User Guide of PC Software

Version: A/0

Date: April 24, 2014

Contents

1 Introduction to Ambulatory Blood Pressure Monitoring

Ambulatory blood pressure monitoring is a diagnosis technology for collecting blood pressure data at intervals of 24 hours, and a clinical tool for collecting many blood pressure data. Currently, in clinic, the parameters widely-used in ABPM (ambulatory blood pressure monitor) contain: systolic pressure (SBP), diastolic pressure (DBP), pulse rate (PR), mean blood pressure, overnight changes in blood pressure, white-coat analysis, blood pressure variability, blood pressure smoothness index, arterial stiffness index,morning surge index and so on. Ambulatory blood pressure monitoring is superior in predicting target organ damage, morbid events, or cardiovascular risk.

Scope of application:

The data obtained from ambulatory blood pressure monitors is highly accurate and useful for managing a wide variety of hypertensive situations including::

● Hypertension;

● Hypopiesis;

● Borderline hypertensive (BH), renal inadequacy;

● Control efficacy of anti-hypertension, drug evaluation and so on.

Please read the manual carefully before any operation. Hingmed ABPM package include two manuals. “User Manual of ABPM” which is mainly about the application of pressure monitor machine, and the “User Guide of PC software” which is mainly about the application of software system.

2 Software introduction

The software is a simple, powerful application tool that allows maximum flexibility in the ambulatory blood pressure study, analysis, and reporting. The functions of the software include data retrieving, management of diagnosis advices and patient data, analysis of BP data, review of BP tendency chart, comparison of patient BP data, and blood pressure values in different body positions, reporting, etc.

The software is easy-to-use. Its menu-driven design of the software enable user to analyze the ABP data in a number of ways. User could decide the items of report by his or her demands. Overview of the blood pressure characteristics in data analysis report could help to evaluate the blood pressure data. Home page of the report supplies the basic blood pressure analysis and patient information. Statistical analysis, histogram, hourly average, correlation chart and pie chart indicate the blood pressure tendency well to assist in patient treatment. Statistical calculations, including Difference of Pulse Pressure and Pressure Rate Product, provide

further analysis of patients.

The PDF report creates by the software makes it easy to share the information of the patient. Any of the following combination could be contained in the report:

• Patient information on the home page, blood pressure data analysis, statistical result, tendency chart, and diagnosis and so on;

• Statistics;

• Histogram, pie chart and correlation chart;

•Hourly averages of collected ABP readings with additional statistical analysis;

•Detailed record of collected ABP readings.

The minimum demands for computer configuration

• Windows 2003, Windows XP or above Windows system

• The minimum screen display is 1024*768 resolutions with at least one available USB port.

3 Software installation

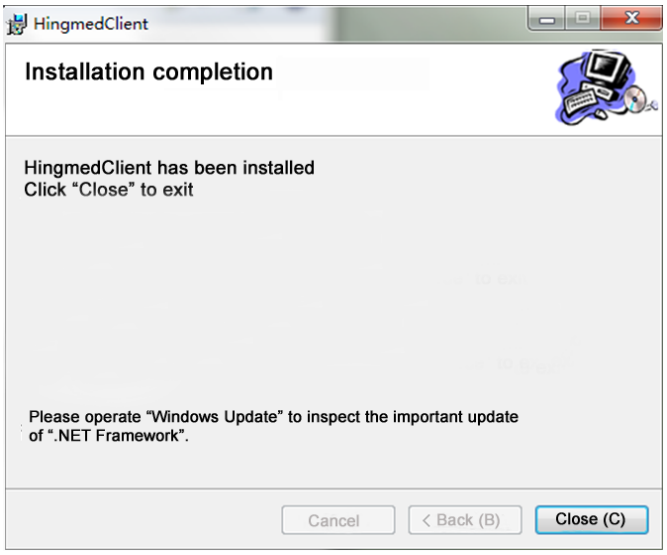
3.1 Installing the software

Put the Installation CD into CD drive, then follow the steps below:

a) Open “my computer” or “computer”;

b) Click CD drive and open installation software;

c) Double-click the installation “set up” and click→“next”→“next”. Select a language (Chinese or English) and click “next” and continue to install. On the final dialog box, click “close” to finish the installation as Figure1.



(Figure 1)

After installation, an icon as Figure.2 displays on the computer table. PC software of Hingmed ABPM has been installed in your computer successfully.

(Figure 2)

3.2 Uninstalling the software

The uninstallation of the software is as same as that of common software:

a) Click “start”——find the icon of HingMed blood pressure software in program——click “uninstall”;

b) Or, uninstall on “control panel”.

4 Use of ABPM software

The use of ABPM software is very simple and flexible.

• Connect the software to monitor by USB cable;

• Programming monitor and retrieve the data;

• Moreover, users could set the parameters through PC software to control the measurement activity.

The first user should firstly set the database, i.e. patient information and medical history database; the database path may be set based on his/her needs. (See the detail of path establishment in this chapter: **Software use → Menu → Management → Configuration → Data Configuration**）

4.1 Menu and Toolbar introduction

4.1.1 Menu

• Data: Mainly patient information management, data analysis, diagnosis advice, reporting, etc.

• Programming: Set blood pressure monitoring intervals and time; input patient information and set functions and parameters of monitoring.

• Read: Upload the blood pressure records into computer after measurement.

• Management: Database path setting; Data exporting/importing, function configuration and on-line help.

• Exit: Exit the software

4.1.2 Toolbar

• Tendency charts: Displaying raw data, threshold edition, set statistical parameter and show blood pressure tendency curve.

• Statistics: BP data statistics, i.e. Mean, SD, Max, Min of the BP readings at whole day, awake, asleep, period, also providing analysis option of Asleep dip., BP load, Morning surge, Smoothness Index, BP Coefficient Variation, Arteriosclerosis Index, etc.

• Histogram: Distribution proportion of blood pressure records in different range.

• Pie Chart: Proportion (in percentage) of the blood pressure records which are beyond the standard limit.

• Correlation: Linear correlation distribution, correlation coefficient, and distribution center points of systolic vs diastolic, systolic vs heart rate, diastolic vs heart rate, Mean BP vs heart rate respectively.

• Hour Average: Hour average analysis of systolic, diastolic, mean pressure, heart rate and pressure & rate product, also providing comparison analysis of one patient 24 hours BP readings in different days.

• Dr. Advice: Condition description, doctor's diagnosis and prescription.

• Patient: Patient information details and medical history.

• Preview: Report preview, report option and printing the report.

• PDF File: Report in PDF format.

• Exit: Exit current database

4.2 Connecting software to computer

Making sure the monitor is removed from patient; and connecting the ABPM to your computer by USB cable.

4.3 Menu introduction

The function button in top menu is as below: Exit, Management, Programming, Read and Data.

4.3.1 Exit

Click "Exit" to exit the software.

4.3.2 Management

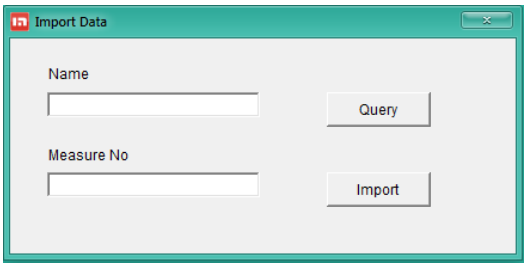
Mainly modify the configuration of the basic settings of the software. The command contains some subcommands: Import, Export, Configuration, Website, Help and About.

4.3.2.1 Import: Import the patients' BP data from computer to software for further study. The format of the data must be consistent with the requirements of the software, and this data

are generally uploaded by other users from the software.

a) Open software and click “Management” → “Import”;

b) Click “Query” as below Figure



d) Select the patient BP file in the directory and click it;

e) Click “Import” to open and analyze the data.

4.3.2.2 Export: Export the patient data from the software to computer drive.

The function exports the ABP data. Steps are as following:

a) Click “Data” and select the target data;

b) Click icon “⊞” or double click patient name → “Room time” → “Measure time” by the left mouse button, select measure time, click the right mouse button and select “Export data” in the Pop-Menu;

c) Choose a storage path in the Pop-Menu, and click “store” to store the files in the defined directory;

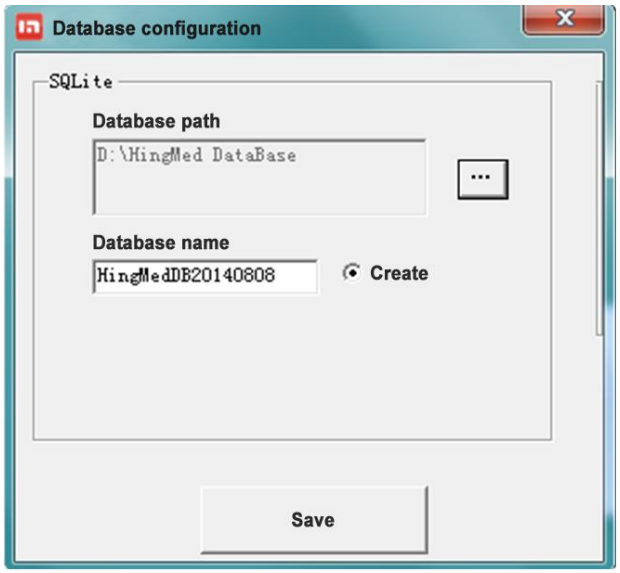
d) Alternatively, export data by opening the wanted data and click “Management” → “Export” in the menu. Choose a storage path and click “Save”.

4.3.2.3 Help: Instruction help.

4.3.2.4 Configuration:

a) Database configuration

Database configuration method: management-> configuration -> Database configuration. The dialog box as below Figure.3 pops up.

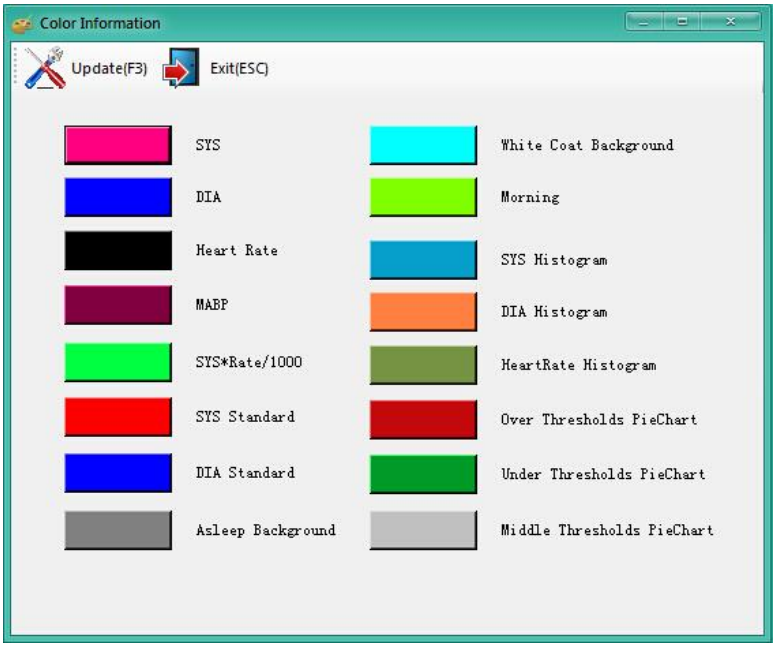


(Figure3)

Select "Create", then click "...". User may set individual storage path, click "Save", then the BP data saving path is reset.

b) Color configuration

Database configuration method: management-> configuration ->color configuration. The dialog box as below Figure 4 pops up. Users may modify the color by their demands, then click "update". Restart the software, the color modification will become valid.



(Figure 4)

c） Hospital information configuration

Database configuration method: management → configuration → hospital information. The dialog box as below Figure 5 pops up.

(Figure 5)

Fill in with hospital information, click “Update” at top left corner, and click “Exit”. The hospital information will appear on the top of the report.

d). Bluetooth management. management-> configuration ->Bluetooth management. The dialog box as below Figure 8 pops up. When the ABPM is Bluetooth inside version, and the computer of software is with Bluetooth receiver provided by Hingmed medical, click “Bluetooth search”, then the ABPM Bluetooth serial number will be displayed on the “BT Mac List”. Name the Bluetooth ABPM in the “BT Name” field and then click “Add”. The Bluetooth ABPM and computer system will be connected for further operation, i.e. programming, reading, etc.

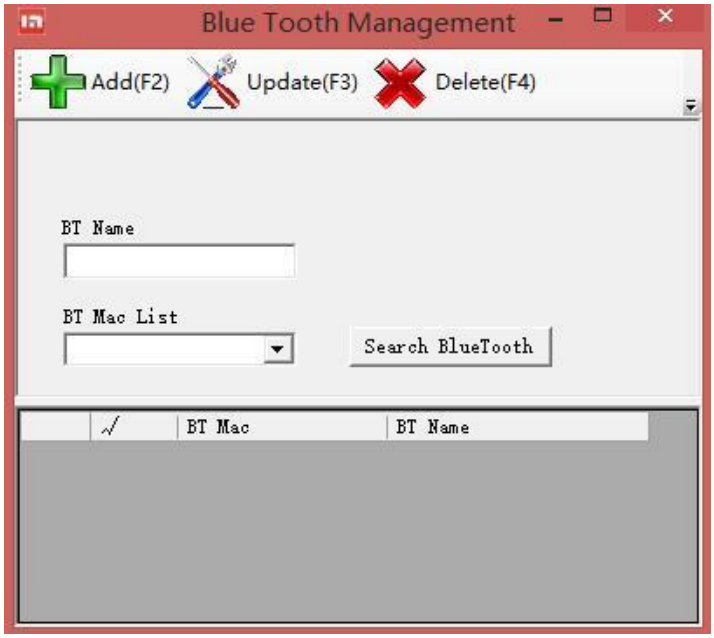


Figure 6

e) Hospital Logo

To set hospital user logo on the report, click “management → configuration → logo file”, then the software will require user select the hospital logo file. The logo will be put on the final report as long as the hospital logo file is selected.

To remove the hospital logo from the report, select “management → configuration → logo file”, then you will find a √beside the “logo file” word. Click “logo file”, the √will disappear. Then the hospital logo is removed from the report.

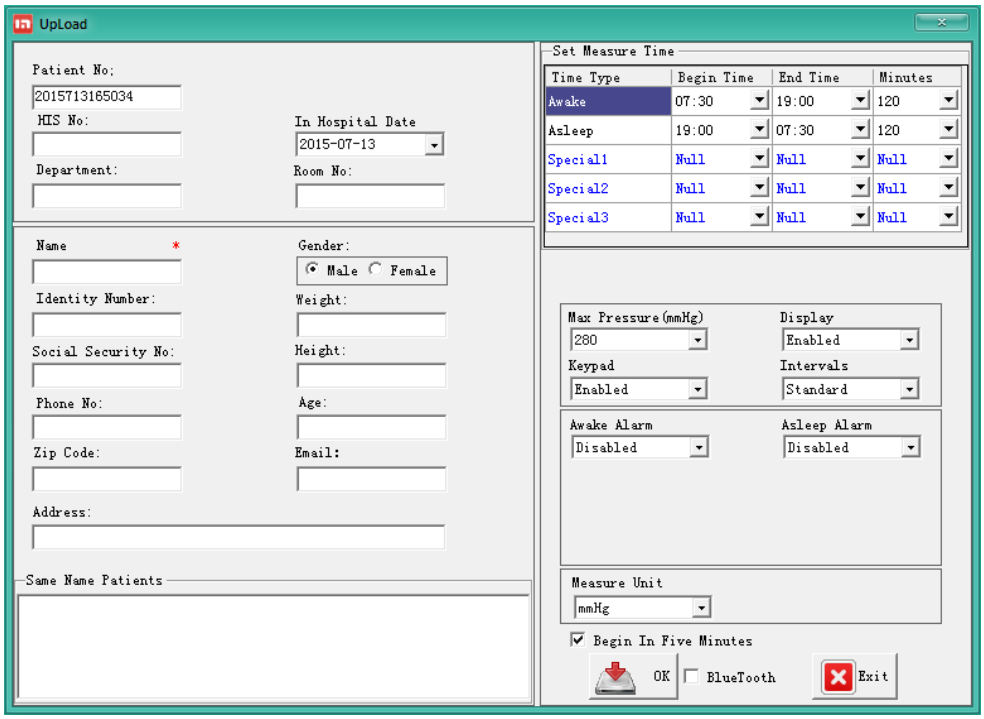
f). Signature

To set doctor electronic signature, click “management → configuration → signature”, then the software will require the user to select the doctor signature file. The doctor signature will be put in place on the final report as long as the signature file is selected.

To remove the electronic signature, select “management → configuration → signature”, then you will find a √beside the “signature” word. Click “signature”, the √will disappear. Then the electronic signature is removed from the report.

4.3.3 Programming

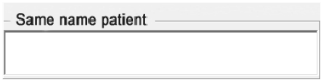
Inputting patient information, automatic same name patient searching, setting measurement intervals, max inflation pressure, enable/disable display, keypad, intervals option, alarms, etc. See in Figure 7.



(Figure 7)

1. Patient No.: The system can automatically generate a patient number, user can also input a number by himself upon hospital regulation.

2. Name: Patient’s name is always required, otherwise the programming will not be proceeded.

3. Same name patient: it locates on the left bottom corner of the programming screen, 

, if there are same patient names in the system when inputting patient name, then the patient number of same name patient will display in the blank. If the names are verified to be the same patient as the current patient, then tick the box before the names, and the data of the current patient will be saved in the original directory after retrieving data, If not, DO NOT tick the box.

4. HIS No.: The number of patient in HIS system of hospital.

5. Type of time: Daytime is the time except of sleeping. Nighttime is the sleeping time. Generally, time type is set in accordance with the patient's sleeping habit. Special 1 to 3 are additional periods by which doctor could monitor the blood pressure in wanted periods. If doctor consider it is not necessary, keep the blanks "Null".

6. Time interval: The interval between two successive measures. There are 5, 10, 15, 20, 30, 45, 60, 90 and 120 (min) as options.

7. Max pressure: The monitor can be inflated to 290mmHg the highest. In case of any further safety requirement, this function can be used to set the inflation upper limit. It can be set 40 mmHg higher than the possible maximum systolic BP reading. It doesn't mean the cuff pressure of each inflating will reach the setting pressure.

8. Begin in 5 minutes: Tick the box in front of it, then the monitor will start to programming measurement automatically within 5 min after programming. If do not select this item, user needs to press "Start" key to run a manual measurement as the start of the programming measurement.

9. Display: There are enable, disable options. If choosing "Disable", the screen will only display time, battery capacity and other general information, but do not display BP readings, which can avoid unnecessary impaction to subjects who see the measurement results. Note that the setting of disable will only start to work after 30 minutes of the success programming, within 30 minutes, screen will still display the BP readings. If choose "Enable", the screen will display BP readings normally.

10. Keypad: There are enable, disable options. If choosing "Disable", the functions of the keys will disable except power on and power off, and measurement process will follow the programming. Note that the setting of disable will only take effect after 30 minutes, user can still start/stop measurement within 30 minutes.

11. Time Interval: Two modes are optional, i.e. "Standard" or "Fixed". For "standard" mode, there is +/-2min of deviation. For "fixed" mode, there is no deviation.

12. Awake alarm: "Enable" or "Disable" is optional. Select "Enable", the monitor will alarm at daytime if the reading exceeds the setting limit. Select "Disable", there would be no alarm.

13. Asleep alarm: “Enable” or “Disable” is optional. Select “Enable”, the monitor will alarm at Nighttime if the reading exceeds the setting limit. Select “Disable”, there would be no alarm.

14. Highest SYS: Upper limitation setting of systolic pressure alarming, monitor alarms when the readings are higher than the upper limitation.

15. Highest DIA: Upper limitation of diastolic pressure alarming, monitor alarms when the readings are higher than the upper limitation.

16. Lowest SYS: Lower limitation of systolic pressure alarming, monitor alarms when the readings are less than the lower limitation.

17. Lowest DIA: Lower limitation of diastolic pressure alarming, monitor alarms when the readings are less than the lower limitation.

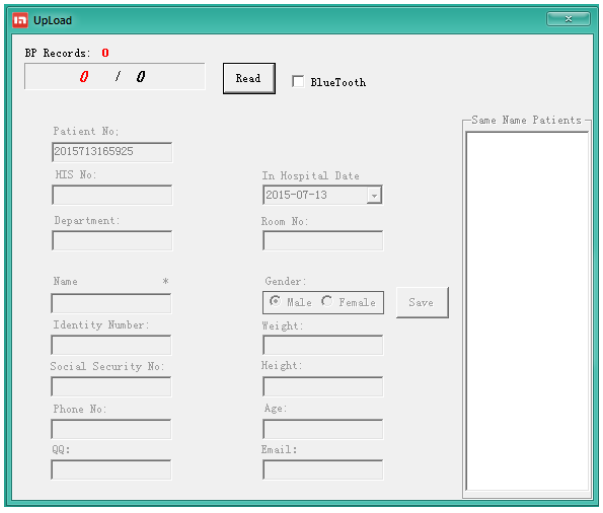
18. Unit: “mmHg” or “Kpa” is optional, unit of the readings.

19. Complete other blanks. And Click 

to upload the information to monitor. Monitor sounds “beep” after successful programming and at the same time the screen shows a message “programming success”. No “beep” means a failed programming.

4.3.4 Read

This function searches the data in the monitor, meanwhile upload them to computer. Click “Read”, dialog box as below Figure 8 pops up.



(Figure 8)

Users could use USB cable to obtain data, click “Read”, the data will be searched and uploaded to computer, the monitor sounds “Beep” when reading completion, no “Beep” means timeout and retrieving failure.

The monitor which is conducted in the programming stage, there would be a name checking in the column of the dialog box: “Same name patients”, see Figure 7 for details, if it’s the same person, you can select the name in the column and then the new BP data will be automatically saved under the same patient name in the process of data retrieving.

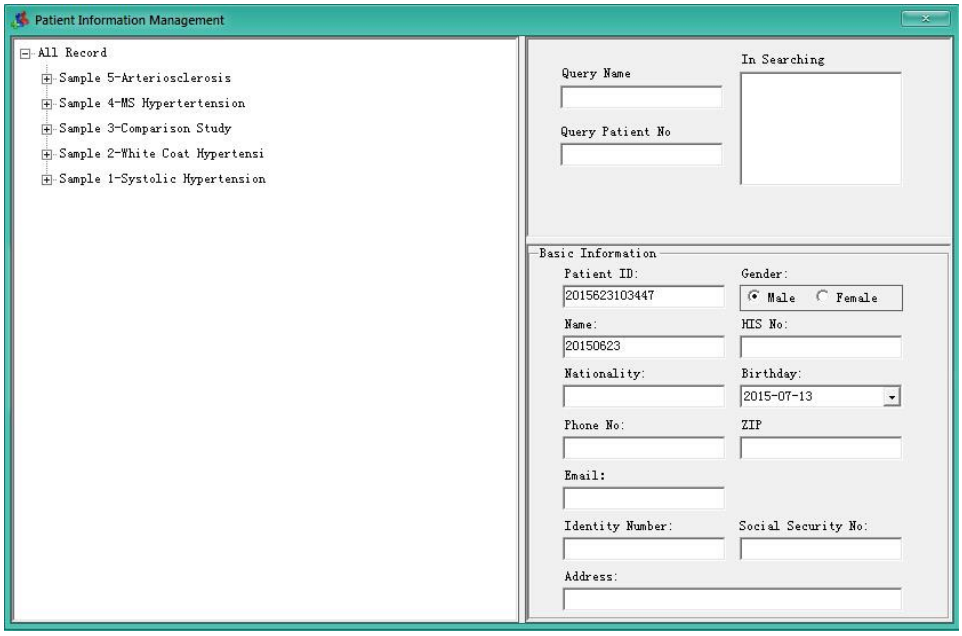
While retrieving data after connecting monitor with computer, if there is no patient name in the monitor, namely user repeat upload BP readings to computer, or the name was deleted, there would be a question comes out:”New patient?” Select the answer of “Yes” to proceed the data retrieving. After the data transition finished, please input the patient name. If there is the same name in the computer, then it will ask “Is it the same person?” If select answer of “Yes”, then the data will be saved under the same person. If “No”, the system will be saved under separate patient name even though it’s the same name.

ATTENTION: Click “Save” after the reading completion, or the data will be lost.

BP (blood pressure) records: The measurement times in total. Red digitals are uploading records from monitor to software, black digitals are records stored in the monitor.

4.3.5 Data

This function is for viewing the patient BP data and data playback, also for patient information edition. Press “Data” at the top toolbar, the dialog box as Figure 9 pops up, then select patient required on the left.



(Figure 9)

On the top- right of the dialog box, there is a box which can be used for patient searching by name or patient number. You can use this function when there are too many patients and it is difficult to find the target patients through screen viewing. Input the patient name and/or number, the possible patients will display on the “In searching” box. Double click the patient name you wanted to obtain the details.

4.4 Patient information management

This function is for managing patient files in main window.

Delete and add

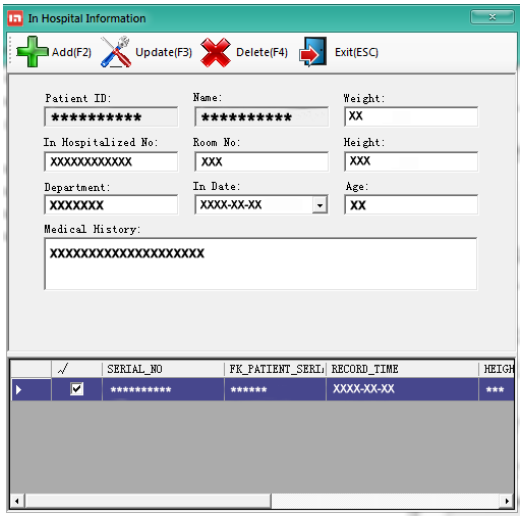
This function allows you to delete the data of one or several patients. All of the blood pressure data of the patient will be deleted by this function. Operate as following:

a) Click “Data”, it pops up the dialog box as Figure 9.

b) Delete patient data: select the target patient, and click the right mouse button, then select “Delete the patient” in dropdown menu to delete the data.

c) Add patient data: select the target patient, and click the right mouse button, then select “Add being hospital” in dropdown menu, then it pops up a dialog box named “In Hospital Information”, see Figure 10, user can update, delete or add information in the blanks except blanks of “Patient ID” and ”Name”, then click “Add ”, “Update”, ”Delete” on the top, and click “Exit” to shutdown the dialog box.

d) Add measurement data: double click the patient name by the left mouse button, then click the “Room date” by the right mouse button, select “Add measure”, select “Yes” on the box of “Would you want to empty the device’s data”, then it pops up the dialog box shown in Figure 7, re-program the monitor for further measurement.



(Figure 10)

e) Double click “Room date” by the left mouse button, then click the “Measure Time” by the right mouse button, then user can select the operations of “Export data”, ”Set standard BP”, ”Set awake and asleep”, ”Delete the measure”.

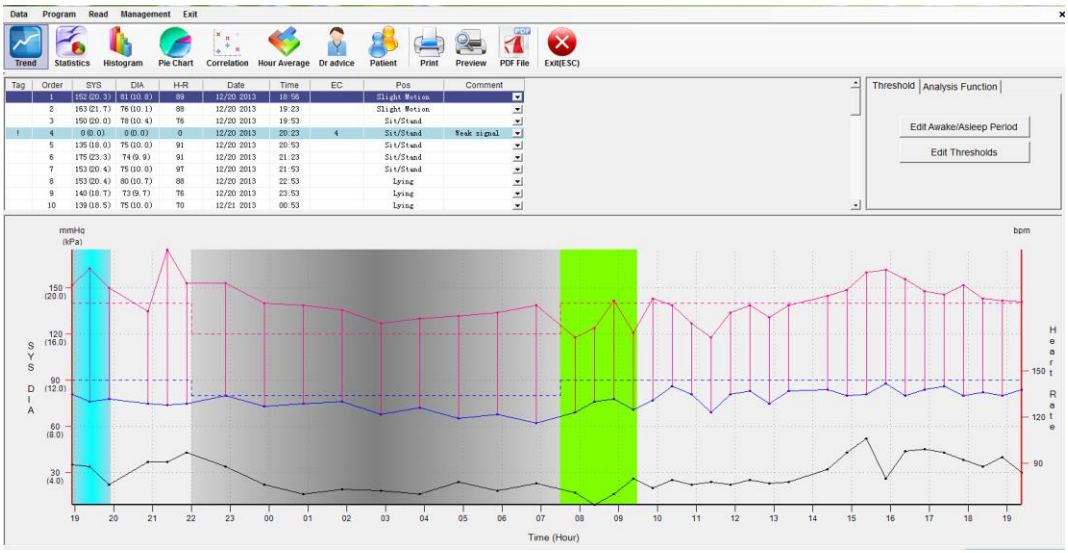
Note: 1 Operation of “Program” can delete the data saved in the monitor;

2 After operation of “Read”, click “Save” on the dialog box, or the data would be lost.

4.5 Toolbar use

4.5.1 Tendency Chart

Select the patient data, double click “Room date”, and double click “Measure Time”, then data tendency chart shows on the software, see Figure 11.



(Figure 11)

4.5.2 View Ambulatory Blood Pressure (ABP) study

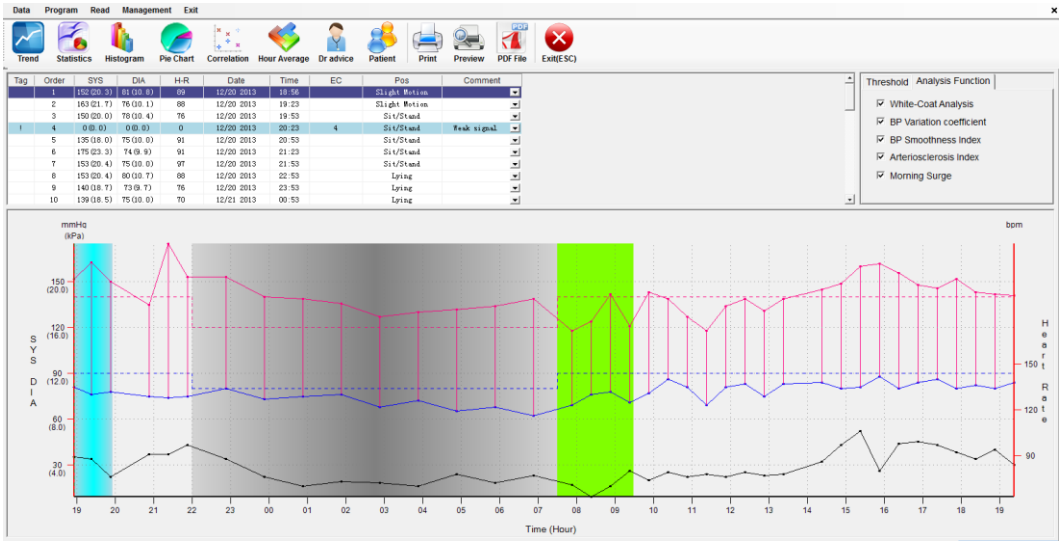
See Figure12, it displays all raw data in the left top area: systolic pressure, diastolic pressure, heart rate, measurement time, body position and error code.

Below is the blood pressure tendency chart. X-axis is time, and Y-axis is blood pressure readings with the unit of mmHg or Kpa, and heart rate readings with the unit of bpm.

Beside the raw data area, there are two options: “Threshold” and “Analysis function”.

Click “Threshold”, there are two options: “Edit Awake/Asleep period” is used to set the start/end time of day and night, see Figure 14; “Edit Thresholds” is used to set the analysis standard of blood pressure values, see Figure 15. AHA/JNC7 is America Hypertension Association standard, ESH is European Society hypertension standard. “Default” is most common setting for doctors. “Manual” means user can set a standard by oneself. After setting, click “Update” to confirm the settings.

“Analysis Function” allows users to select the wanted statistical items. Tick the box in front of the item you want, the analysis results will show the ticked items, and vice versa.



(Figure 12)

See Figure 12, the shaded area with different colors means the studying period. Default color meanings are:

• Blue Shadow: White-coat period, it means the first hour period of the ambulatory BP measurement;

• Light Gray Shadow: Asleep period;

• Green Shadow: Morning surge period, the two hours after getting up from bed.

The color could be changed, please see 4.3.2.4 - b for details of color configuration".

Adjust the size of graph by:

a) Adjusting vertical axis: Move mouse pointer on vertical axis area. Press mouse left button; pull the pointer upward or downward to adjust the size of graph when the pointer becomes double-headed arrow.

b) Adjusting horizontal axis: Move mouse pointer on the area below horizontal axis. Press mouse left button, pull the pointer on the left or right to adjust the size of graph when the pointer becomes double-headed arrow.

Adjust the size of BP data table by:

a) Moving the mouse pointer on the bottom lines.

b) Pull the pointer upward or downward to adjust the size when the pointer becomes double-headed arrow.

4.5.3 Edit an ambulatory blood pressure (ABP) study

You could edit the ABP study when you view the historical data.

1 Exclude the records

In the tendency tab, records marked with "**!**" in the column of "Tag" by monitor will be treated as invalid data and excluded in the analysis, and will be neglected in report printing too. User

can also mark “*” by moving the cursor to the relevant box of “Tag” column, then click by left mouse button, to exclude the data that will not be analyzed by user’s needs, meanwhile, user can also delete “*” by clicking the left mouse button on it.

2 Select data

a) If select one reading in the form, there would be a vertical broken line on the tendency chart marked the reading.

b) If select one reading point on the tendency chart, there will be a vertical broken line, and the relevant data in the form will become blue background.

3 Data in the table

a) For the explanation of “Systolic Pressure, Diastolic Pressure and Heart Rate”, please refer to 4.5.10 “Hour Average”.

b) Error code (EC): it is the code of error event. Software identifies incorrect records automatically during measurement and marks the reading with “*” or “!” in “Tag” column. The code will be given in “EC” column, and the causes of error code will be listed in “Comment” column.

c) Body position: It is a characteristic feature of our monitor. Our monitor can measure the body positions/status while BP measurement. The body position is provided at 4 options: “Stand/Sit”, ”Slight Motion”, ”Lying” and ”Heavy Motion” etc.

d) Comment: Doctor can give input in this column in accordance with patient’s actual feedback. Details refer to Figure 13.

(Figure 13)

4 Adjust awake time/asleep time

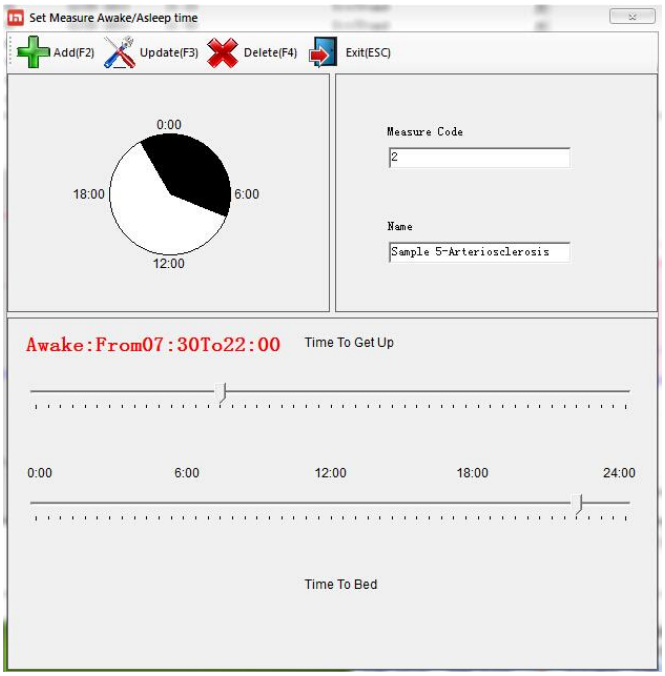
Awake time/asleep time have been set in programming. You can change the setting in software after data retrieving if needed. Operation as follows:

a) Select “Threshold” beside Tendency chart;

b) Click “Edit Awake/Asleep Period” to adjust the awake time and asleep time;

c) As Figure14, you could move the Time-Slice to reset awake time and asleep time in the tab. The dark part represents asleep time and white part represents awake time. The clock is same as the computer time setting.

d) Click “Update” for successful update.



(Figure 14)

4.5.4 Adjust blood pressure Threshold

Blood pressure threshold applies to all patient files and contains: JNC7/AHA, ESH, default setting and user-defined.

JNC7/AHA: according to the Seventh Report of Joint National Committee of USA on the Prevention, Detection, Evaluation, and Treatment of Hypertension, the threshold during waking period is 135/85/85, and 120/75/75 for sleeping period.

ESH: The ESH (European Society of Hypertension) guides the threshold is 135/85/85 for waking periods and 120/70/75 for sleeping periods.

Default setting: The default setting is 140/90/85 for waking periods and 120/80/75 for sleeping periods.

User-defined: Any individual doctor for any individual patient, the threshold can be defined individually according to the actual study requirement.

Operation as follows:

a) As Figure 15, select “Threshold”→ “Edit Thresholds” beside Tendency chart;

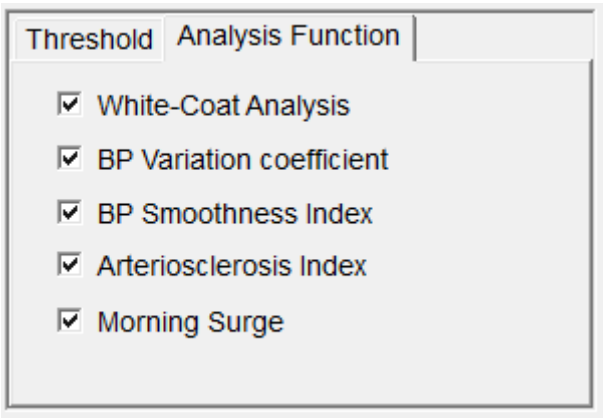
b) Select blood pressure threshold in line with actual situations;

c) Click “Update” for successful update.

(Figure 15)

4.5.5 Analysis Function

Click “Analysis Function” on “Tendency” interface, see Figure 16:



(Figure 16)

The tab contains five options: White-Coat analysis, BP variation coefficient, BP smoothness index, Arteriosclerosis index, Morning Surge. (The concept of these indexes is presented in the following “Note”)

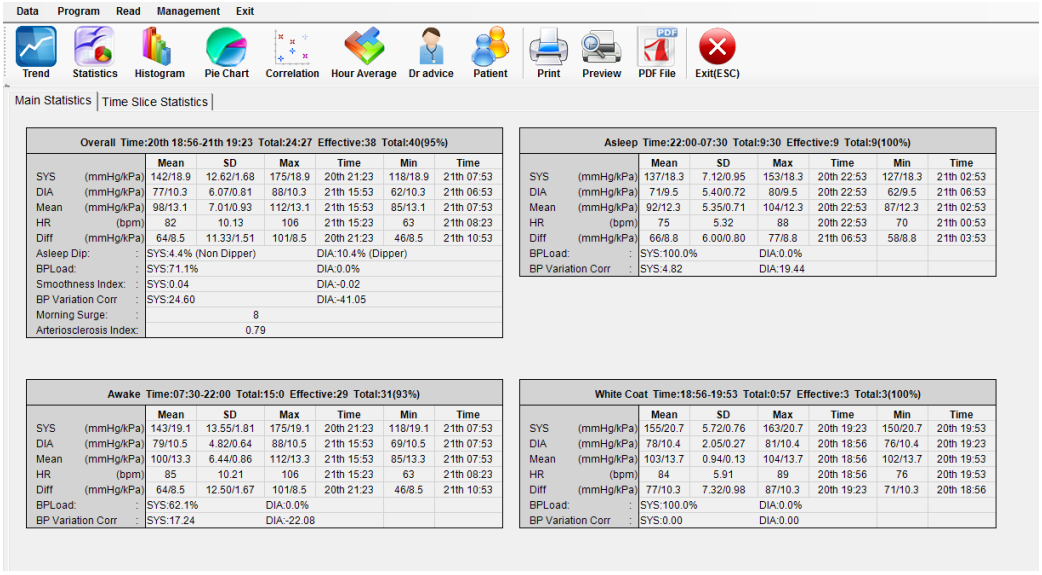
You can choose to enable or to disable the White-Coat analysis. The white coat syndrome affects patients whose blood pressure is abnormally rising when they are in a medical environments.

Enable the white-coat analysis by ticking “√” in the box, the other indexes are as the same. The chosen indexes and their statistical result will be displayed in statistical table.

View statistics: Click “Statistics” →“Main statistics” in the toolbar and open the statistical

analysis. The tab as Figure 17 displays:

- Over all time: Statistics of whole day BP readings;
- Awake time: Statistics of awake time BP readings;
- Asleep time: Statistics of asleep time BP readings;
- White coat time: If select the White-Coat Analysis, then you can get the “White coat statistics” form which is based on the BP readings within first hour.



(Figure 17)

Asleep Dip: it is the analysis about how much dip the BP readings descend from awake period to asleep period. Base on this analysis, Hingmed BP program tell the patients which situation they belong to in below options.

Note: The following statistical indexes is just for your reference!

- Reverse-dipper: A patient shows a increase of 0% or more for average systolic or diastolic blood pressure readings taken during sleep compared to readings taken while awake.
- Dipper (normal): A patient shows a decrease of 10% ~ 20% for average systolic or diastolic blood pressure readings taken during sleep compared to readings taken when awake.
- Non-dipper (abnormal): A patient shows a decrease between 0% to 10% for average systolic or diastolic blood pressure readings taken during sleep compared to readings taken when awake..
- Extreme: A patient shows a 20% or more decrease for average systolic or diastolic blood pressure readings taken during sleep compared to readings taken when awake.

Blood Pressure Load (BP Load): The percentage of readings exceeds the upper limited threshold, e.g. 75.4% of BP Load means that 75.4% of the readings are above the upper limited threshold. The possibility of hypertension correlates with the BP load, high

percentage of BP load means more possibility of hypertension. BP Load is counted in distinct period based on different systolic pressure and diastolic pressure.

Blood pressure smoothness index (SI): SI is an index of evaluating the antihypertensive effects. Ambulatory Blood Pressure Curve Smoothness Index is a ratio of the average of BP hourly decreasing values to its standard deviation after 24 hours' medical treatment. High SI value means better and more balanced antihypertensive effects.

Blood Pressure Coefficient of Variation (CV): CV is a ratio of BP hourly decreasing standard deviation to average BP hourly decreasing. The index reflects the blood pressure fluctuation in a certain period of short-term or long-term. The CV values of 24-hour, daytime or nighttime represent blood pressure fluctuation of distinct period. SI=1/ CV, reflects the stability of blood pressure decreasing.

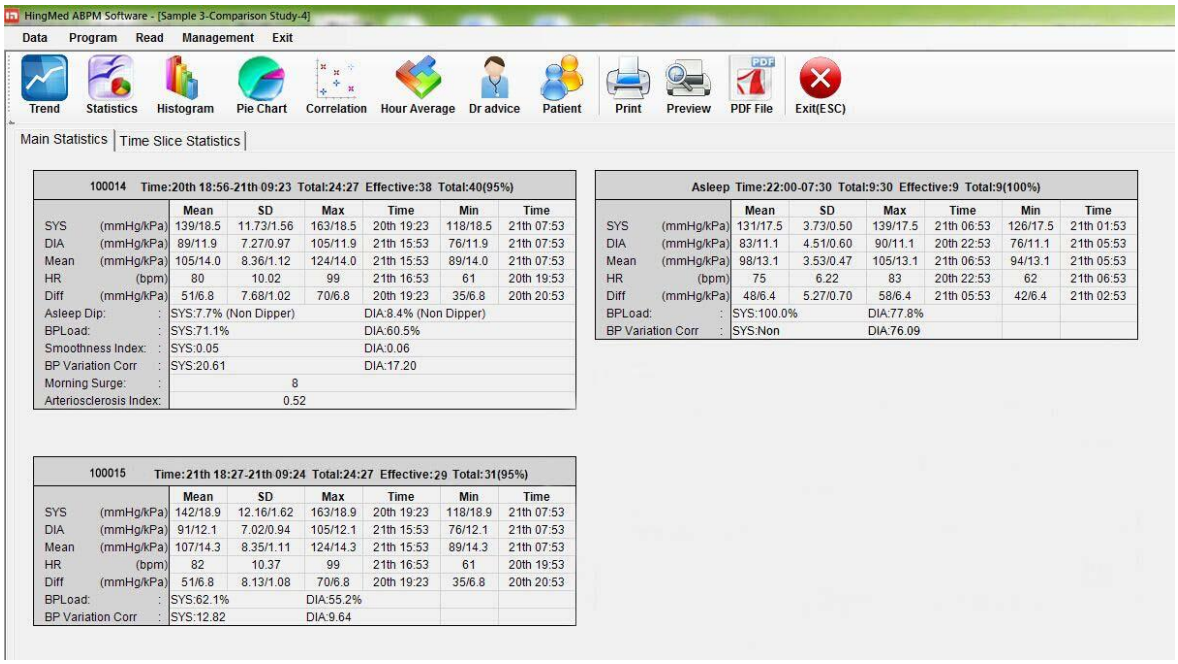
Morning Surge (MS): The biggest fluctuation of blood pressure usually occurs in early morning. At that time the patients become active from sleeping state and the blood pressures rise rapidly up to a high level (even up to the highest level in a day). The MS is the average value of systolic pressure readings within 2 hours from awaking minus the average value of the lowest systolic pressure readings within one hour in sleeping state.

Ambulatory Arterial Stiffness Index (AASI): AASI is an index reflecting the arterial stiffness. The index value is attained by processing and calculating the 24-hour's ambulatory monitoring data.

AASI is formulated as 1 – f, f is a regression slope of the diastolic blood pressure vs systolic blood pressure. It reflects the severity of arterial stiffness, AASI values approaches to 1 more closely, it means the arterial stiffness is more severe, It reflects the stiffness of the whole arterial system, not just some parts of the system.

4.5.6 View Statistics in special period

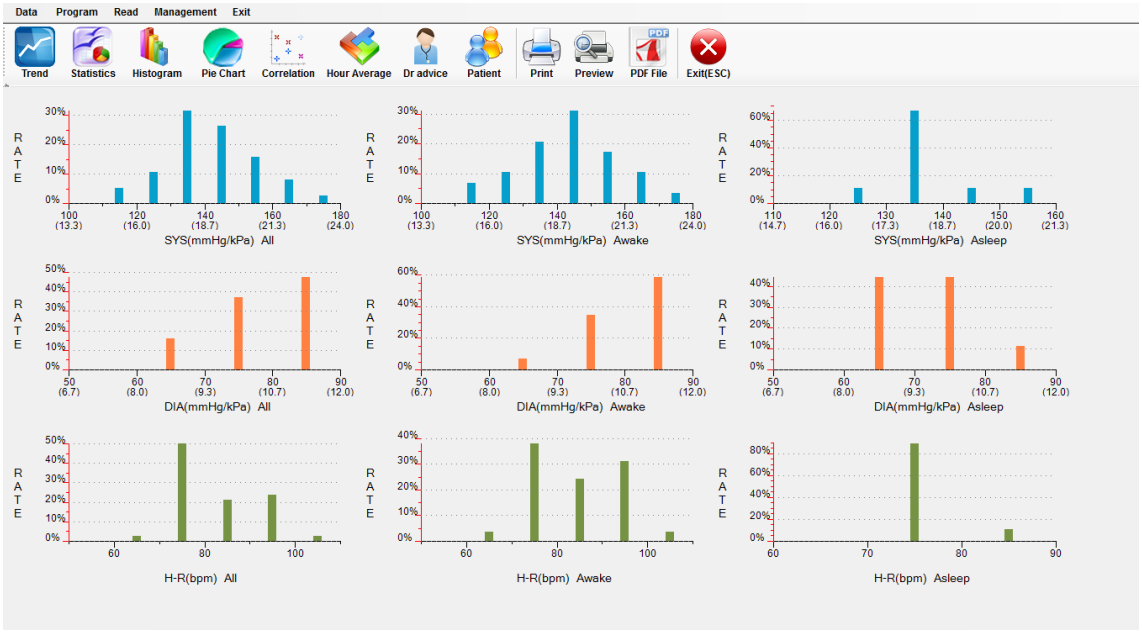
If you program the BP measurement with special period, then the software can analyze and statistic the readings in the special period individually, click "Statistics"→"Time slice statistics", see Figure 18:



(Figure 18)

4.5.7 View Histogram

Histogram shows the BP readings distribution in different ranges; click “Histogram” in the second row of top-toolbar, as shown in Figure 19:



(Figure 19)

These histograms contain the information of systolic pressure, diastolic pressure and heart rate in whole day, daytime and nighttime.

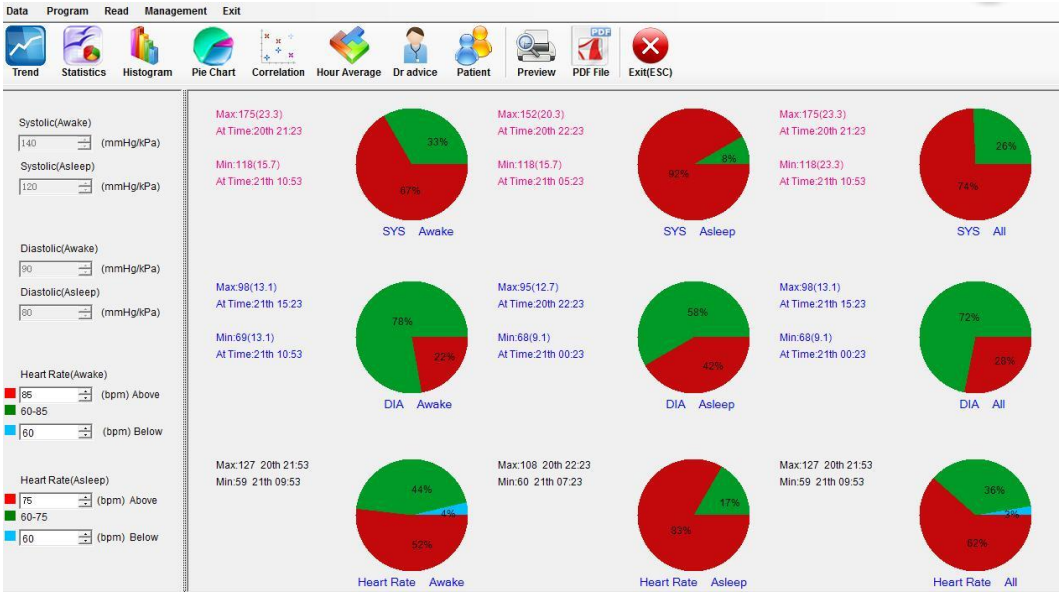
a) Y-axis: The percentage of systolic pressure, diastolic pressure or heart rate, e.g. 40% SYS in whole day represents that the specific systolic pressure reading take 40% of the whole day systolic pressure readings.

b) X-axis: it means blood pressure values or heart rate values. The unit of blood pressure is mmHg or KPa, 1KPa=7.051mmHg.

Under the X-axis, the first row is the readings with unit mmHg and the second row is the reading with unit KPa. i.e. 120 is 120mmHg, 16.0 is 16.0 KPa.

4.5.8 View Pie chart

The pie chart shows the percentage of readings which are beyond the blood pressure limitation set by the standard, click ”Pie Chart” in the second row of top-toolbar, as shown in Figure 20:



(Figure 20)

These Pie charts contain the information of systolic pressure, diastolic pressure and heart rate in the whole day, daytime and nighttime.

a) The pie chart is based on the BP standard on the left. The data on the left of each pie chart are the highest and lowest readings and happening time during related time slot.

b) The red part in the pie chart represents the proportion of readings beyond standard setting. The green part represents the proportion within the standard setting.

c) Maximum represents the maximum reading during the measurement period. Minimum represents the minimum reading during the measurement period.

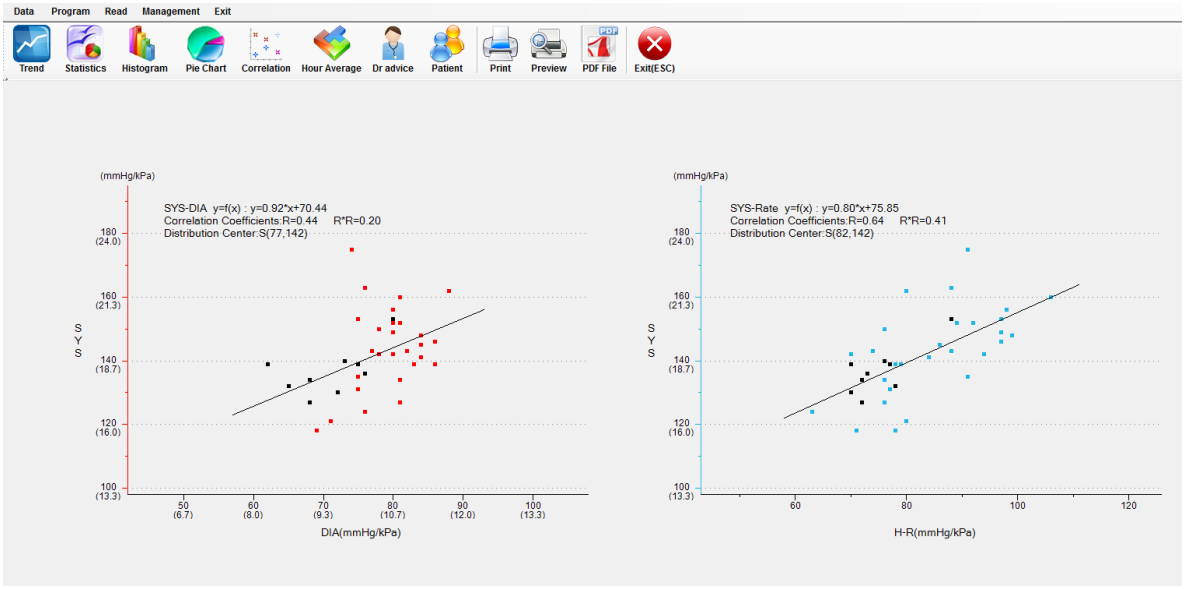
d) The BP standard on the left side cannot be adjusted. If it needs to be adjusted, please go to Tendency - Threshold - Edit Threshold, see Figure 15 for details.

4.5.9 Check Correlation

User can check the linear correlation graph of ABP study by clicking “Correlation” in the second row of top-toolbar. See Figure 21.

Linear correlation graph makes all the BP readings to fit linearly; it establishes the regression

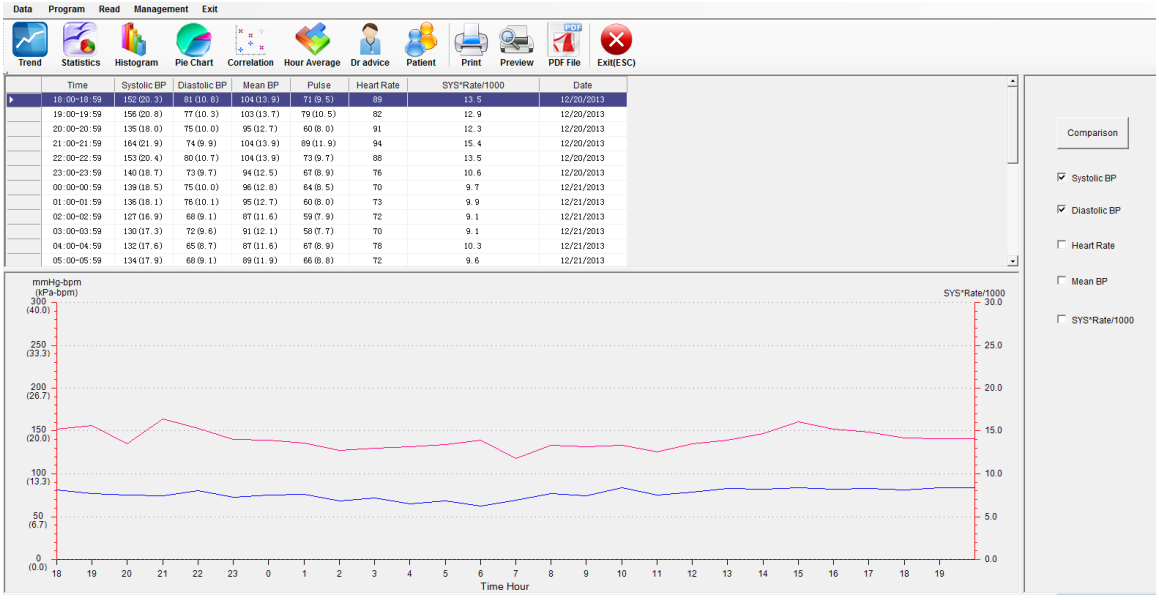
equation to analyze the linear relationship between systolic pressure vs diastolic pressure, as well as systolic pressure vs heart rate, diastolic pressure vs heart rate, and MAP vs pressure. For instance, in the data (120/80/65), respectively means systolic blood pressure, diastolic blood pressure and heart rate, “120/80” corresponds to one point in the left graph, and “120/65” corresponds to one point in the right graph.



(Figure 21)

4.5.10 Hour Average

You can view hourly average readings by clicking the “Hour Average” in the first row of top-toolbar. The readings display in the table. See Figure 22.



(Figure 22)

Users can tick and select the indexes of Systolic BP, Diastolic BP, Mean BP, Heart Rate and SYS*Rate/1000.

• Systolic Blood Pressure (SBP): The highest arterial blood pressure reached when the ventricles are contracting. WHO standard: hypertension (adult SBP ≥ 140mmHg or/and DBP ≥ 90mmHg); borderline hypertensive (adult SBP: ≥130mmHg and ≤ 140mmHg); normal pressure (adult SBP ≤ 130mmHg); ideal pressure (adult SBP ≤ 120mmHg).

• Diastolic Blood Pressure (DBP): The lowest arterial blood pressure when the ventricles are relaxed and the arterial vascular walls elastically retract.

• Mean Arterial Pressure (MAP): It means the average pressure in the artery over the period of one heart beat, its average value of normal adult is 70-105mmHg, it is calculated: MAP= (SBP+2*DBP)/3, or MAP=DBP+1/3(SBP-DBP).

• Difference of Pulse Pressure: It is calculated by subtracting the diastolic from the systolic reading. It is another hemodynamic parameter that may serve as an indicator for cardiovascular risk.

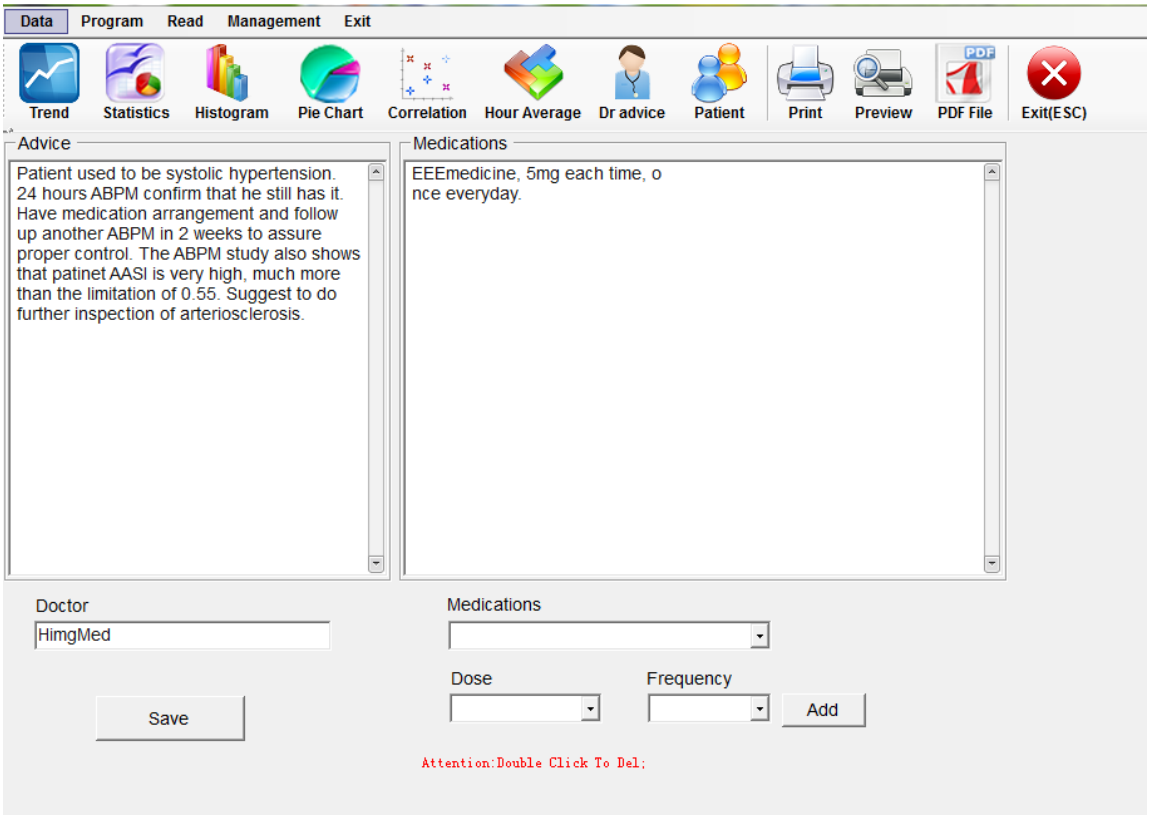
• Heart Rate (HR): The number of heartbeats per unit of time, usually expressed as beats per minute. The HR is 60-80 times per minute for normal people. Activity will increase the HR. The HR of athlete is slower than normal people.

• Pressure Rate Product (PRP): This is the product by multiplying the average systolic reading and the average heart rate, then divide by 1000. PRP strongly correlates to a patient's action and body position and may be a key indicator of cardiovascular risk.

• Comparison: It is to compare the BP readings collected at different dates on the same patient based on the hourly average data, such as to compare the BP reading of today and two weeks ago, then we can find if the treatment solution works on the hypertension after two weeks, which can help doctor to make further diagnosis. The operation processes are: Open patient data----click comparison on the hourly average screen—the screen gives options of different measurement date---select one date to proceed. Then the screen will give the hourly average comparison of the two dates' readings.

4.5.11 Dr. advice

You can check or edit doctor's advice, prescription and the information of doctor in charge by clicking "Dr. advice" in the second row of top-toolbar. Dialog box as Figure 23 pops up.



(Figure 23)

To edit “Advice” or “Medications”, please:

a) Select “Dr. advice”, input your advices in “Advice” column.

b) Input the information of “medications”, please:

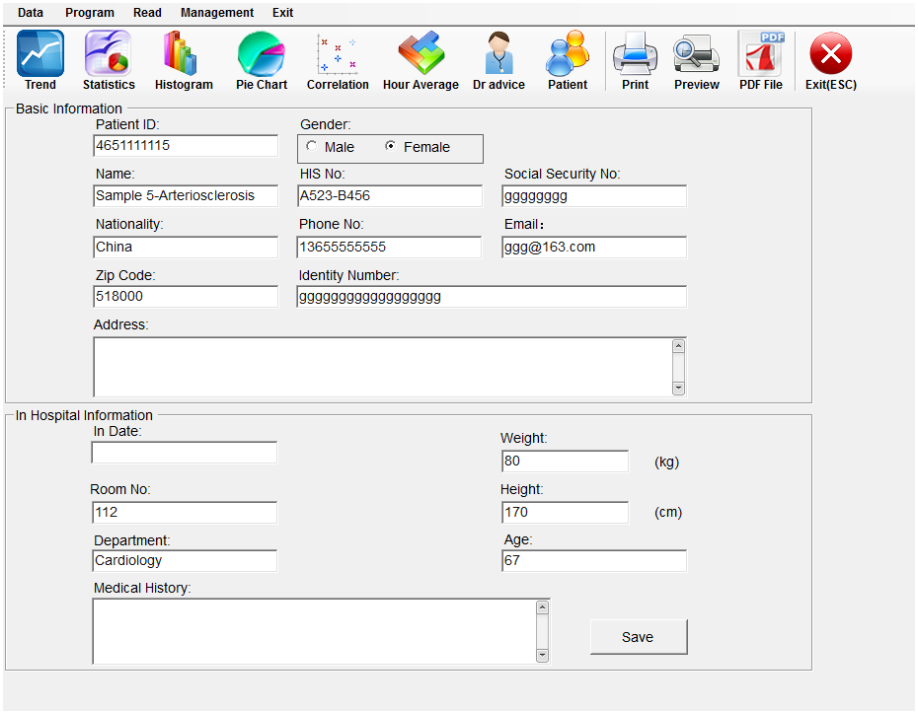
Firstly: Input medicine name to the blank of “Medications” in the bottom.

Secondly: Input “Dose”, “Frequency”, click “Add” to add the messages to above box.

c) Click “Save” after completion of inputting.

4.5.12 Edit details of patient

Depending on the actual conditions, users can edit Basic Information (Patient ID, Gender, Name, HIS NO., Social security NO., Nationality, Phone NO., E-mail, Zip code, Identify NO., and Address etc.) and Hospitalization Information (Date, Weight, Room NO., Height, Department, Medical history etc.). See Figure 24.



(Figure 24)

To edit details of patient, please:

a) Select “Patient” on second row of top-toolbar;

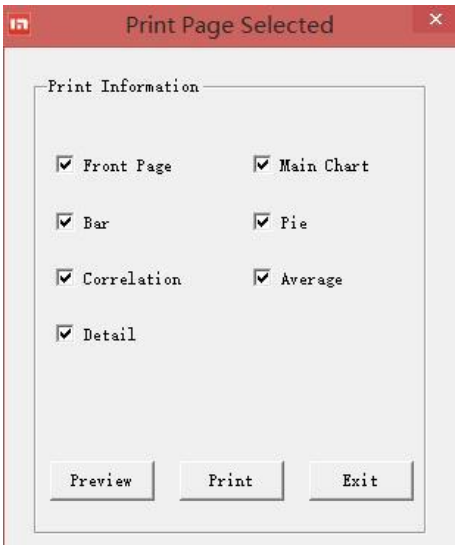
b) Then input the information in the blanks directly;

c) Click “Save” after updating the information.

4.5.13 Create report

Print preview

a) To create and view BP analysis report, click “Preview” on second row of top-toolbar, it appears “Preview” dialog box, see Figure 25.



(Figure 25)

b) Select the items you want on the configuration box as shown in Figure 25. Front page is a summary of the whole report, which contains details of patient information, statistical analysis of blood pressure records, and prescription. The following pages give tendency chart, Histogram, Pie chart, Correlation chart, Hourly Average and detailed raw records.

c) Click “Preview” button to browse the report.

4.5.14 Printing

If you want to print the report, please: Click “Print” on the top left corner of the preview to print the selected report.

Store the report with PDF format: click “PDF File” and store the report in a defined directory with PDF format, and users can also select the desinated store place by themselves. This function is better for the sharing of patient information.

Exit the current patient data: click “ 

” on second row of top-toolbar to exit the current displaying;

Exit Hingmed blood pressure software: click “ Exit ” on first row of top toolbar. Alternatively, click “  ” on top right corner of the software.

Introduction of symbols in printing report: The following symbols are shown in the original BP data report pages:

Symbols	Explanation
“+”	Indicates that the reading was measured manually by pressing the Start/Stop key on the monitor.
“r”	Indicates that this reading was a automatic re-measurement reading while the last automatic measurement failed.
“*”	Indicates that the records could be a invalid reading.

5 Error code, description and resolution

Event Code	Description	Resolution
EC 01	Loose cuff caused winding loose or cuff is not winded	Retighten cuff or keep correct posture when measurement
EC 02	Gas Leakage due to valve or air circuit leaks	Tighten connector and check cuff and hose. Contact with distributor if leakage cannot be stopped
EC 03	Pressure error (valve does not open normally)	Check whether electromagnetic valve works normally or not
EC 04	Weak signal (too weak pulse or loose cuff)	Tighten cuff if it is too loose
EC 05	Blood pressure exceeds range, maybe the subject’s BP pressure exceeds the maximum measurement range.	Press [Start/Stop] button to measure again. If problem persists, change a monitor of larger range to retry

EC 06	Excessive motion, maybe signals contains too much motion artifact or interference	Keep quiet and don not move the arm with BP cuff in measurement
EC 07	Overpressure, in adult mode, the pressure exceeds 290mmHg	Press [Start/Stop] button to measure again
EC 08	Saturated signal (large signal amplitude due to motion or other reasons)	Keep quiet, press [Start/Stop] button to re-measure
EC 09	Measurement overtime (exceed 150s in adult/children mode)	Keep quiet, Press [Start/Stop] button to re-measure
EC 10	Manually stop	Keep quiet, Press [Start/Stop] button to re-measure
EC 11	System error	Reopen device. If the error is frequent, ask professional to maintain
EC 16	Cuff pressure exceeds the maximum setting	Reprogram in PC software and raise the maximum setting
EC 32	Handshaking communication failure	Press [Start/Stop] button to measure again
EC 33	Safety pressure exceeds 15mmHg, cannot measure again	Deflating until the pressure is lower than 15mmHg and re-measure
EC 34	Measurement finish, measure again when the pressure is still above 15mmHg	Deflating until the pressure is lower than 15mmHg and re-measure
EC 35	No response after start measurement, and measurement fails	Press [Start/Stop] button to measure again
EC 36	Measurement results are unattainable	Press [Start/Stop] button to measure again
EC 37	Measurement overtime	Measure again
EC 48	Full of internal memory, cannot measure again	Empty the data after program the monitor

*If the event could not be corrected, please call agent or after-service department of Hingmed for help.

6 Notice

A) The software supports the analysis of 72-hour successive records at most, and the software will not support the analysis of records which exceed 72 hours.

B) Technology assists to *Hingmed* ambulatory blood pressure monitoring software:

Installation

Firstly: Use the program supplied in setup disk to install Hingmed software.

Secondly: Please place setup disk in the CD drive of your computer. The CD will run automatically, screen will display the installation instructions.

If the CD does not work automatically, operate as following:

a) Open “my computer”;

b) Double-click CD drive and open the CD;

c) Double-click to install the file of set up.exe;

d) Operate by following the instructions on screen.

C) Technology statement about Hingmed Website

If you have any trouble in using our product, please refer to “Management” → “Help” on the top toolbar of software, or log in our website: www.Hingmed.com for help. If the problems are still unsolved, please contact after-service department of our company.

You can contact the after-sale department of *HingMed* for most updated version.

Contact information:

Company: Shenzhen Hingmed Instrument Co., Ltd.

Address: 4F, Zhonghangflying Building, NO.371, Guangshen Road, Bao’an District, Shenzhen, China.

Telephone: 086 0755 23720600

Fax: 086 0755 23720602

E-mail: service@Hingmed.com