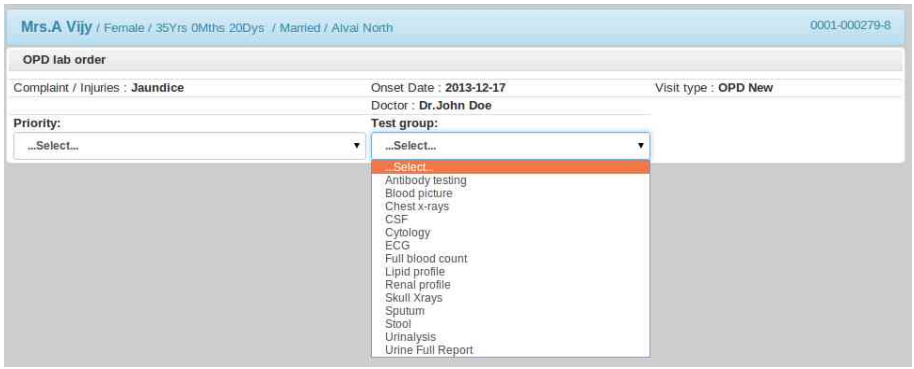
If the patient is examined during the visit, the findings can be recorded on this structured screen. Normal values for the numerical fields can be entered by clicking on the hand icon. The values can be nudged up or down using the arrows at the end of the boxes.



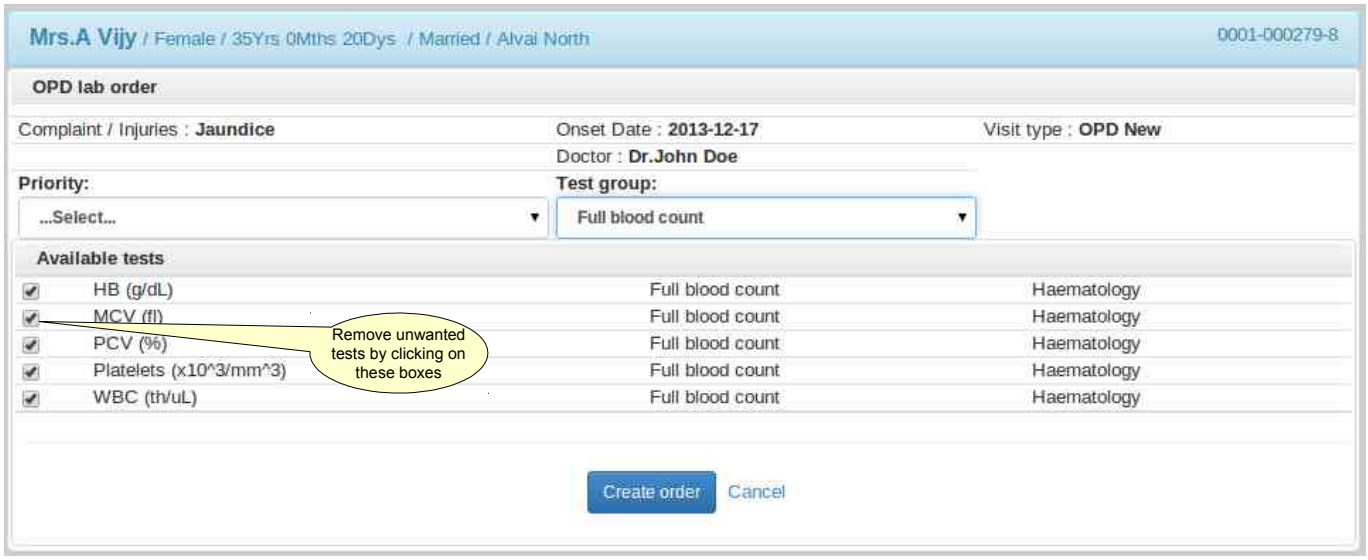
Order lab-tests

On this screen, the doctor can order lab tests for the patient who had this OPD visit:

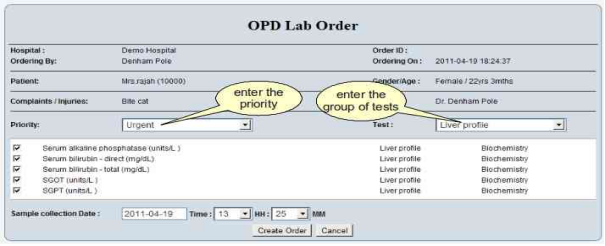
The tests are arranged by department (e.g. Hematology, Biochemistry) and within each department are grouped so that they can be ordered together (e.g. Urine screen, Lipid profile).



Tests in a group not required for this patient can be removed from the list.



Prescribe drugs

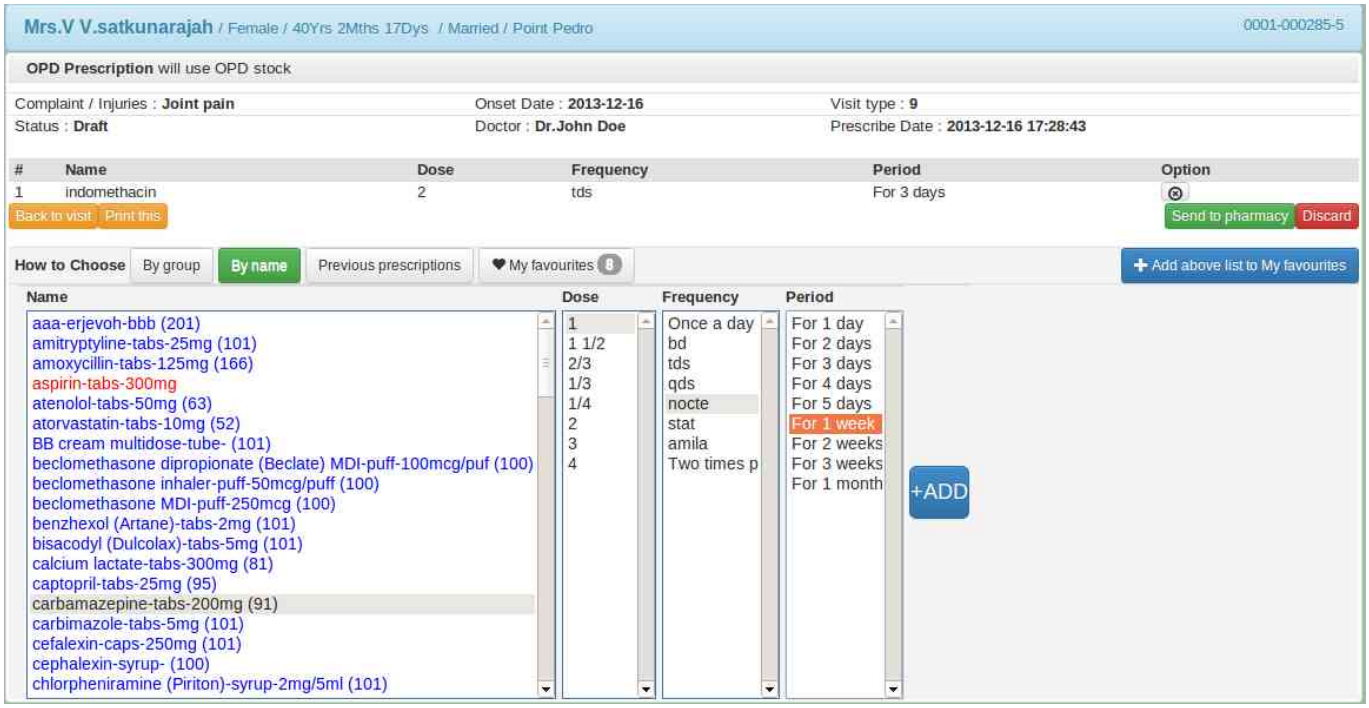


In previous versions of *HHIMS*, the only way to select drugs to prescribe was to choose the combined drug name / formulation / dosage from a list. In version 2, this method (choosing by name) is still available but two more methods of selection have been added: choosing from pharmacological groupings and from sets of medications created by the user.

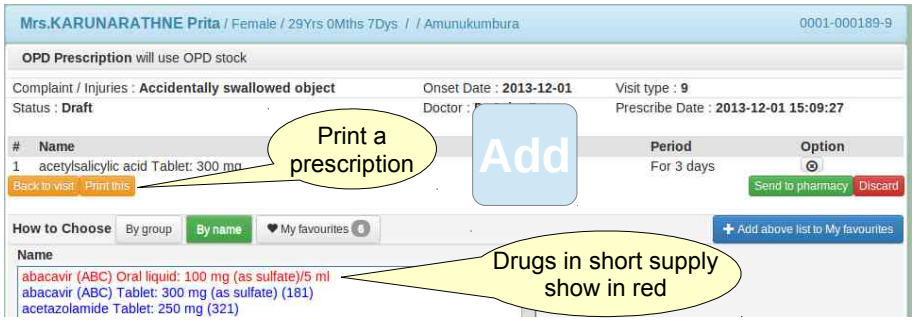
Selection by name

When selecting medications by name, the first window shows the list of drugs with their formulation and dose available in the dispensary attached to your department (see illustration on next page). It also shows the number of doses remaining in the stock available.

Each department and ward can maintain their own stock levels in the database. The stock list that you are currently using is shown at the top of the screen just below the patient's name. If the level of stock falls below a certain quantity, the preparation is listed in red. The patient's recorded allergies are also shown to remind you of possible incompatibility with certain medications.



On the right of the list of medications, the other windows allow you to record the number of doses, the frequency to take them and the period for which they should be taken. This allows the dispensary to choose the appropriate number of doses to dispense. Default values show in these 3 windows (they are set by the pharmacist in the *Drugs* table from the *Preferences* menu). After choosing a medication, press the large blue button at the right of the screen and the choice will be added to the prescription.



Once you have prescribed at least one medication, several buttons appear below the prescription allowing you to process it further:

Back to visit: this returns to the visit screen without any prescribing.

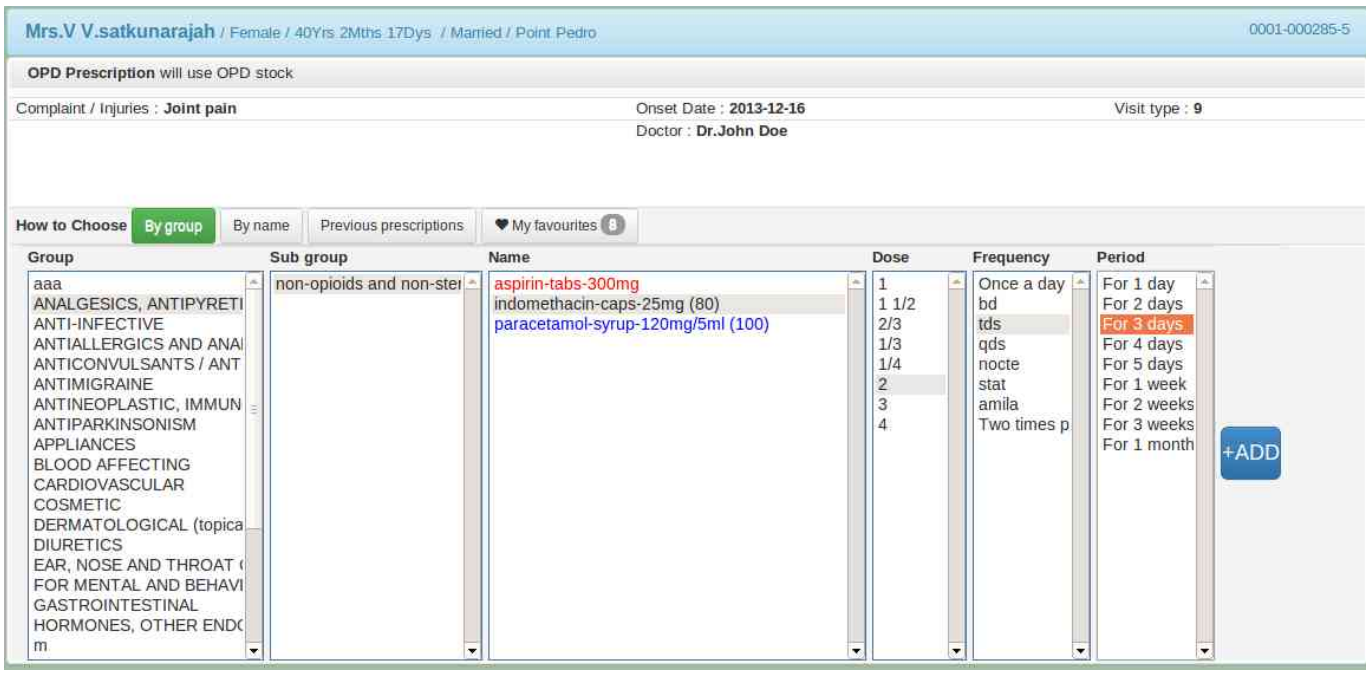
Print this: this allows you to print the prescription (on a POS-printer if available). You can print all the drugs prescribed or limit the list to those that you want the patient to acquire privately.

Send to pharmacy: finish the prescription and send it to the dispensary to await the patient's arrival – after making this choice the prescription is closed and cannot be further changed.

Discard: cancel the prescribing activity.

Add above list to My favourites: make a personal set of medications from this prescription that can be prescribed as a single set (you can name this list - see below).

Selection by group

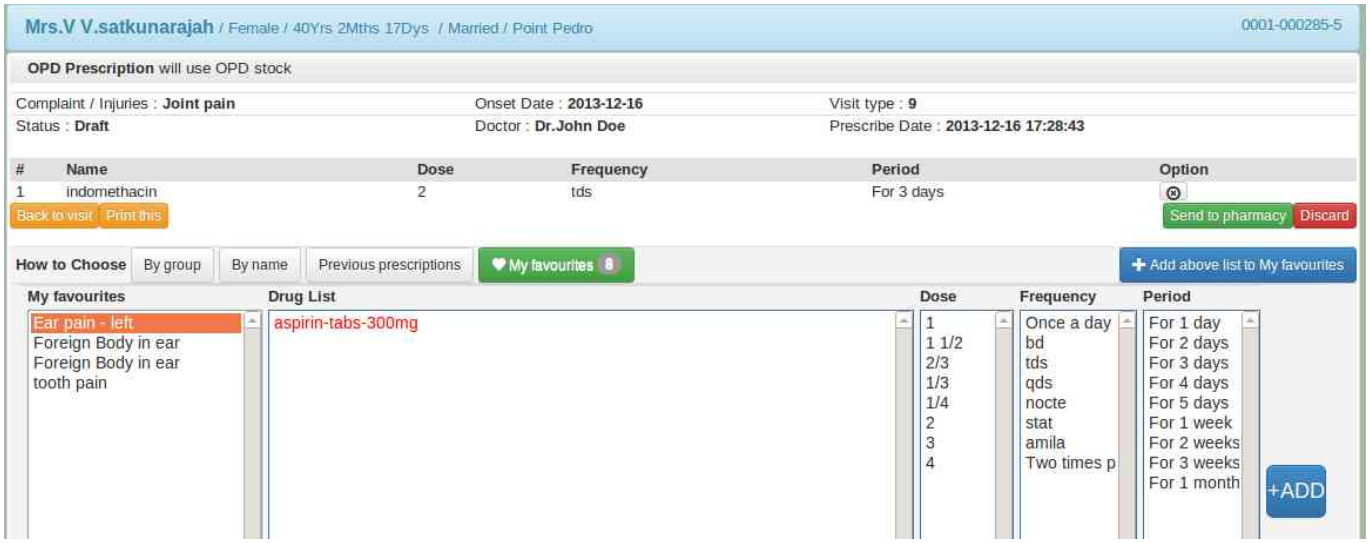


In this method of selection, the same set of medications is shown but now they are sorted by pharmacological groups. These groups are created by the hospital pharmacist and follow the grouping in the WHO list of Essential Medicines.

It is possible to select some of the medications by group, then shift to the selection by name to add more drugs that way.

Selection by 'My favourites'

The third method of selecting from the medication list is for individual users to create a personal set of preparations and to give them a name. A complete set, or more than one set, can then be prescribed together by the same doctor in order to save time for common combinations of medications. These lists are personal and not shared with other users.



In this example, the doctor has prepared 4 lists of medications for his own personal use and given them names for easy identification. The one chosen here is called “Ear pain” and contains the medications aspirin with an appropriate dose, frequency and period. If the list contains more

than one medication, they can be selected individually as required. An advantage of these lists is that they save the user a lot of time spent scrolling through the full list of drugs in stock. It is also possible to apply 2 or more selections, or to choose further drugs using the previous methods (by name or by group). In testing, it was possible to produce a typical OPD prescription in less than 5 seconds – the design criterion.

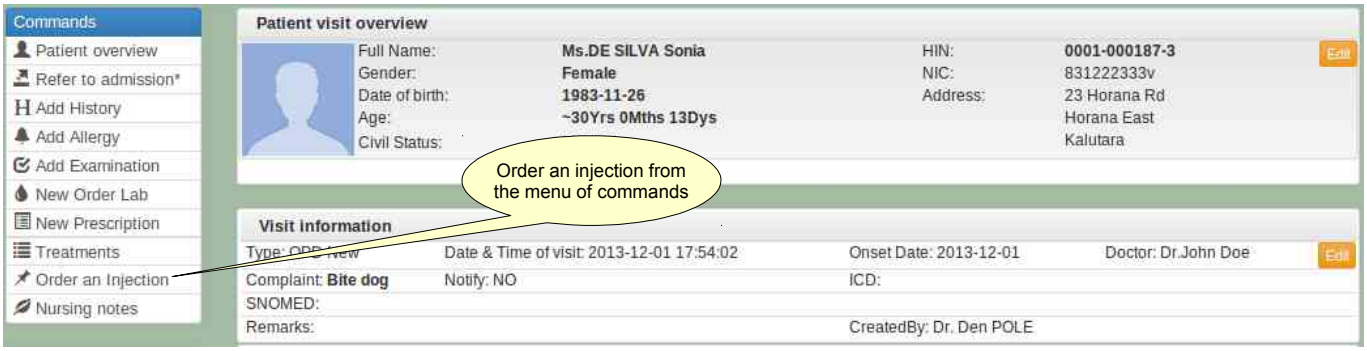
It must be emphasised that the existence of these sets is a private matter of individual doctors and in no way implies that the *HHIMS* software is giving any advice or recommendations on treatment. It is merely reproducing an aide-memoire list stored by an individual doctor in the computer. The lists are not shared with other users and cannot be accessed without the username and password of the person who created them. For a more complete disclaimer, see the text shown by pressing the "i" (information button) on the top-right of each screen.

Order treatments

On this screen, the doctor can order treatments for the patient who had this OPD visit:

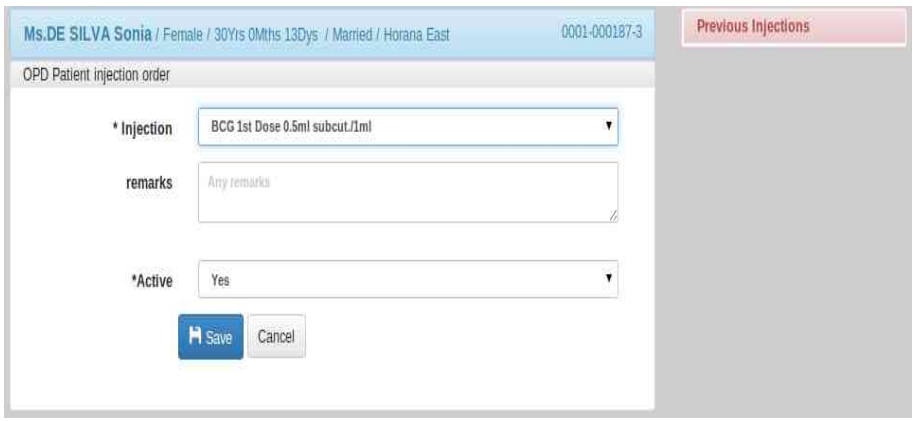
Treatments not in the list can be added on this screen or by editing the *Treatments* table *from the Preferences* menu.

Order injections



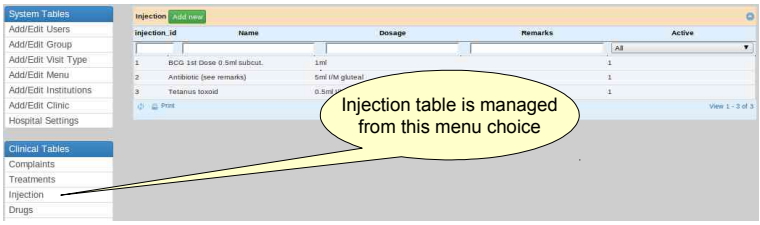
A special aspect of out-patient treatment is giving injections. As these are often administered by a separate staff, *HHIMS* has a second module to order them. On the *Patient Visit Overview*, choose the command '*Order an injection*':

In the screen that opens select an injection to order:



If previous injections have been ordered, they will show in a list on the right and can be repeated.

Before using the injection order module you may need to add items to the table of injections. This table is accessed from the *Preferences* module ('*Clinical tables*') by choosing the left-menu item '*Injections*':

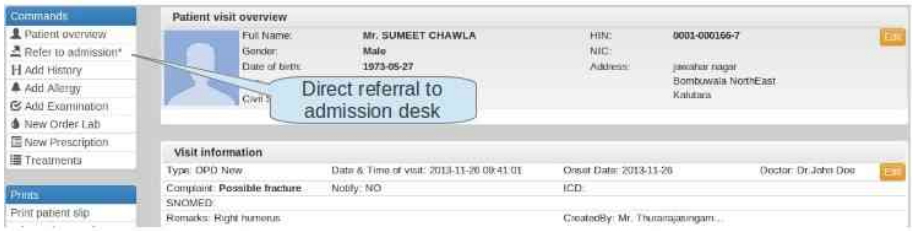


You cannot delete items from this table as they may have been referred to in previous patient records.

Direct referral to admission desk

Although in many cases, patients needing admission will be handled directly by the admission desk, it is often the case that patients are first seen by a doctor in the OPD Department or in a Clinic before being admitted. The notes taken at such consultations and the prescription, treatments and lab-tests ordered are useful for the admission and need not need to be re-entered by the admission officer. This considerably streamlines the admission process.

A menu item is visible on the Patient Visit overview screen to initiate this function:



Make sure you have added all the useful information to the visit record (such as diagnosis and any suggestions for the management of the patient) before choosing this menu item “Refer to Admission”.

After referring the patient for admission, you should not order any more lab tests or treatments, or prescribe any more drugs as the patient will no longer be in the out-patient department and the results or prescriptions will go to the wrong place. These can be added after the patient is admitted.

The next form that appears will be the admission referral form:

You can add several items to this form before sending it to the admission officer for the actual admission:

If the case is urgent you may wish to inform the Admission Officer that the case is coming by using the chat module or by phone.

This referral will be visible from the main menu module *OPD Referrals* and can be further processed by the admitting officer responsible for that activity. If it is necessary for the admitting officer to add further information (such as the ward or remarks) they can add this to the admission record once the patient is admitted. Any orders (such as lab-tests or prescriptions) that might be necessary can also be added to the admission record (if the patient is admitted) or to the OPD visit record (if the patient is returned to OPD).

On the visit information screen, the referral that you have made will be indicated by a small blue indicator:

The referral form can also be opened again to add additional information.

Entering data on a Clinic visit

Clinic visits are initiated either via the '*Clinic Management*' menu choice or from the list of *Clinic appointments* (see the section '*How to create a patient encounter*', above).

When a new clinic visit is opened for the first time it is blank:

Unlike the case of the OPD record, there is no fixed Clinic record screen – each Clinic has its own questionnaires that can be created by the consultants in individual institutions. There are also simple basic record screens that can be used for any Clinic.

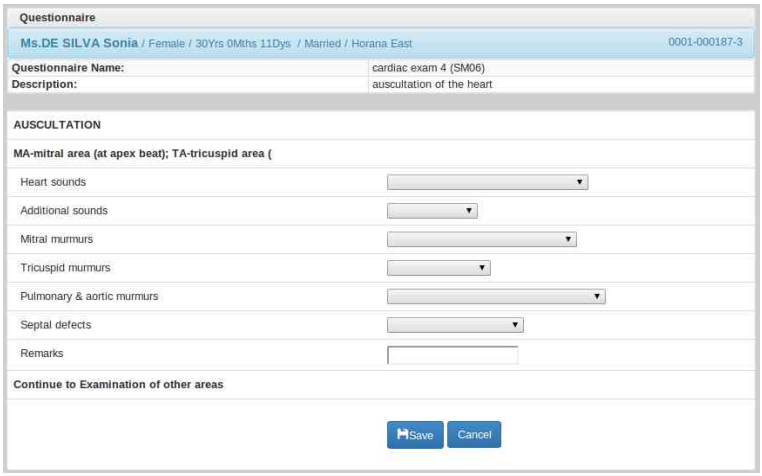
If there are previous visits, they are summarized on the screen:

Clicking on one of these previous records shows the clinical details recorded in them:

New questionnaires can be opened from the list in the left menu. These questionnaires can be prepared by the hospital consultants without specialised programming skills. The standard distribution contains several preconfigured questionnaires that can be used as is or modified

according to the requirements of individual consultants.

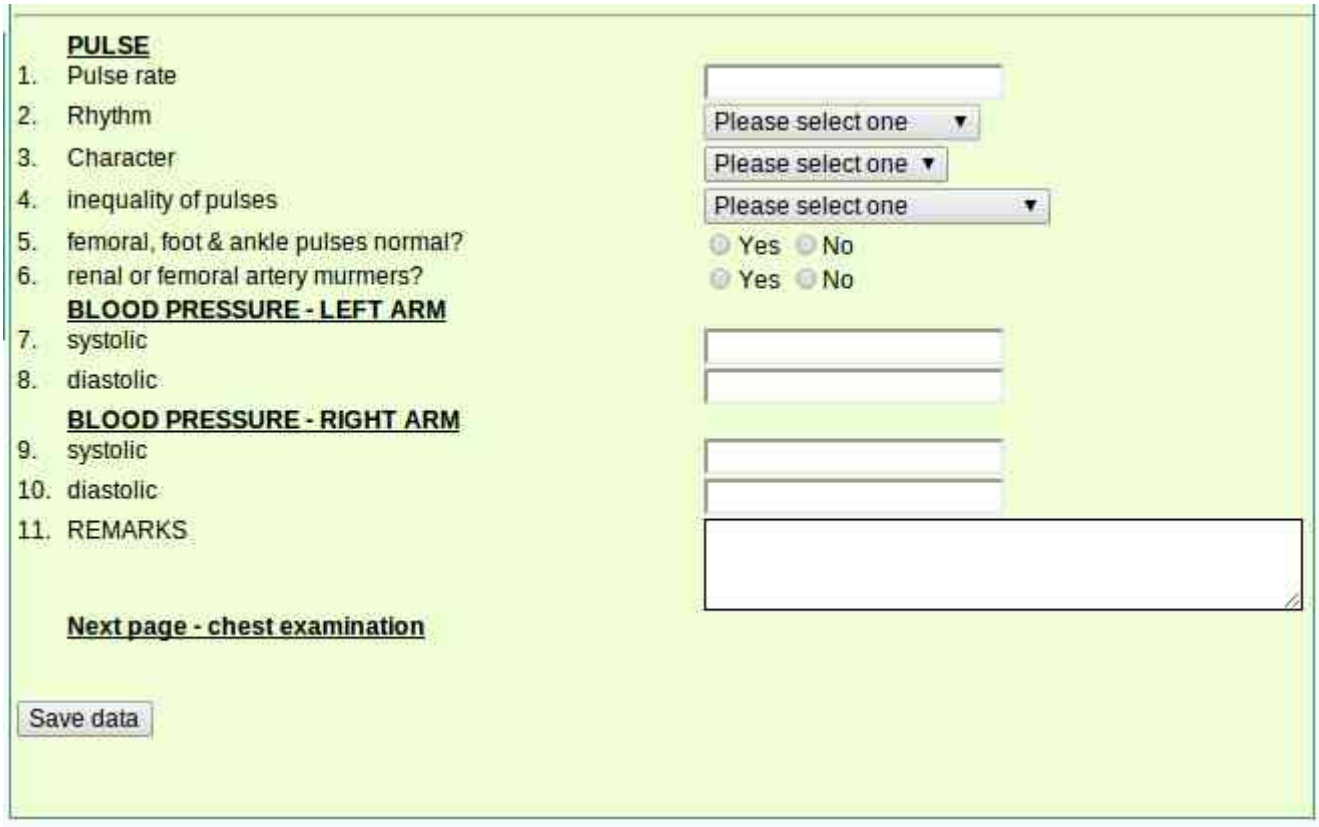
This is an example from a set of screens designed to capture cardiology clinic history and examination findings:



Flexible Clinic record screens

A major new development in HHIMSv2 is the existence of separate patient record screens for the different types of Clinic. These screens can also be designed by the staff of the hospitals using the system and to adapt then to the specific needs of the consultants. For further information see the section on the *Questionnaire Module* '*Creating New Screens*' (above).

An example of a specialised Cardiology Clinic examination screen created using this module is shown here:



As well as the detailed Cardiac clinic history and examination, five standard examination screens were created during the development of HHIMSv2. They are shown in a separate document (HHIMSv2 Examination Screens.pdf).

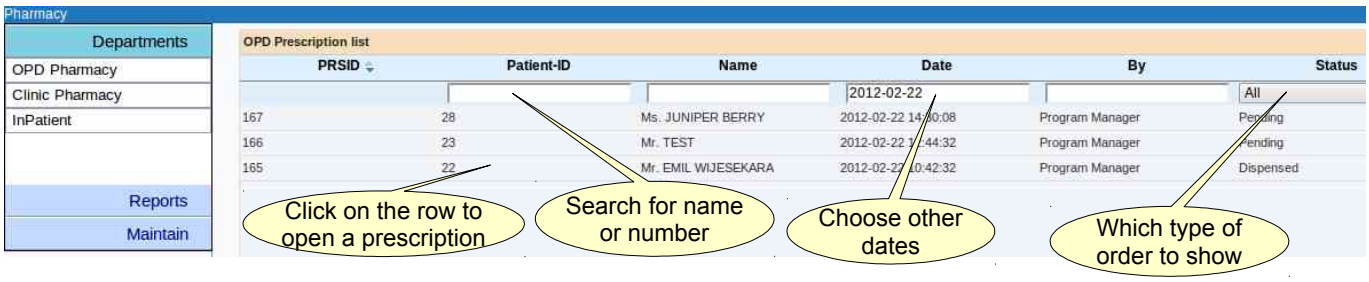
Processing visit orders

After the doctor enters the orders for an out-patient visit, the staff can record the action taken for each type of order such as drugs to be dispensed, lab-tests to be carried out and treatments to be given. Each of the different types of order is processed by staff attached to different sections of the OPD department. For each section there is a separate module which allows the staff to record the orders carried out but does not reveal all the clinical information. Missing drugs, lab-tests or treatments can be added in the basic data tables (page 42).

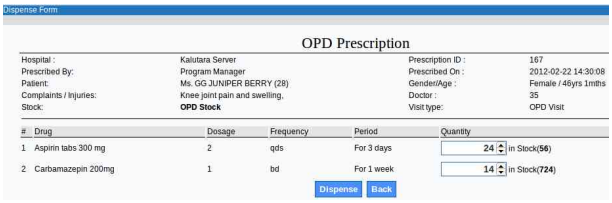
Pharmacy dispensing module

This module is chosen from the menu bar at the top of the screens. It allows the pharmacy staff in the out-patient dispensaries (OPD & Clinics) to dispense the drugs prescribed by the doctors.

When this screen opens it shows the prescriptions made today. Other days can be chosen using the date choice window at the top of the table. You can also show all the prescriptions for this day or only the ones that have not been dispensed. The pharmacist can search for the prescription using the patient name or the registration number.



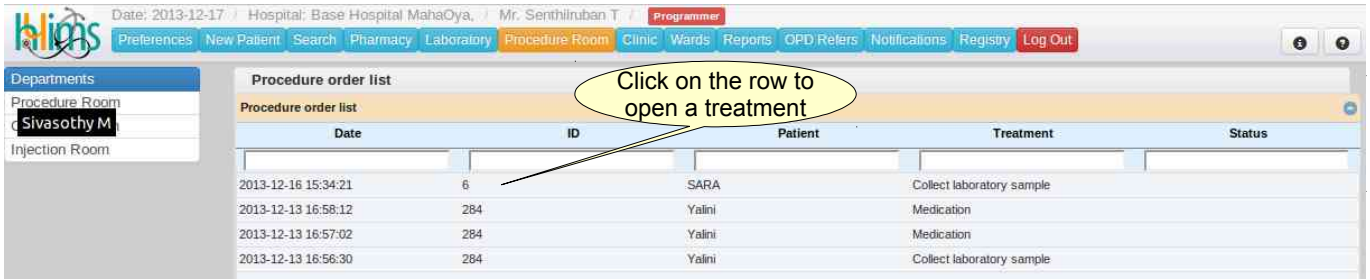
After clicking on the row with a prescription, a screen opens showing details of each drug prescribed. By viewing these on the screen, it is not necessary to use paper so the dispensary can run paperless.



The computer calculates the approximate number of tablets from the doctor's prescription. This figure can be changed by the pharmacist if necessary. At the end of each day, various reports on the daily drugs prescribed and dispensed can be listed.

Recording treatments

This module is chosen by the Procedure Room staff from the menu bar at the top of the screen. It allows you to see what treatments are ordered and to record the fact that they have been carried out. The treatments ordered today are shown first and the default display is 'Pending':



One of these treatments can be selected by clicking on the corresponding row.

The screen that opens when you choose one of the treatments, shows the details of the doctor's order including the remarks for each treatment entered:

You can add additional remarks if necessary. After the treatment has been carried out, the status can be changed from “Pending” to “Done”.

Recording of lab test results

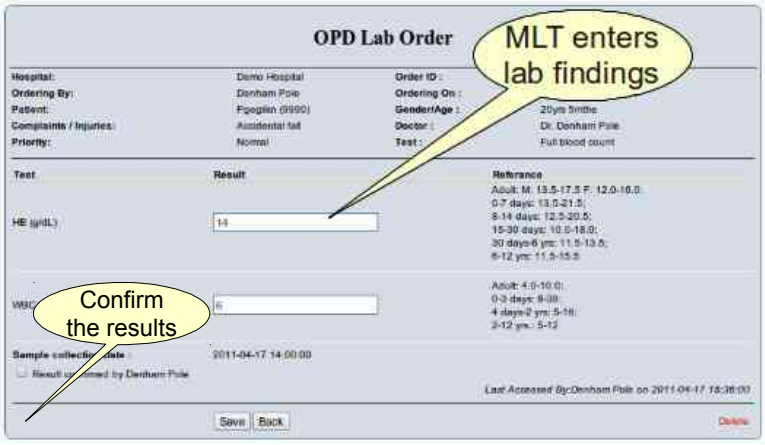
This module is chosen by laboratory staff from the menu bar at the top of the screen. It allows the laboratory staff to see tests ordered by the doctors and to record the results.

When the screen first opens, it shows the tests ordered today:

You can show all orders or only the ones that are pending.

When you click on one of the lab-test orders in the overview list, a screen opens showing the details of that lab-test:

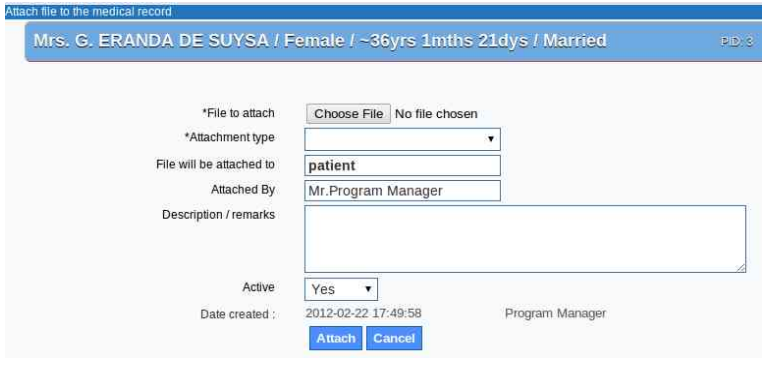
On this screen it is possible to enter the results manually. After the results are entered, the entered values must be confirmed to avoid errors.



Adding a document to the record

It may be necessary to store a softcopy (digital file) of an image or a document with the patient record. These may be images (digital X-ray, microscope image, ECG tracing etc.), scanned paper documents from an attached scanner, or text files (Libre-Office document rtc.).

The file is selected by choosing the menu item *Attach file* on the left panel of the *Patient overview*. The screen that opens is as follows:



File to attach: clicking on *Choose file* opens the file browser of your operating system. You will be able to browse the files available on your PC or other

computers connected to the LAN. As this will differ in different installations, specific instructions must be supplied by your System Manager who will set up the access to the files you may need.

Attachment type: this is the type of file (PDF-document, scanned image, ECG etc) to allow them to be processed differently.

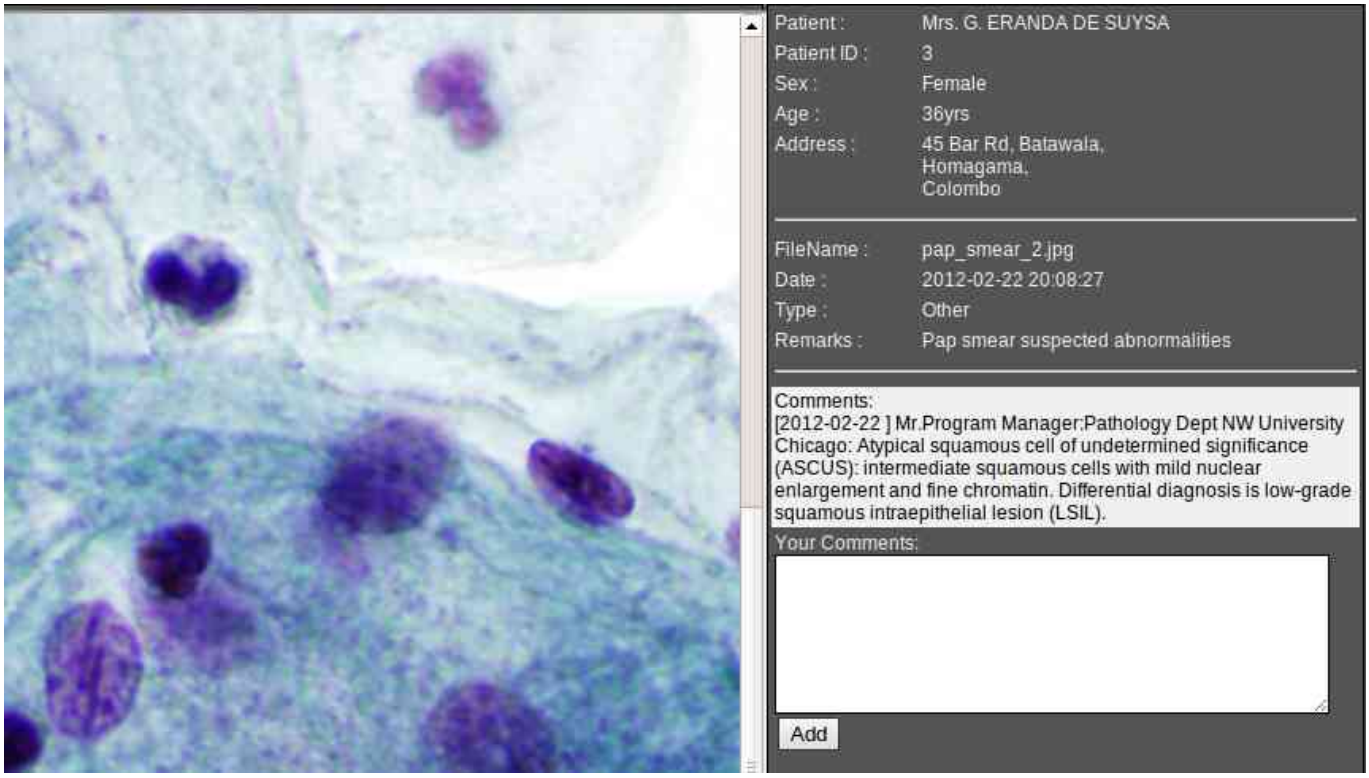
File will be attached to: in the present version of *HHIMS*, all files are attached to a patient record.

Description/remarks: explanatory text can be added (this will be useful if records are shared across the Internet as part of telemedicine consultations canned text can be used).

Active: is this document in active use or has it been archived (possibly off-line)?

Attach: in the distribution system, these files are stored on the server. Adequate disk-space must be reserved for them. Alternatively, if considerable use is to be made of this facility, external or additional internal disks can be added to the server. When the system is installed the storage location of attached documents needs to be set up by a programmer (not user-definable).

Example of an attached file, in this case a Papanicolau cervical smear:



Other files can include digital x-rays, graphic ECG tracings, images of the patient's lesions or microscopic images.

Patient record for telemedicine

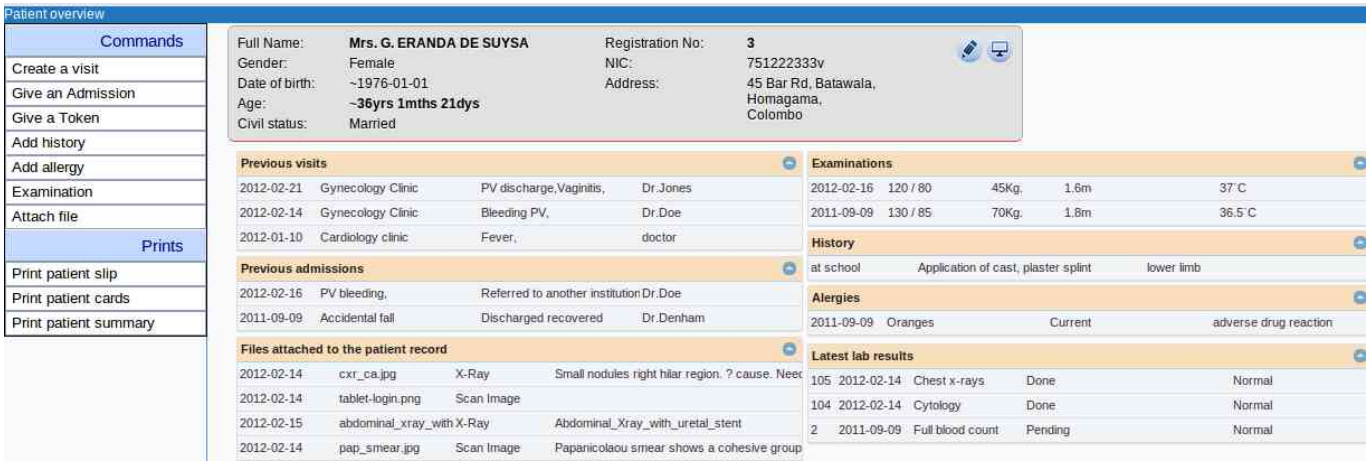
Telemedicine is the practice of medicine (consultation, education and research) using telecommunications to transmit data and images from a patient between sites remotely located from each other. It allows a doctor practicing in a geographically distant place to share the patient information with a specialist for a second opinion, or to consult with other doctors who are experts on a particular disease. As well as giving the patient the benefit of additional medical opinions without having to travel long distances, the consultation process can be an educational tool for both the referring and the consultant doctor. Consultations may be aided by using digitized diagnostic images in addition to the textual medical record.

Some telemedicine setups have video-conferencing capability but these require specialized, fairly expensive communications equipment. *HHIMS* offers a simple, low cost alternative based on the *HHIMS* patient record in a hospital:

Hardware: the standard *HHIMS* system in the hospital is used – broadband Internet connection must be available in order to have adequate preformance. Imaging devices (cameras, equipment with digital output) will be used in this first phase. Later digital sensors (electronic stethoscopes, continuous physiological monitoring etc.) can be included. Headphones and microphone will be useful for telephonic communication. A *Slate* or *Tablet PC* is useful for drawing diagrams.

Software: *HHIMS*, remote desktop access (a standard component of *LINUX* or a proprietary program), imaging and multimedia display software. Skype should be installed for telephonic communication. Digital recording is an advantage for recording and playing back audio comments.

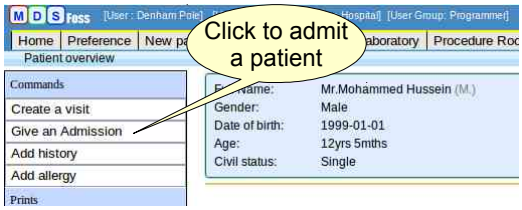
Patient overview: the consultation will be based around the patient overview screen. Both local doctor and distant consultation will share the same view of the patient record. All the clinical information related to the condition to be discussed should be entered into the admission record beforehand. For out-patients, some notes may need to be added and any appropriate laboratory and diagnostic test results should be stored in the database in advance. Visual files must be prepared and stored using the *Attach file* module. Here is a possible collection of information shown on the patient overview screen and some appropriate an attached file.



If there is interest in pursuing this concept, please contact the HHIMS Foundation at www.hhims.org.

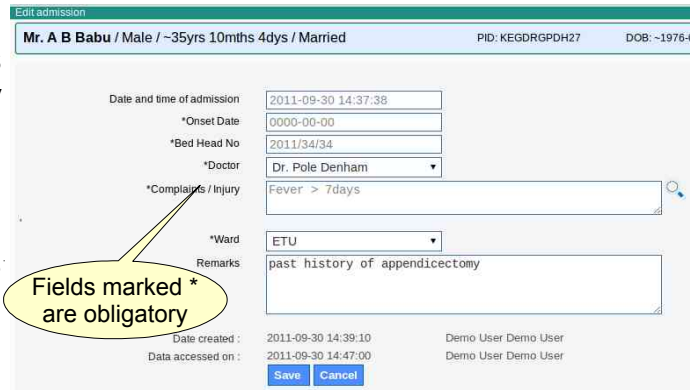
Admitting a patient

Before a patient can be admitted, they must first be registered (page 13). Select a patient on the *Search* screen or by using Alt-F, to display the *Patient Overview* screen. From this screen, create a new admission from the menu on the left or click on an admission in the *Previous Admissions* window to view it. Previous admission data may only be viewed, not changed.



After choosing to view a previous admission or to enter a new one, the screens that appear look the same. The difference is that data for discharged patients can be viewed but not changed. You can only add remarks.

Entering admission information



The information to be entered on admission is the same as standard Health Ministry documentation:

Date & time of admission

This defaults to the current time and date when the admission was registered. If wished this can be changed.

Onset date

This is chosen from a calendar - for this month just choose the number of the day. If earlier than that, the month must be chosen also.

Bed Head No.

This is the number of the *Bed Head Ticket (BHT)*. It will be calculated by the computer if possible, but you should check the result and correct it if necessary. Later you can search the list of patients using the BHT number.

Doctor

This is the name of the doctor who will look after the patient during this admission. It defaults to the doctor currently logged on.

Complaint / injury

The reason the patient gives for coming to the hospital can be chosen by typing in a few letters or from a pop-up list using the magnifier icon. You can add more complaints to this list in the *Data Tables* (page 42). All the notifiable diseases are included - they show in red.

Ward

The ward in which the patient is currently placed. You can transfer the patient to another ward later if wished. The list of wards can be updated in the *Data Tables* section (page 42).

Remarks

Free text can be entered in this field. There are no restrictions on the data that can be entered. This is the only field that can be changed after the patient is discharged.

Dead on admission

If the patient was dead on arrival at the hospital or died before being admitted to a ward, they

still need to be registered as an "Admission" as they have actually entered the hospital. It is important to store the information relating to the death for statistical purposes. In order to facilitate the management of data on deaths, it is recommended to create a ward entry called "*Dead on admission*" and to store the patient there until they are “discharged". In this way the data will be integrated with the rest of the database.

Save

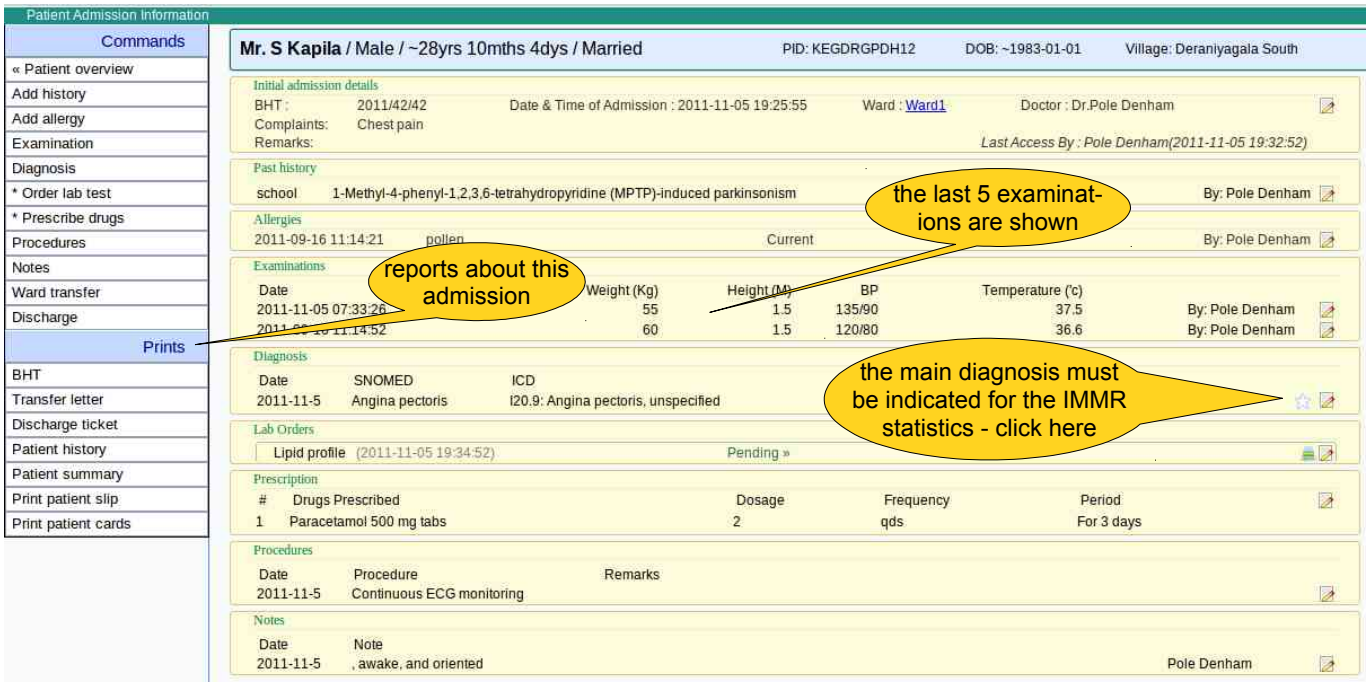
Clicking on this button confirms the entry and checks the input for validity. If there were errors on the screen or missing information, these must be corrected before the computer can store the information in the database.

Cancel

Leave the screen without changing any information in the database.

Patient admission info screen

In contrast to the manual recording of patient notes on the BHT, the computer record is structured into different components. By showing these components separately, you get a clear overview of the entire admission record on one screen - the *Patient Admission Information* screen (see below). This structured record gives a logical overview of the clinical data as it accumulates during an admission. You can enter additional information from this screen either by choosing from the menu on the left side or, if data has already been entered for that section, by clicking on the corresponding window. To simplify the screen, each window can be minimized by clicking on its green title on the top left of the window. Note: data can only be entered or edited during the admission. Once the patient is discharged, the data are frozen and cannot be modified (except for '*Remarks*”).



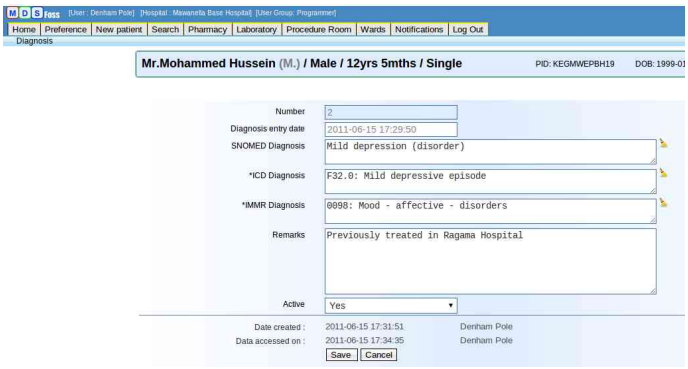
Initial admission details

This information is the same as is recorded when the patient is first admitted (see above). However you can add more information or edit the existing entries.

Past history, Allergies, Examinations

These items can also be added from the out-patient sections. They are described in detail in that section (page 21).

Diagnoses



Shortly after admission, it is possible to enter a provisional (working) diagnosis that guides the clinical staff on the initial treatment and diagnostic investigations necessary. If there is more than one diagnosis, the main one should be indicated by highlighting the star next to the diagnosis.

The ICD-10 (International Classification of Diseases, Version 10) is the database used by the Health Ministry to code hospital admissions. With the help of the text look-up in *HHIMS*, it can be used directly by clinical staff to select a diagnosis. The "*IMMR*" term that appears on this screen is a summary term used by the Ministry's Epidemiological Department for statistical purposes.

However, the ICD classification is not easy to use without extensive training. In order to facilitate diagnostic lookups by hospital staff, Sri Lanka has obtained a license to use the SNOMED clinical terminology. This contains over a million terms from every aspect of clinical terminology including diagnoses. SNOMED-CT contains most of the everyday terms used by clinical staff. It also has a link to the ICD-10 so that ICD codes are selected automatically. This selection is only a suggestion – the decision whether to accept the corresponding ICD code suggested is up to the user.

Lab orders

This module is similar to the one used for OPD visits (page 22).

In-Patient prescribing

The way doctors can prescribe drugs for in-patients (I/P) is essentially the same as the method described for out-patients (see the section *OPD*: *Recording additional information, page 22*). After selecting the patient, the drugs (or other items) are chosen by name or by pharmacological group as before.

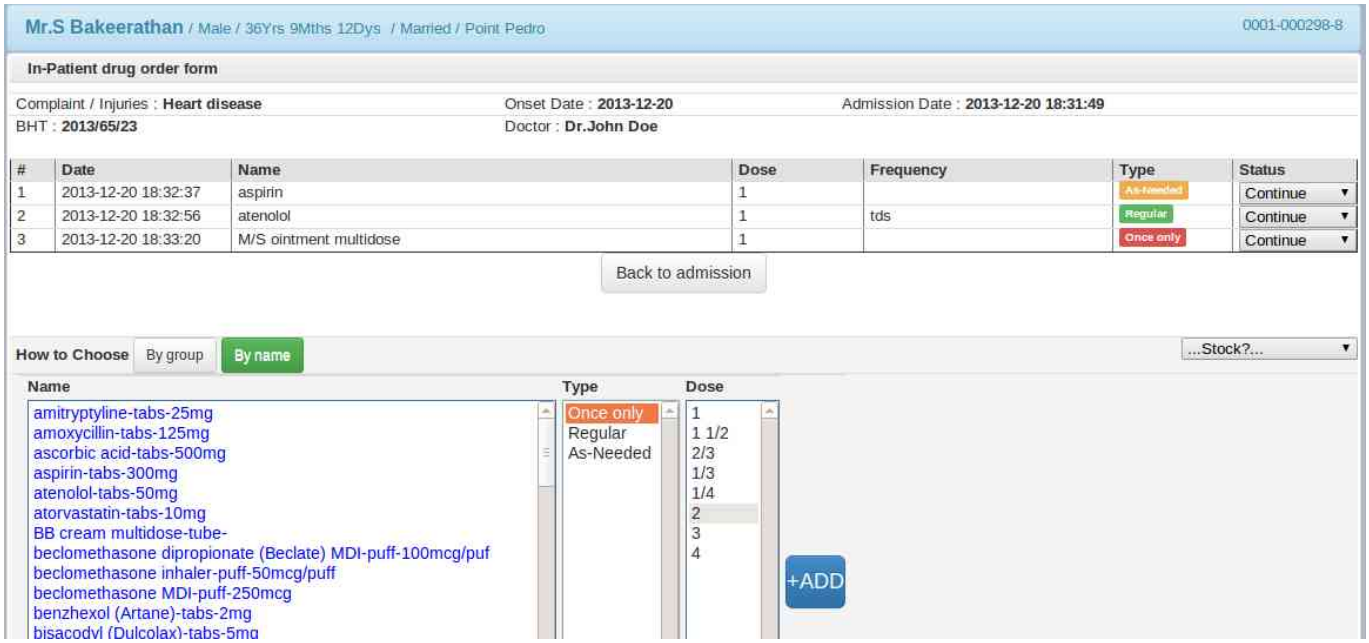
However, unlike the case in out-patients, the in-patient doctor has to indicate whether each preparation is to be dispensed by the nurses 'once-only', to be 'regularly dispensed' or can be dispensed 'as-needed'. This choice will show on the I/P prescription screen against the drug as follows:

- once-only in red;
- regularly dispensed in orange;
- as-needed in green.

In the case of regularly dispensed drugs, *dose* and *frequency* must then be chosen, but for the other two categories only *dose* is necessary. The '*period*' is not used for I/P prescriptions.

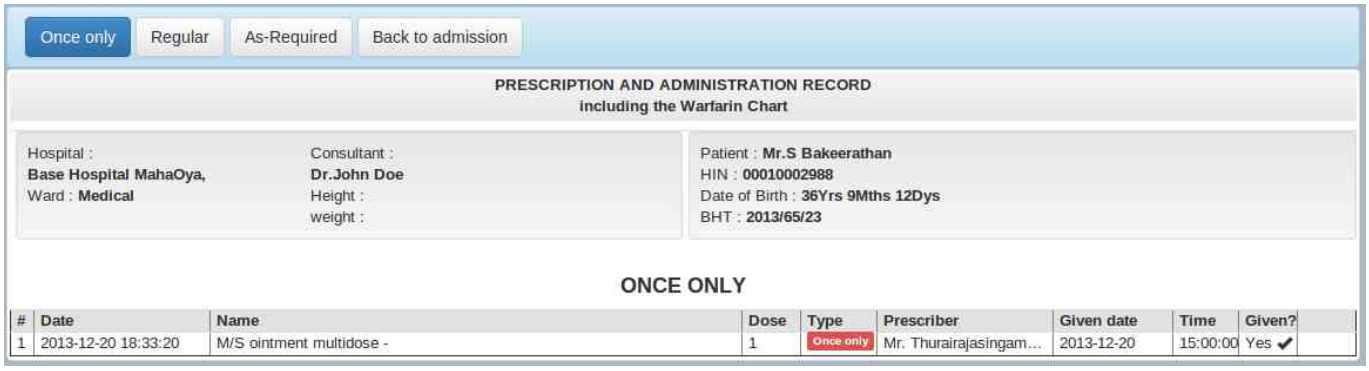
Clicking on the 'Sort' button will sort the prescribed drugs into these three categories if required. A second press returns to the date/time order.

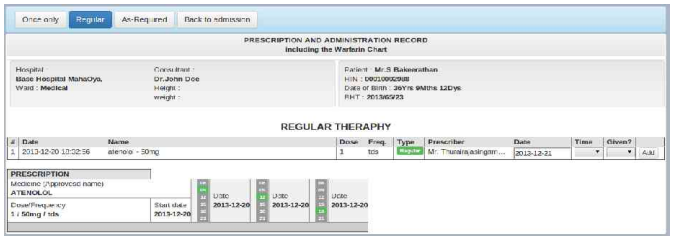
When the prescription is complete, click on 'refer to nurses'.

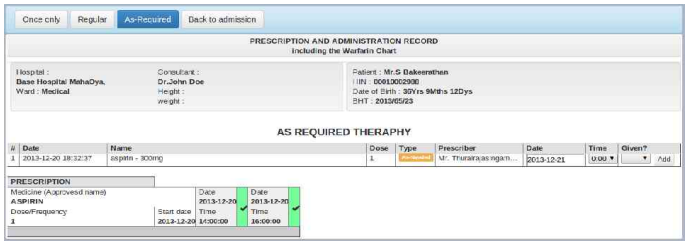


In-Patient dispensing

The nurse responsible for dispensing in the ward will first select the patient in question (there is a list of patients admitted to each ward that can be opened from the main menu). They can then open the left-side menu item *Nurses' Drug Chart*. There are 3 charts showing the type of prescription with the same color codes as described above. These charts are chosen from a tab-like button at the top of the chart:





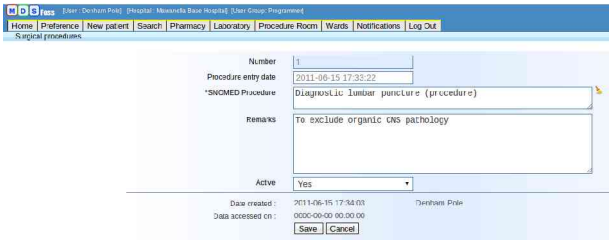


To the right of each row in the prescription are boxes where dispensing information can be entered. Confirm the added data by pressing 'CONFIRM' before leaving the screen.

The whole chart can be printed out for manual recording of dispensing and filing in the patient record. This manually recorded data may be optionally transferred to the screen version of the

chart on a desktop later, or information can be directly entered using a portable device such as a laptop, Tablet PC or Smart-phone during the ward-round. These devices will need to be connected to the main server by WiFi and will of course need well-charged batteries or an external power supply.

Ordering procedures



The SNOMED clinical terminology has a listing of surgical and non-surgical procedures. It can therefore be used to select the surgical operations carried out on the patient or the medical procedures. These procedures will show on the discharge summary (including any remarks entered).

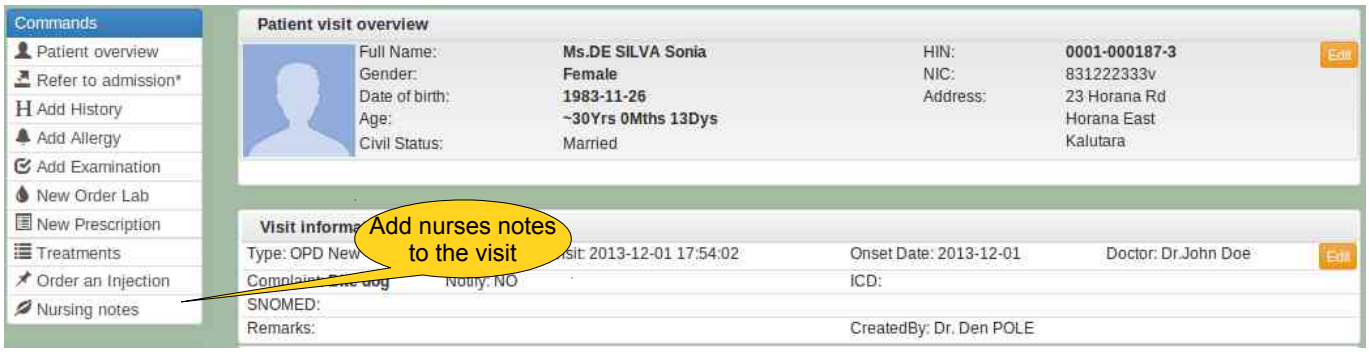
Nurses' and doctors' notes

During the admission, doctors and nurses can enter remarks to indicate the progress of the patient or other useful clinical information. As many notes as necessary may be entered. Abbreviations used in *Remarks* fields can also be used.

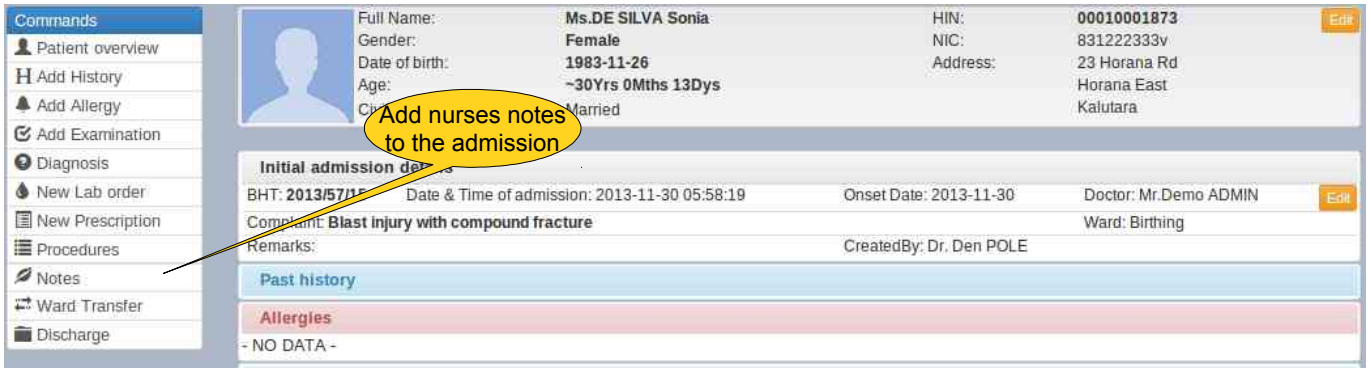
Nursing notes can be added at the patient level, at the visit level or in the admission record.

At the patient level, they are chosen from the *Patient Overview*:

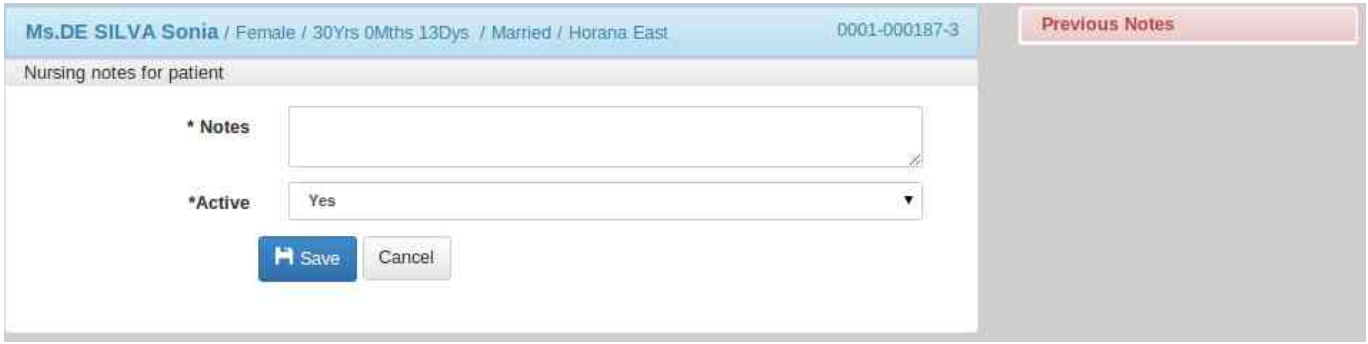
At the visit level, they are chosen from the *Patient visit overview*:



And at the admission level, from the *Admission details screen*:



Notes are entered in a window like this:



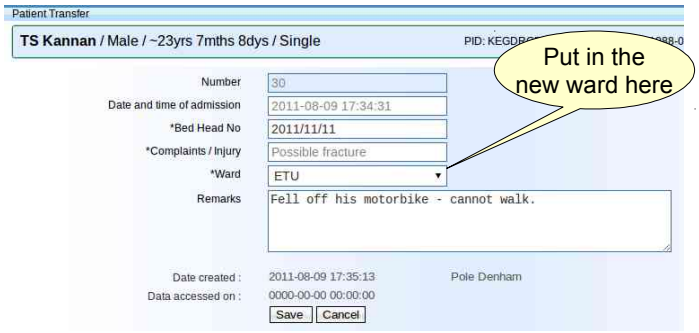
If previous notes have been entered the first lines show in a list on the right and can be opened.

The notes print out in the respective summary reports. They can also be listed together in the *Midnight Census*.

Ward transfers

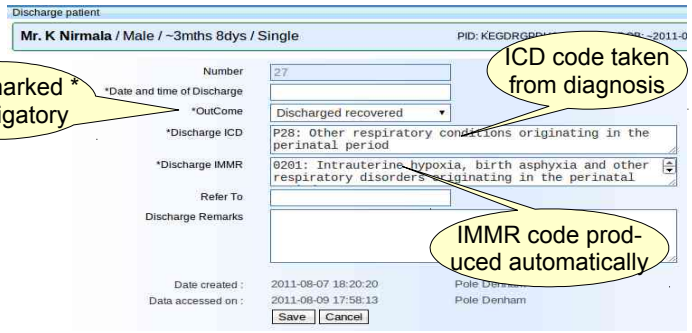
It is necessary for administrative and statistical purposes to keep a track of the ward where the patient is treated. This can also be used help to locate a patient's record in the computer.

When a patient is transferred from ward to another, the ward recorded in the computer should be corrected immediately with this module.



Discharge

On discharge, the main provisional diagnoses will be shown again (this is the one shown by the star entered when the diagnoses are recorded). The outcome and the referred-to hospital, if any, are recorded in the usual way.



Printouts

The reports that can be produced on this patient and this admission can be chosen from the menu on the left side of the screen. See the corresponding chapter in this User Handbook where it describes how to produce these reports (page 45).

Notification of infectious diseases

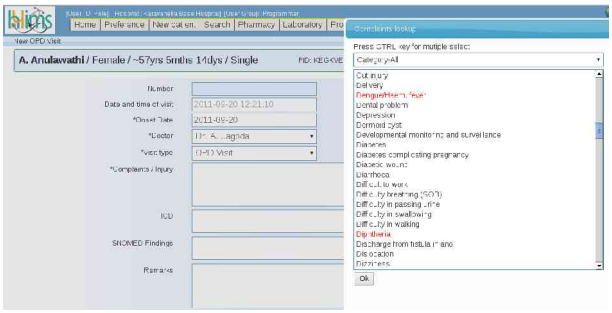
The Epidemiological Department of the Health Ministry prescribes a list of disease whose notification (even for suspected cases) is mandatory. These diseases are currently:

Acute Flaccid Paralysis	Human Rabies	Simple Continued Fever of 7 days or more
Chickenpox (Varicella)	Leptospirosis	Tetanus
Cholera	Malaria	Tetanus - Neonatal
Dengue Fever	Measles	Tuberculosis (Pulmonary)
Dengue Shock Syndrome	Meningitis	Typhus Fever
Diphtheria	Mumps (Infectious Parotitis)	Viral Hepatitis
Dysentery	Plague	Pertussis / Whooping Cough
Encephalitis	Rubella	Yellow Fever
Enteric Fever (Typhoid Fever)	Congenital Rubella Syndrome (CRS)	
Food Poisoning	Severe Acute Respiratory Syndrome (SARS)	

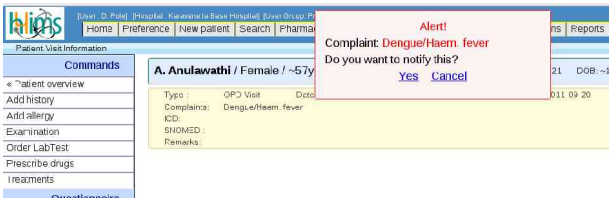
There are two phases in the notification of an infectious disease. The first is for the doctor who sees the patient to indicate that this case should be notified and to place it in a list for sending. This can be done from the *Visit* module (OPD or Clinics) or from an *Admission*. The second step is for the person responsible for notifications to choose them from this list and to send them out either on paper or by e-mail.

Notification for ambulant patients

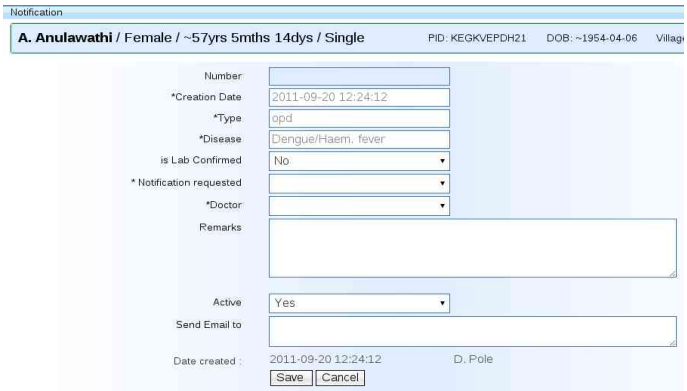
When doctors choose a complaint for a patient visit, the notifiable diseases are listed in the pop-up window. In order to remind hospital staff, they are shown in red in this list and also in the ICD-10 listing.



When such a diagnosis is entered, the computer reminds the doctor that this is a notifiable disease and asks if they want to request permission to notify it to a Medical Officer of Health:



If the answer is 'Yes', the request for notification is logged in the notification module (selected from the main menu):



Certain additional info must first be added:

Creation Date: defaults to today's date and time

Type of visit: copied from the visit data

Diagnosis: the condition chosen as the complaint

Lab confirmed: answer yes or no depending on whether the disease has been confirmed by labtests

Notification requested: answer yes or know depending on whether you want to notify this case

Doctor: the doctor making the notification

Remarks: these will appear on the notification form

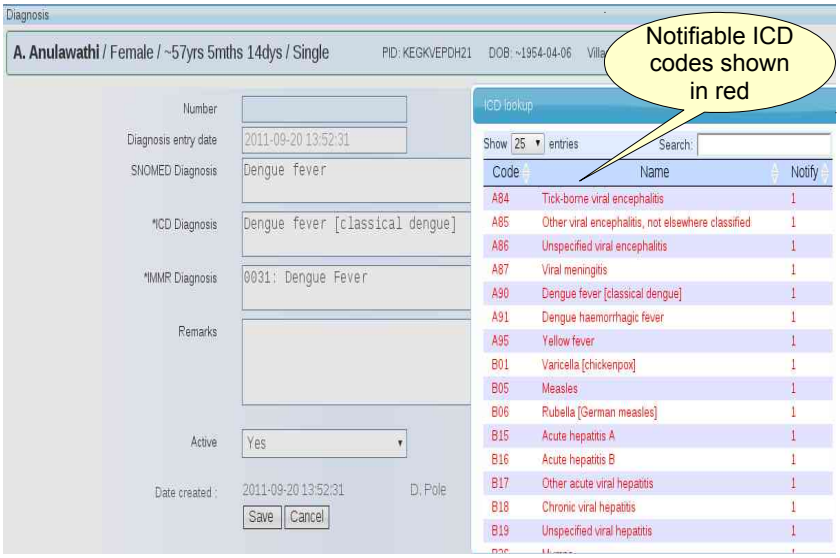
Active: is this request currently active?

Send E-mail to: put in the e-mail address of the MOH where the notification should be sent.

Notification for admissions

For admissions, the notification process is triggered, not only by the presenting complaint, but by the provisional/working diagnosis. In this case the notifiable disease markers are stored in the I*CD-10* file and the *Complaints Table* provided with the system. Currently the SNOMED file does not have these markers.

The notifiable diseases are shown in red in the ICD list and in the diagnosis window:



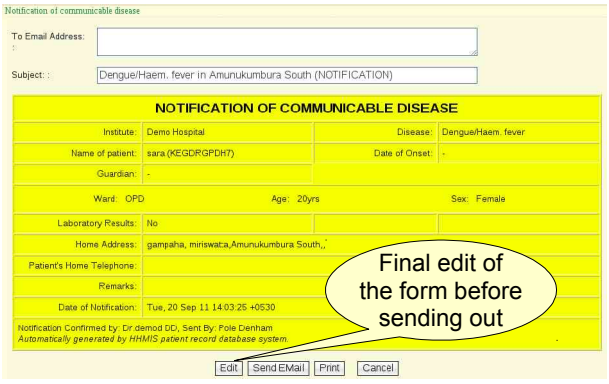
On the right of this window is a small icon for requesting a notification. Clicking on that icon opens a confirmation window similar to the one used for visits.

Sending notifications

Choosing the menu-bar module *Notifications* opens a screen with a list of all requested notifications. This list initially shows pending requests, but may be extended to show all notifications, including those already sent out.

To send a notification click on the corresponding row of the table.

A screen opens showing the notification form as it will be sent by e-mail:

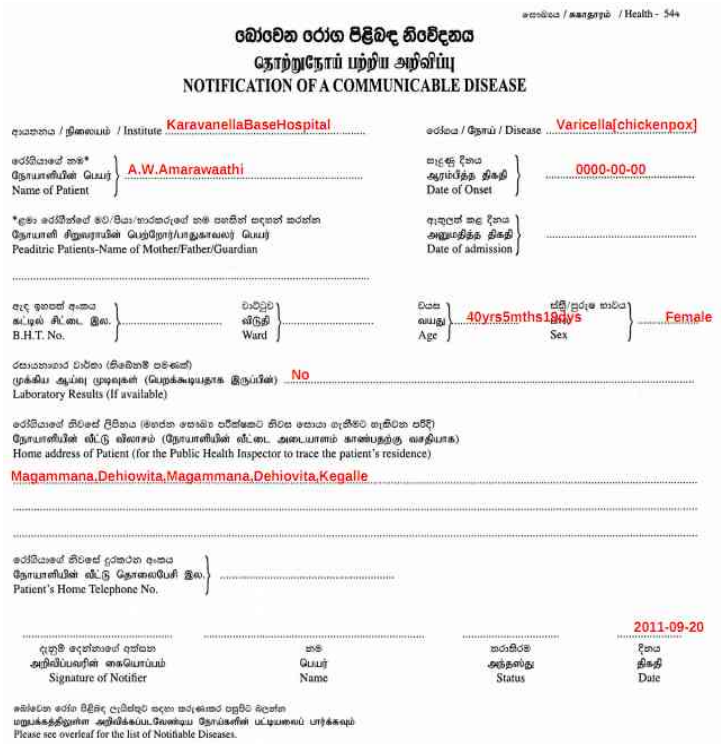


This can be further edited by choosing the 'Edit' button at the bottom of the screen.

This notification can be e-mailed to the MOH (button at the bottom of the screen).

It can also be sent on paper.

Clicking on 'print' produces a PDF file with a copy of the Epidemiology Department's printed notification form filled in:



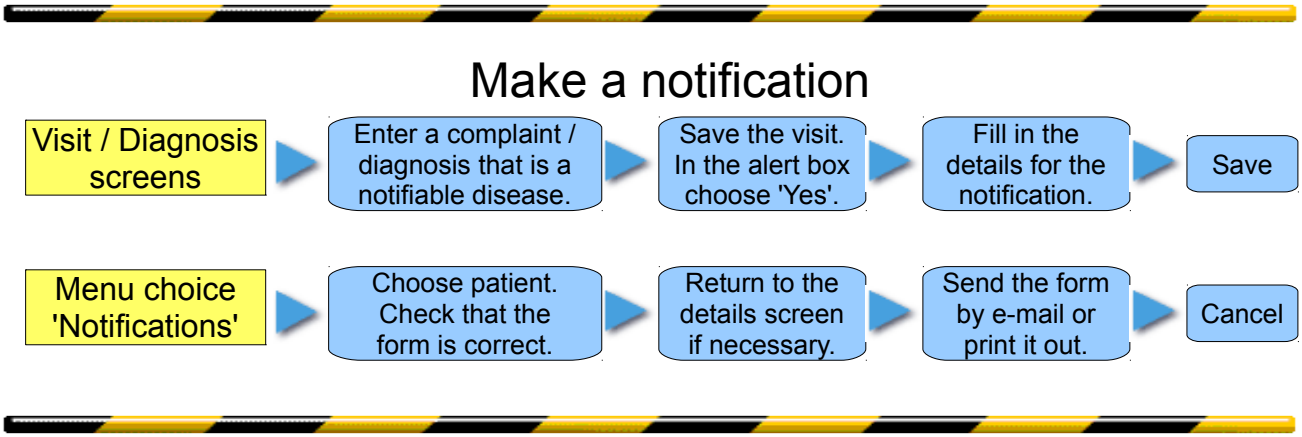
බෝවෙන රෝග පිළිබඳ නිවේදනය
நோற்றுநோய் பற்றிய அறிவிப்பு
NOTIFICATION OF A COMMUNICABLE DISEASE

Institute: KaravanellaBaseHospital
Disease: Varicella[chickenpox]
Name of Patient: A.W.Amarawaathi
Date of Onset: 0000-00-00
Date of admission:
B.H.T. No.:
Ward:
Age: 40yrs5mths18days
Sex: Female
Laboratory Results (If available): No
Home address of Patient (for the Public Health Inspector to trace the patient's residence)
Magammana,Dehiowita,Magammana,Dehiovita,Kegalle
Patient's Home Telephone No.:
2011-09-20

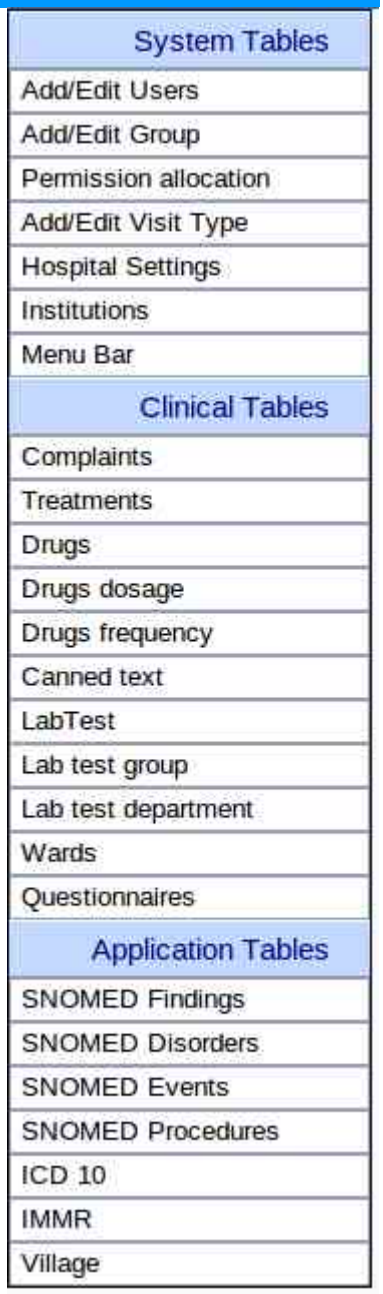
This form can be printed and posted to the appropriate MOH.

Note: the display of the data in red in this form is for clarity – on the actual form it is printed in black.

This process is summarized as follows:



Managing the Basic Data Tables



As well as storing patient data, the *HHIMS* software has a number of tables that contain basic data for running the system. In order to manage these tables, the user's *Menu Bar* must include *Preferences (page 7).* The tables are sorted into three groups:

System Tables

These tables are included in the *HHIMS* distribution with sample data but will need to be configured for each institution when it is first installed.

Users, *Groups*, *Permissions* and *Menu Bars* govern the access that the hospital staff will have to the system. Their set-up is described in the *Log on* section.

Visit Types and *Hospital Settings* and *Wards* are specific to your hospital so should be configured individually (as described below).

Institutions is used for patient transfers and notifications. The Health Ministry is developing a country-wide list, but until this is available you will have to enter them manually.

Clinical Tables

These tables can be used “as-is” but will probably need to be edited specifically for your hospital during the first few weeks of using the system.

Complaints is used as a reason for OPD/Clinic visits and admissions.

Treatments, *Injections*, *Drugs* and *Labtests* are used in choice-lists for doctors' orders on visits. They are also used for admissions.

Canned texts are used in all the *Remarks* fields throughout the system. Their use is described in *Entering Visit Data* (page 20).

Questionnaires can be defined by users (see the special section on their use, page 11).

Application Tables

These tables require specialized knowledge and updates will be provided by the Health Ministry. If you wish to be advised when updates are available please contact the HHIMS Foundation at www.hhims.org They are copied from public or licensed databases; *SNOMED* from the IHTSDO (free license), *ICD* from WHO (public domain), the *IMMR* list was provided by the Epidemiology Department of the Health Ministry, the list of *Villages* was prepared by the UN agency IOM as part of the tsunami program of the UNDP. These tables should not be used outside Sri Lanka without obtaining a license from the copyright holders.

Notes on the tables:

Users, Groups, Permissions, Menu Bar

The configuration and use of these tables is described in the section *General features* (page 3).

Visit types

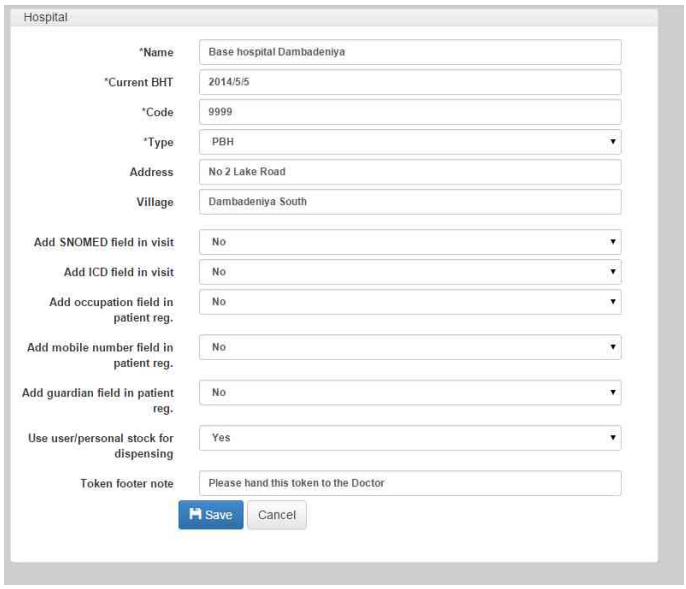
The standard out-patient module can be used for a variety of purposes. This includes the OPD department and clinic visits, but it is possible to add other types of visit. Certain types of visit have associated questionnaires in the *HHIMS* distribution

Wards

This is an obligatory part of setting up needed when *HHIMS* is first installed in your hospital. Some of the entries are not strictly 'wards' (Home leave, Mortuary etc.) but are included in the distribution as they are used in hospitals to indicate where patients are and can therefore share the same programmed features as wards. You can deactivate these or define others as required.

Hospital settings

The institution where the system is installed needs to be defined at the beginning of the implementation as many of its properties are used throughout the software:



Code: HHIMSv2 now uses the Health Ministry's *HIN*-number. For details see the section on Patient Registration (page 15).

Settings: a number of features in the *HHIMS* database can be switched in or out to cater for different requirements. This allows a hospital to configure the system according to their own practice. These settings apply to every user of the system in a hospital – it is not possible to have different settings for different users as they all share the same database.

License information: The distribution version of *HHIMS* has a default hospital called 'Demo'. This appears on all the screens and reports in the initial version. By registering your system at www.hhims.org you will be able to show the name of your hospital instead. However the unregistered system is fully functional.

Registration is free and optional. The information will be held by the HHIMS Foundation in order to see how the software is being used and to contact users about bug-fixes and new releases. When you register you can opt-out of these features if you wish.

Drugs / dosages / frequencies (3 tables)

The drug list can be edited and the amount of stock recorded. There are separate tables for the dosages and frequencies that can also be modified to suit your practices. For each drug, a dosage and frequency can be entered to appear as defaults for a prescription. The doctor can override this default value if wished.

Canned texts

Remarks fields throughout the *HHIMS* system have a set of abbreviations that can be chosen by preceding the code with a back-slash. For example typing “\chf” followed by a space will produce the text “congestive heart failure”. New texts may be added, up to a maximum of 200

characters (approximately 5 lines).

Lab tests / test groups / test departments (3 tables)

Laboratory tests are listed by department (initially Bacteriology, Biochemistry and Haematology) and within department by group. Groups & departments can be seen (or new ones added) by choosing the corresponding table. New tests are added via the LabTest table screen and can be allotted to a Group and a Department. Normal reference values may also be added.

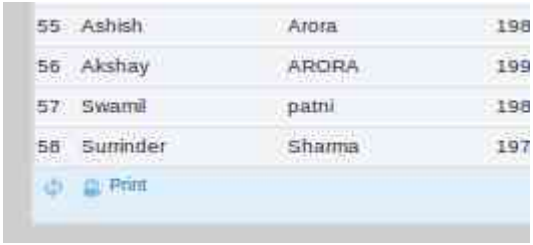
Villages

This is the only application table that can be modified by the user – new villages can be added. The list obtained from the OIM was produced several years ago and it is necessary to add new villages that have been created since then.

Printing out information

HHIMS is essentially a 'paperless' system, so the printing or routine information (prescriptions, lab-tests etc.) within the hospital is deprecated. However, when necessary, it is possible to print out the information stored in the *HHIMS* database. The reports available refer either to an individual patient (e.g. personal information, visit information, notification form), to groups of patients (e.g. all patients seen today, IMMR quarterly statistics) or to the database tables (e.g. drug stock, staff list, complaints). The reports available are usually related to a screen being viewed and are shown in the *Reports* menu on the left of each screen. This menu will differ depending on where it appears – the patient overview screen has different reports from the visit information screen. General reports, not related to specific patients are chosen from the *Reports* menu bar.

A simple listing of the data shown on every search screen can also be produced. At the bottom of each table there is a small icon that when pressed, produces a PDF listing of the table:



If the list is too long to print, make a selection of the data by entering search criteria in the search windows at the top of the table. Only the data selected will be printed.

Choosing a printout

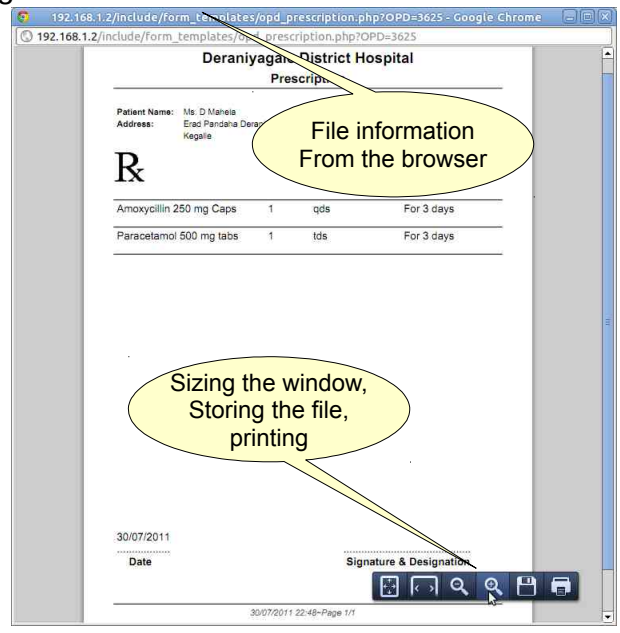
For reports related to the subject of the screen, click on *Reports* on the left of the screen to open the menu of available reports, then click on one of these reports. For reports requiring selection information such as date range, an intermediate window will open to enter this information before the report can be printed.

For general reports from the database, choose the *Reports* menu bar at the top of each screen. If this bar does not show, contact your System Manager.

Visualizing a printout on the screen

The reports are produced in what are called 'PDF' files (Portable Document Format). Originally developed by the Adobe Corporation, this format is now in the public domain and can be used free of charge.

Most computers can read PDF files without any additional software, but unfortunately they each handle these files in slightly different ways. For this reason we recommend the Chrome browser from Google, also available free of charge. This browser works the same way on different computers. It shows the files in a window or allows you to print them or to store them on your workstation. It is also possible to change the shape and size of the printed report.



An example of a PDF file displayed by the Chrome browser is shown on the right. At the top of the window is some technical information describing the file that Chrome has retrieved. The blue boxes at the bottom right allow the window to be re-sized, or the file to be stored on to the hard

disk of your workstation or printed on paper.

Ctrl-S saves the file; Ctrl-P prints it; Ctrl-F searches it

Storing reports on your computer

If you want to keep a copy of the report, it is possible to store it on the hard-disk of your workstation computer. The files containing the reports are given meaningful names by the *HHIMS* software so that they can be browsed and found easily. Normally reports will be stored in the sub-directory Downloads in your home-folder but this can be changed with browser settings. Your System Manager can help you to do this.

Outputting the reports

Printers can be attached to your workstation or to the network. If you attach a printer to one computer you can limit the access that other users have to this printer or you can make it generally available. If the printer is attached directly to the network, this requires an additional network plug. Usually network printers are made available to all users on the system, but it is possible to restrict them to certain specific users.

In a small hospital or clinic it is recommend to attach the printers directly to the server and permitting other users to access them via the local network. Note: for printers attached to a specific computer, that machine must be switched on in order to allow other computers on the network access to it. In a larger hospital, network printers are the more suitable.

In both cases, configuring a printer for various paper sizes, orientation etc., is done using a system program on your computer. You can make this configuration specific to yourself or allow other users to use the same configuration. Your System Manager can help you to configure a printer according to your specific needs.

Transmitting files electronically

Some of the modules in *HHIMS* have built-in links to the e-mail function in your browser, for example Notifications (page 39). However you can send all the reports produced by others, by e-mail.

To e-mail a report, first save the file on to the disk then log on to your e-mail provider. Compose a new e-mail (or a reply to another one) and attach this file. It will be visible to the person at the other end - most computers can read PDF files.

Admission reports

The reports that can be produced for this patient and this admission can be chosen from the menu on the left side of the screen.

Pain Management Unit
Bed Head Ticket
A2

Patient Name:	Mrs. Naomi mohamet	**Ward:**	Surgical
HIN:	0020-000200-4	**Date of admission:**	2014-04-19
BHT No:	2014/3/3	**Time of admission:**	13:42:59
Age:	40Y1M17D	**Date of onset dis/inj.:**	
Sex:	Female	**Disease or injury:**	Chest pain
Civil status:		**Consultant's name:**	Dr. John
NIC Number:	742111234v	**Date of discharge/death:**	
Telephone:	0682222222	**Articles in possession:**	
Address:	22 Coast Road Chenkalady Eravur Pattu Ba...	**Parent/guardian:**	

Disease or injury: Chest pain		
Date	**History, symptoms, diagnosis, treatment**	**Remarks**

Health 946

Pain Management Unit
Transfer of Patient from one Institute to Another

From: Pain Management Unit
To:
Bed Head No: 2014/3/3 **Ward No:** Surgical
Full Name: Mrs. Naomi mohamet(HIN: 0020-000200-4)
Address: 22 Coast Road Chenkalady Eravur Pattu Batticaloa
Age: 40Y1M17D **Sex:** Female
Name and Address of Gardian:
Discharge ICD Diagnosis:
Remarks:

06/06/2014
Date

Signature & Designation

Pain Management Unit
Admission Summary

Personal details

Patient Name:	Ms. Shiromi jayasinghe	**Register No:**	0020-000197-2
Age:	32y 2m 23d	**Sex:**	Female
Civil status:		**NIC:**	823222111v
Telephone:	0116662222		
Address:	236 Galle Road Bambalapitiya Thimbirigasyaya Colombo		

Admission Info

Date of Admission: 2014-06-05 **Date of Discharge:**
Admission Reason: Chest pain
Admission Remarks:
Diagnosis: 1.Chronic ischaemic heart disease
2.
Surgical Procedure:
Discharge Diagnosis:
Discharge IMMR:
Outcome:
Referred To:
Discharge Remarks:

Allergies		
Status	**Allergy**	**Remarks**
Current	Beta-lactam antibiotics	

Laborders		
Test	**Result**	**Ref. Value**
Cholesterol (mg/dL)		normal <199; moderate risk 200-239; high risk >240
Albumin (g/dL)		0-[illegible] yrs-adult: 3.5-5.0
Blood urea nitrogen (mg/dl)		1 day-1 mo: 4 - 12; 1 mo-15 yrs: 5 - 18; 15 yrs-adult: 8 - 21
Serum creatinine (mg/dL)		M: 0.6-1.3; F: 0.5-1.1
Total protein (g/dL)		1 day-1 mo: 5.3-8.9; 1 mo-8 yrs: 5.6-8.5; 8yrs-adult: 6.0-8.2
Uric acid (mg/dL)		M: 3.5-7.7; F: 2.6-6.8

Procedures		
Date	**Procedure**	**Remarks**
2014-05-10		

Prescription			
Name	**Dosage**	**Frequency**	**Type**
isosorbide dinitrate (ISDN)	10mg	tds	Regular

Nursing Notes		
Note	**Created Date**	**Created User**
Very anxious - given counselling	2014-05-10	Dr. Den POLE

Continued on the right...

Modules where report available – second instances are not repeated	***Reports (standard listing is also available for every basic table in the database)***
Preferences → Q-module → Questionnaires	Questions
	Questionnaires
Search → Patient overview	Patient slip
	Patient card
	Patient summary
Patient Overview → Patient visit overview	Patient's visit summary
	Visit lab test results (also included in the previous report)
Patient visit overview → Prescription	Prescription (choose which drugs to print)
Patient visit overview →Labtest order	Labtest order (choose which tests to print)
Patient overview → Patient admission overview	BHT (blank form)
	Transfer letter
	Discharge ticket
	Admission summary
Patient admission overview → Order labtests	Labtest order (choose which tests to print)
Patient admission overview → Order drugs	Drug order (choose which drugs to print)
Patient admission overview → Nurses' drug chart	Form for manual record of drugs dispensed
Patient overview → Give an appointment	Appointment token (for OPD and for Clinic)
Patient overview → Nursing notes	Nurses' notes (choose which notes to print by date range)
Patient overview → Attach file	Print contents of the file
Pharmacy	Daily drugs dispensed
	Current stock balance
	Drug order form
	Visit prescriptions
	Prescriptions by drug (choose by date range)
	Single prescription (choose which drugs to print)
Laboratory	Labtests carried out (choose by date range)
Procedure room	Procedures carried out (choose by date range)
	Injections given (choose by date range)
Clinic	Clinic book entry for this visit
	Prescription (choose which drugs to print)
	Clinic labtest order (choose which tests to print)
Reports → Daily reports	Visits
	Clinic appointments & visits (choose clinic and whether visits only)
	Admissions today
	Discharges today
	Drugs dispensed (choose time period)
Reports → Patients	Encounter statistics (admissions & visits) (choose time period)
	Visit details (choose time period)
	Visit complaints treated (sorted by complaint alphabetic or numeric)
Reports → Hospital	IMMR (quarterly listing of admissions/diagnoses)
	Hospital performance (choose time period)
	Midnight census (choose date)
Notifications	Notification form
Registry	OPD visits and Admissions in MoH standard form

