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1 Basic Information

1.1 Manufacturer

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1.2 Product

Name: Remote & Mobile ECG Monitoring System (hereinafter referred to as the system)

Model: XYS.WRM-1E

File Name: Product Description

File Number: XYS-WRM-1E (E)-E-005

Version: C/1

Date: November 2010

Language: English

1.3 Revision History

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Table 1-1 shows the revision history.

Table 1-1

Date	Version	Description	Remarks

Date	Version	Description	Remarks
04/2008	A/0	The first version.	Software version 1.0
06/2010	A/1	Features are added or revised.	Software version 1.1
07/2010	A/2	Problems in V1.1 are solved.	Software version 1.2
08/2010	C/0	Problems in V1.2 are solved; new features are added.	Software version 1.3
12/2010	C/1	New features are added.	Software version 1.4.3

1.4 Product Classification

ECG collectors are internal-powered general devices, type CF application instead of type AP or APG.

1.5 Application Standards

GB/T 191-2000, GB 9706.1-2007, GB 9706.25-2005, GB 9969.1-2008, YY 1139-2000

2 Overview

Remote & Mobile ECG Monitoring System, model XYS.WRM-1E (hereinafter referred to as the system), is developed and manufactured by Shenzhen New Element Medical Equipment Technology Development Co., Ltd.

Integrating advanced medical and information technologies, the system can monitor ECG anytime and anywhere by employing world wide network resources. Doctors can monitor, analyze and process ECG signals remotely, enabling remote diagnosis, home treatment, centralized patient management. This is essential network and digital monitoring.

The system enables patients to obtain doctors' diagnosis and suggestions in time. Thus, doctors can get ECG monitoring conveniently. For malignant cardiovascular disease patients, their relatives and doctors can be alarmed immediately in the case of emergency. Then, patients can be rescued and treated timely.

2.1 Components

The system consists of ECG collector, lead wires and software (health mobile phone and server). See Figure 2-1.

Figure 2-1 ECG Monitoring System

2.2 Work Flow

The system can collect ECG signals through ECG collectors and send the signals to health mobile phone via Bluetooth in real time for analysis. It will automatically send an alarm in case of abnormal ECG (or manual alarm by pressing the "Emergency" button), and upload ECG data to the remote server through GPRS/Internet. The server will send an alarm immediately after receiving abnormal ECG signals to the doctor for timely processing.

2.3 Application

Applicable to abnormal ECG and HR signals monitoring.

3 Central Service Website

Welcome to use Remote & Mobile Medical Monitoring System. You can type the server address (for example: http://121.33.253.77/Wrm20091201/Default.aspx) in the address bar of IE to access the homepage (as shown in Figure 3.1-1).

3.1 Common Operations

3.1.1 Login and Logout

Access the system website. For a user who does not log in, the page will be redirected to http://*domain name*/WrmWeb/Default.aspx. See Figure 3.1-1.

Figure 3.1-1 Login interface

Password change is required by the system after the first login. The interface is as follows:

Figure 3.1-2 Password reset interface

The homepage after login is shown in Figure 3.1-3.

Logout: to protect your privacy, click EXIT on the upper right to quit the system.

Figure 3.1-3 Homepage

3.1.2 Language

ng system supports multi-language. Select a language by clicking on the upper right to switch working modes in different languages.

3.1.3 al Information

Click

on the upper right to view personal information (see Figure 3.1-4). The user can change password and set favorable page style on this page.

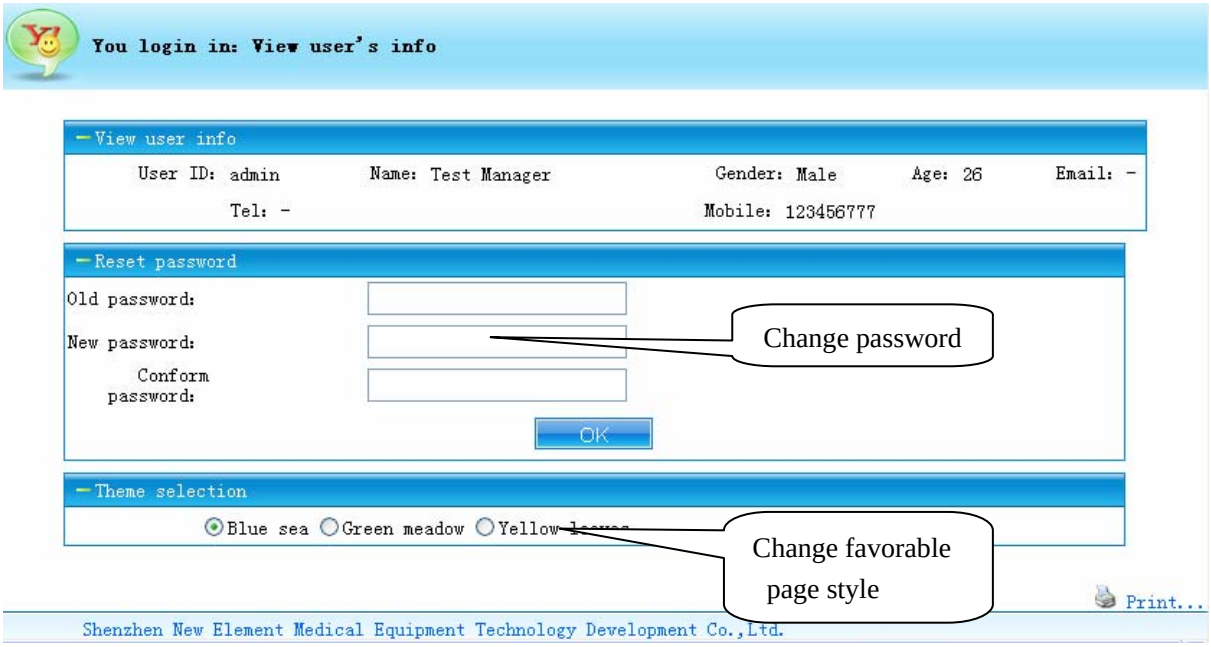


Figure 3.1-4 Personal information

3.1.4 Sorting and Searching

Sorting and searching functions are available in the system. You can click the name of a column to re-sort it.

For the following patient list, click **Age** to sort the column in ascending order (as shown in Figure 3.1-5).

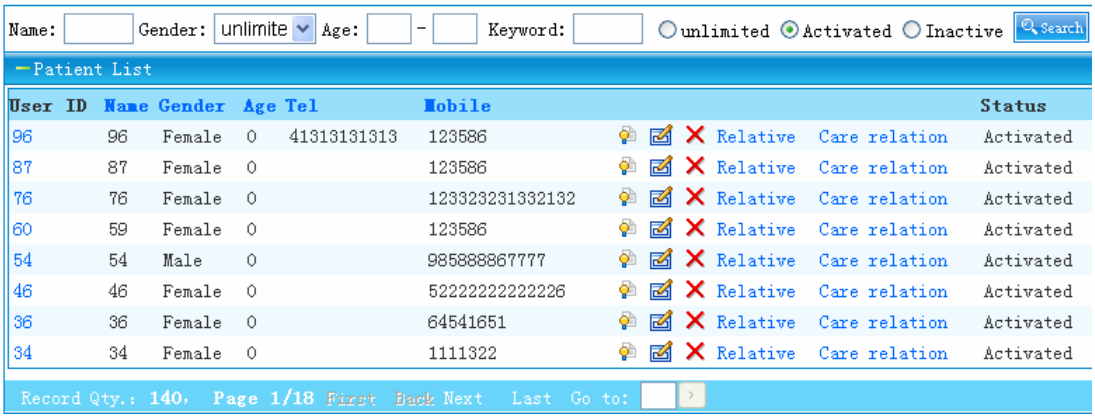


Figure 3.1-5 Sorting page (ascending order)

Click **Age** again, the column will be listed in descending order (as shown in Figure 3.1-6).

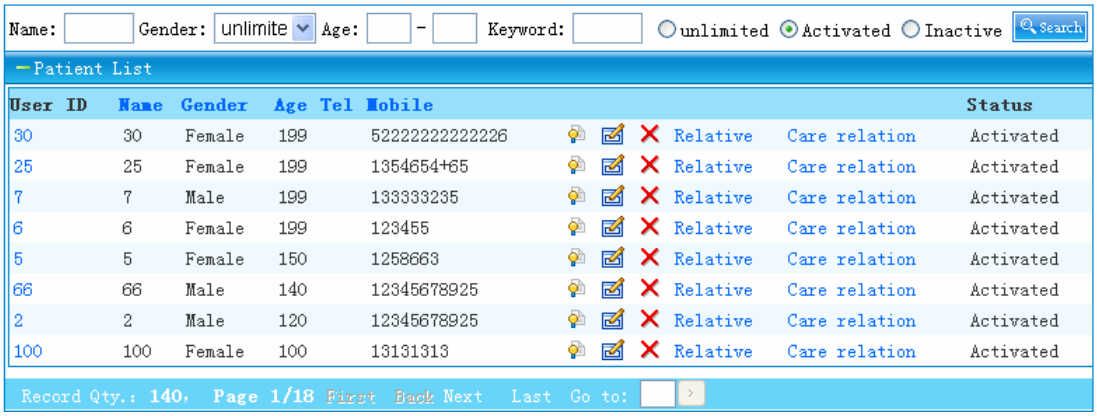


Figure 3.1-6 Sorting page (descending order)

Enter relevant search criteria on top of the form to display matching information in the list (as shown in Figure 3.1-7)

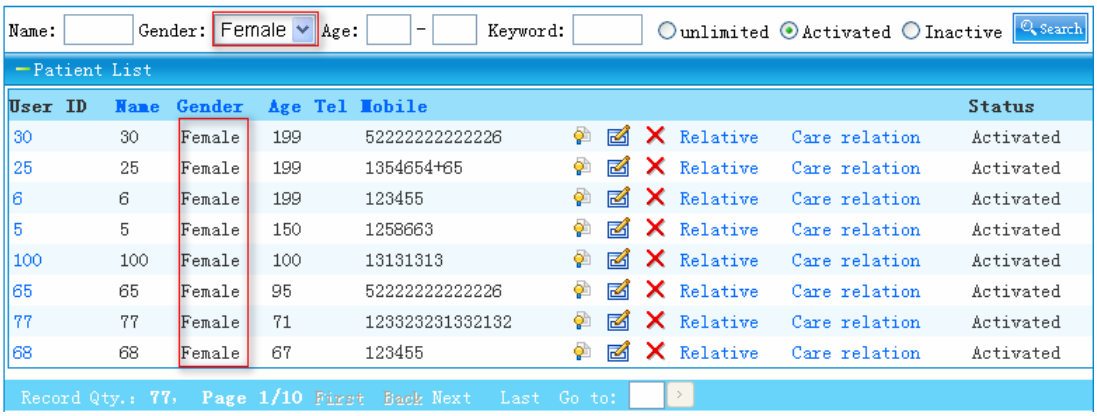


Figure 3.1-7 Column search

3.2 Operation Guide for Administrators

Enter correct administrator account and password on the login interface (as shown in Figure 3.1-1), and then click **Sign in** to access backstage management system homepage (see Figure 3.2-1).

The administrator can perform the following operations: doctor management and patient management.

Figure 3.2-1 Administrator interface

3.2.1 Doctor Management

Click Doctor User Management to access the doctor management interface. The homepage displays doctor list (see Figure 3.2-2). The administrator can manage basic information of doctors, monitoring relations and create new doctors.

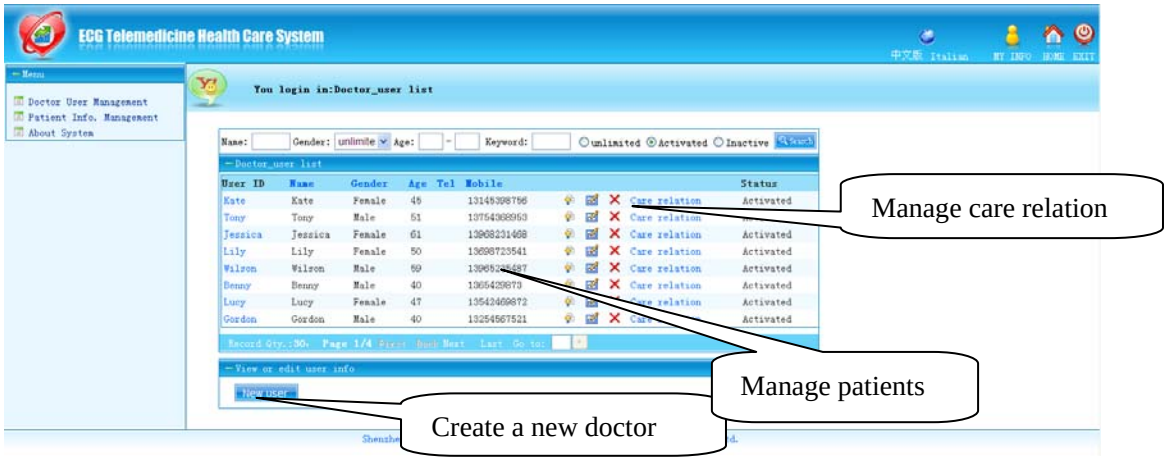


Figure 3.2-2 Doctor management

3.2.1.1 Creating a New Doctor

Click New user on the above figure, a text box is displayed under the doctor list. Fill in relevant information and click **Save** to create a new doctor (see Figure 3.2-3).

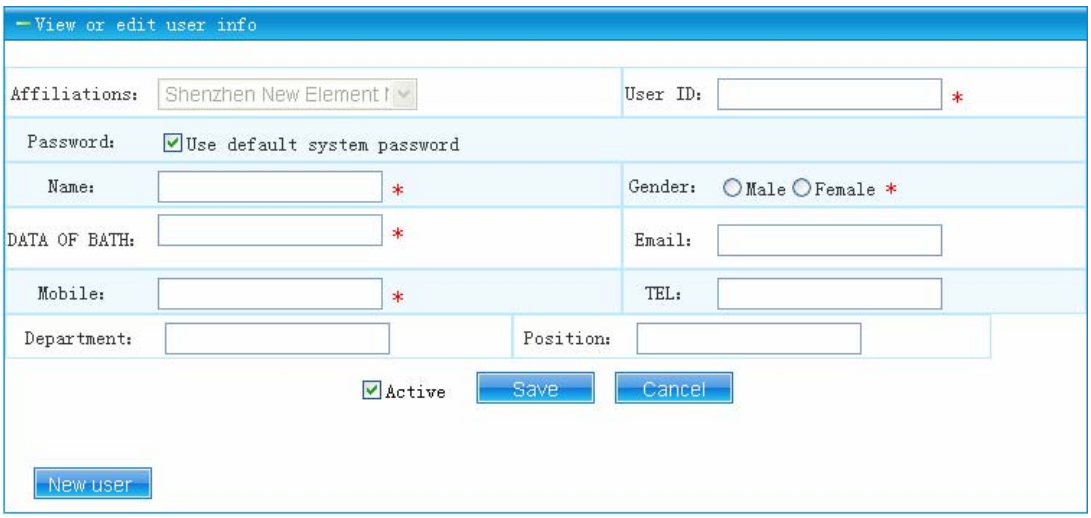


Figure 3.2-3 Creating a new doctor

3.2.1.2 Managing Doctor Information

Click to view basic information of a doctor (as shown in Figure 3.2-4). The administrator can edit the information.

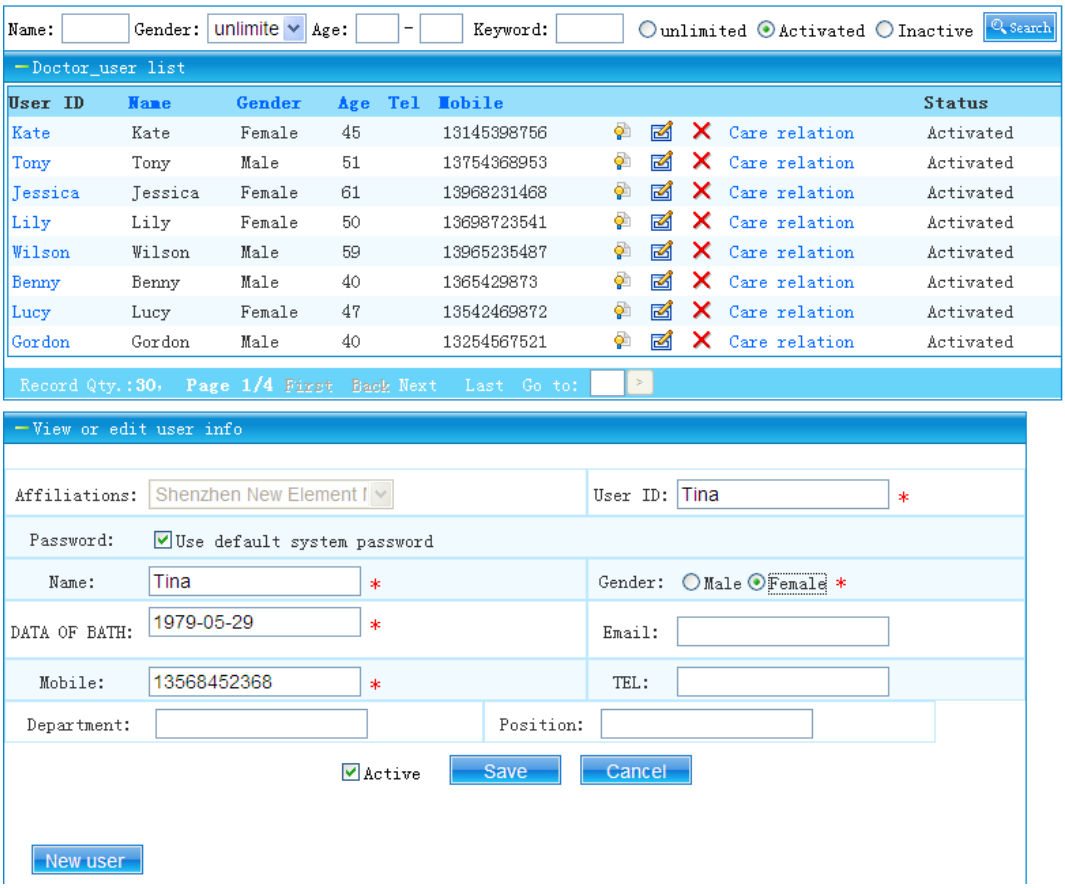


Figure 3.2-4 Doctor information

3.2.1.3 Managing Care Relation

Click Care relation in Figure 3.2-2 to view care relation (as shown in Figure 3.2-5). The administrator can set the care relation.

Select the distributed patient and click **Save care relation** to finish patient distribution.

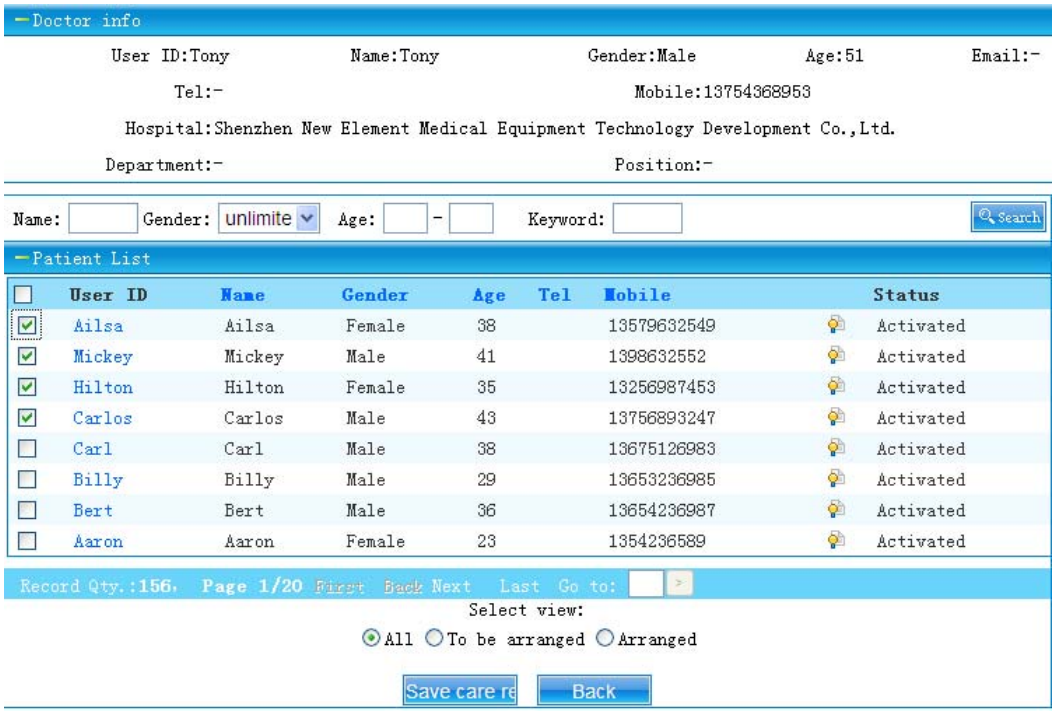


Figure 3.2-5 Care relation management

A patient can be distributed to several doctors at the same time. The guardianship of other doctors toward the patient can coexist. Please manage other doctors or patients to cancel the guardianship.

3.2.2 Patient Management

Click Patient Info. Management to access the patient management interface. The homepage displays patient list (see Figure 3.2-6). The administrator can manage basic information of patients, relative information, care relation and create new patients. (Log in as system administrator)

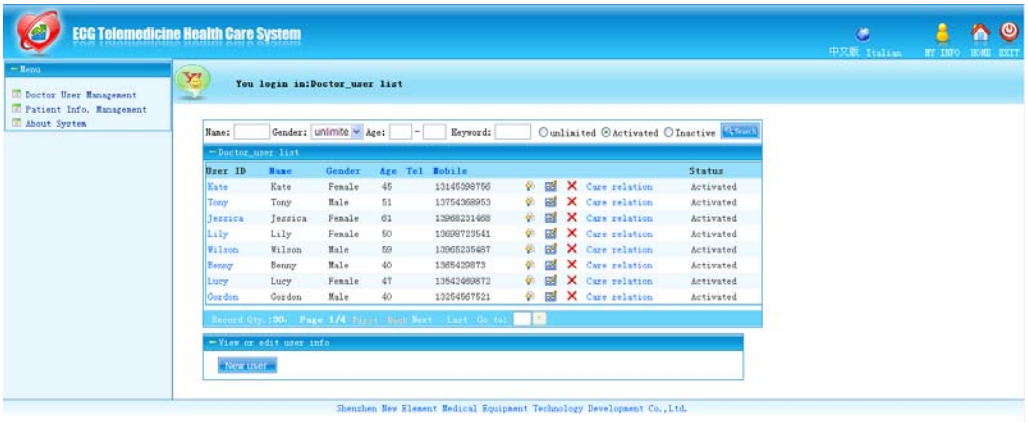


Figure 3.2-6 Patient management

3.2.2.1 Creating a New Patient

Click on the above figure. Enter patient information under the patient list and click **Save** to create a new patient (see Figure 3.2-7).

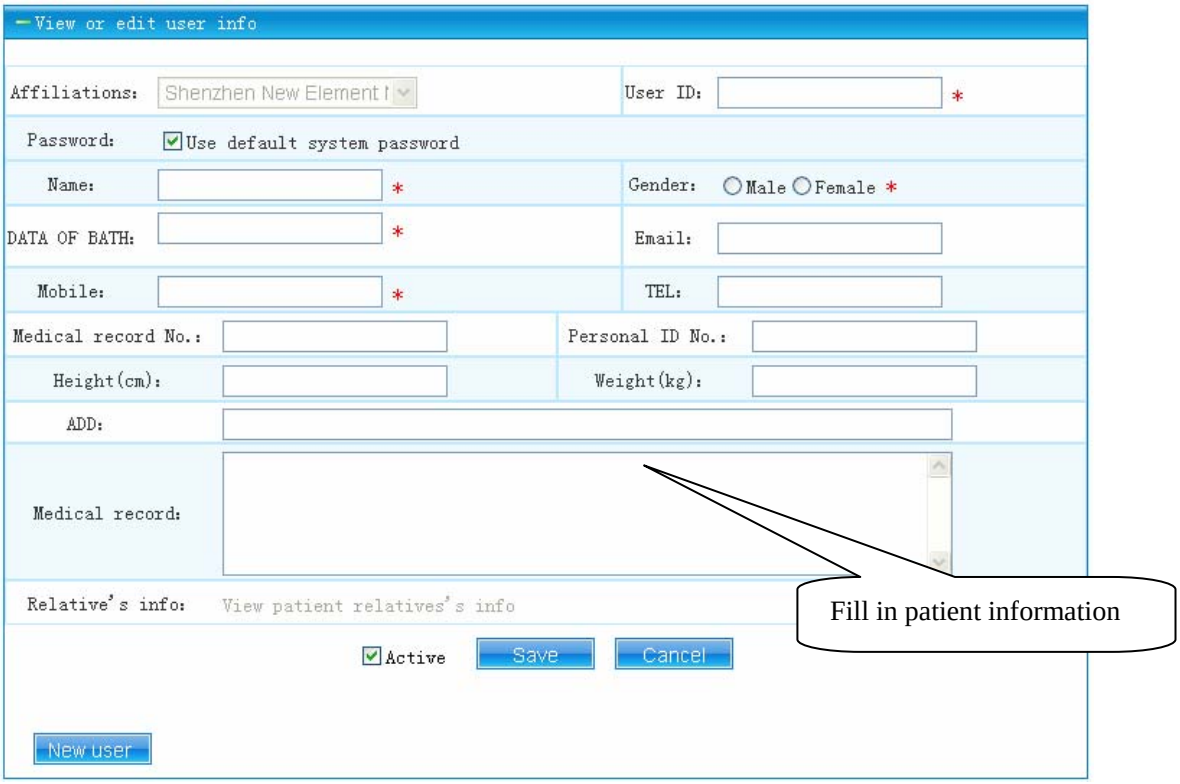


Figure 3.2-7 Creating a new patient

3.2.2.2 Managing Patient Information

Click to view basic information of a patient (as shown in Figure 3.2-8). The administrator can edit the information.

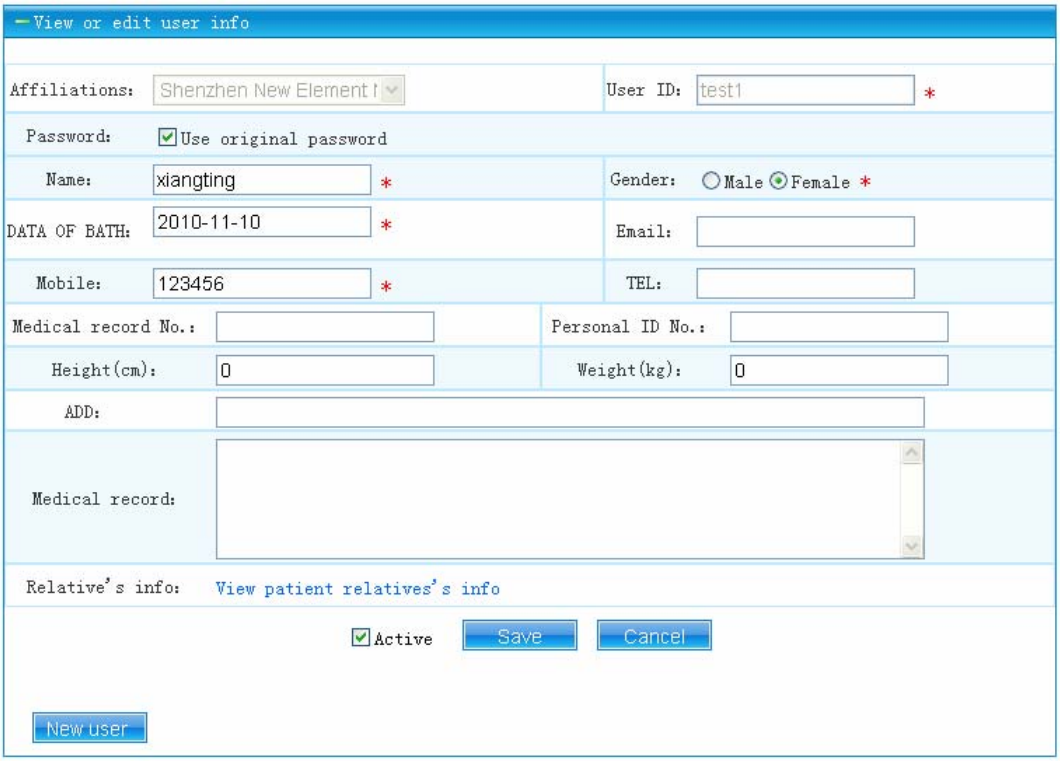


Figure 3.2-8 Patient information

3.2.2.3 Managing Care Relation

Click Care relation icon in Figure 3.2-6 to view care relation (as shown in Figure 3.2-9). The administrator can set the care relation.

Select the distributed doctor and click **Save care relation** to finish doctor distribution.

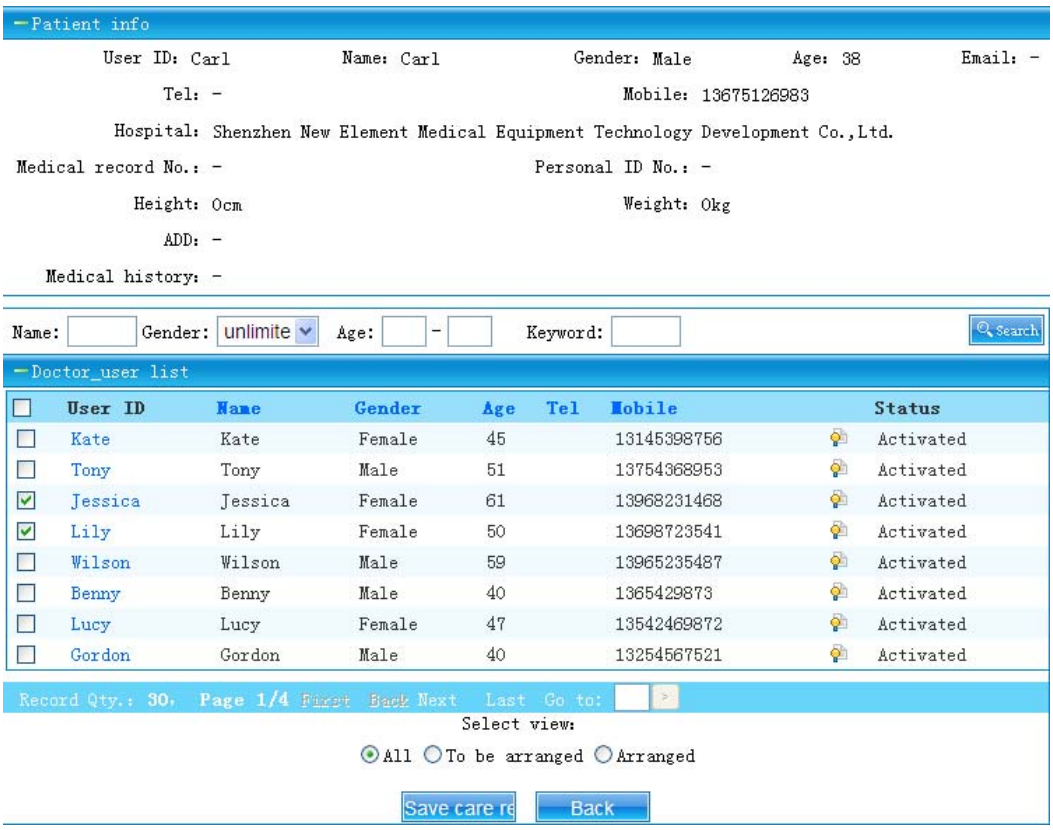


Figure 3.2-9 Care relation management

3.2.2.4 Managing Patient's Relative Information

Click Relative in Figure 3.2-6 to view patient's relatives (as shown in Figure 3.2-10). Click to edit relatives' information, or click New user to add relative information.

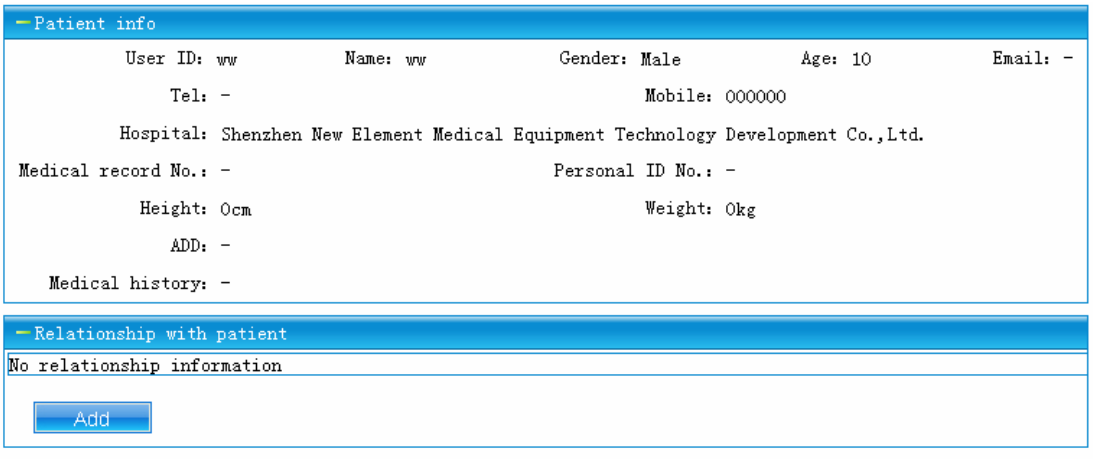


Figure 3.2-10 Patient's relative information

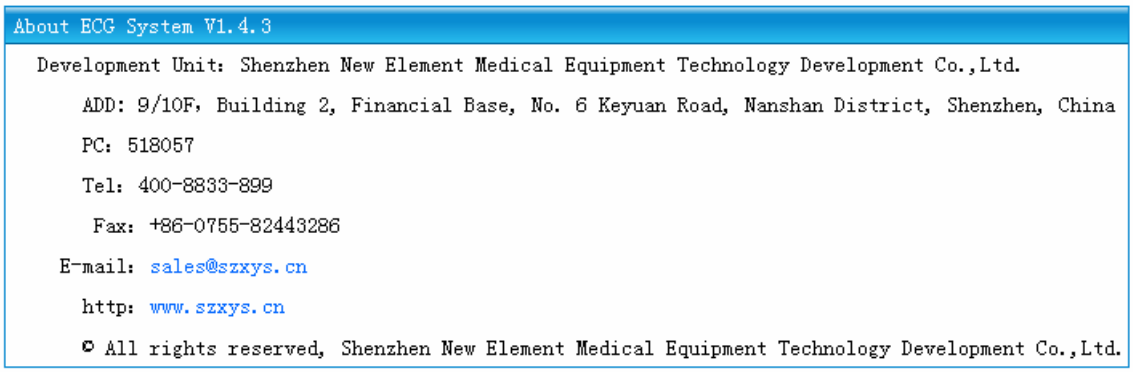


Figure 3.3-1 About the ECG system

4 Introduction to Silverlight

Silverlight is a browser-crossing and platform-crossing plug-in. It plays a role of analyzing ECG data in the remote & mobile ECG monitoring system. At the same time, Silverlight page can be installed to the desktop like a shortcut, making it more convenient for doctors when analyzing data.

4.1 Installation

Select **Silverlight Dynamic Analysis** in

on the main interface to access Silverlight page. Before using Silverlight function, some installations like Silverlight installation, client installation on PC and COM component installation are required.

4.1.1 Installing Silverlight

a) You need to install Silverlight components before using the software. Click Silverlight module, installation message is displayed as shown in Figure 4-1.

Figure 4-1

b) Click

in Figure 4-1, message box is displayed as shown in Figure 4-2.

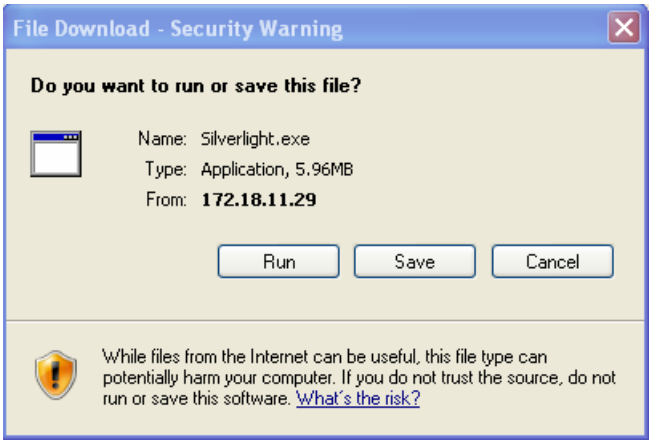


Figure 4-2

c) Click **Save** to save the downloaded file, or click **Cancel** to exit the installation. Save the downloaded file, as shown in Figure 4-3.

Figure 4-3

d) Click **Run** to install the software, or click **Cancel** to exit the installation. A dialog box will be displayed when clicking **Run**, as shown in Figure 4-4.

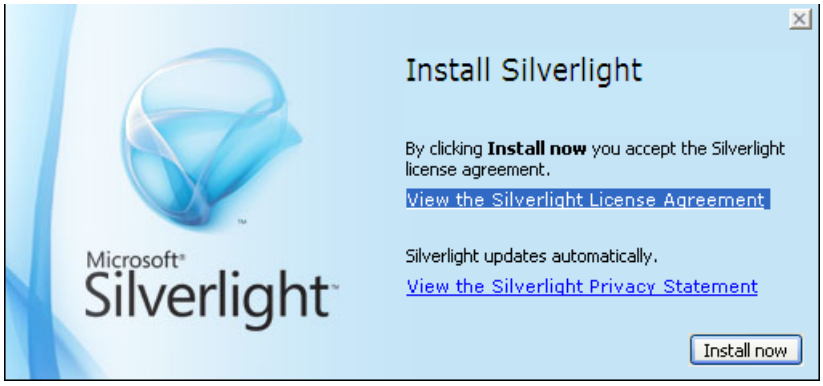


Figure 4-4

e) Click **Install now**, the installation progress is displayed until the installation is completed. Click View the Silverlight License Agreement to view Silverlight license agreement, or click View the Silverlight Privacy Statement to view Silverlight privacy statement.

f) Restart the browser after Silverlight is installed.

4.1.2 Installing Client on PC

a) The doctor can access Silverlight page through the client. A dialog box is displayed when right clicking in the page, as shown in Figure 4-5.

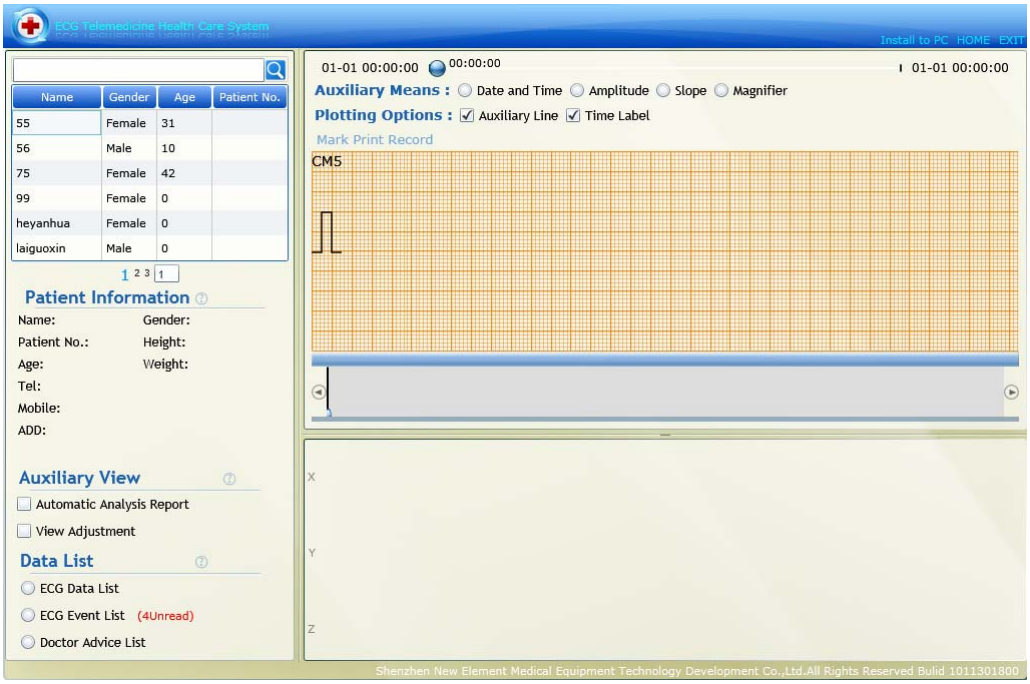


Figure 4-5 Silverlight client installation reminding

b) Select **Install Remote & Mobile Real-Time Monitoring System to the Computer**, or click **Install to PC**. A dialogue box shown in Figure 4-6 is displayed.

Figure 4-6

c) Click **Install**. The shortcut icon is displayed on the desktop. Click the icon to display the login interface, as shown in Figure 4-7, and enter doctor account and password to quickly access Remote & Mobile ECG Monitoring System V1.4.3.

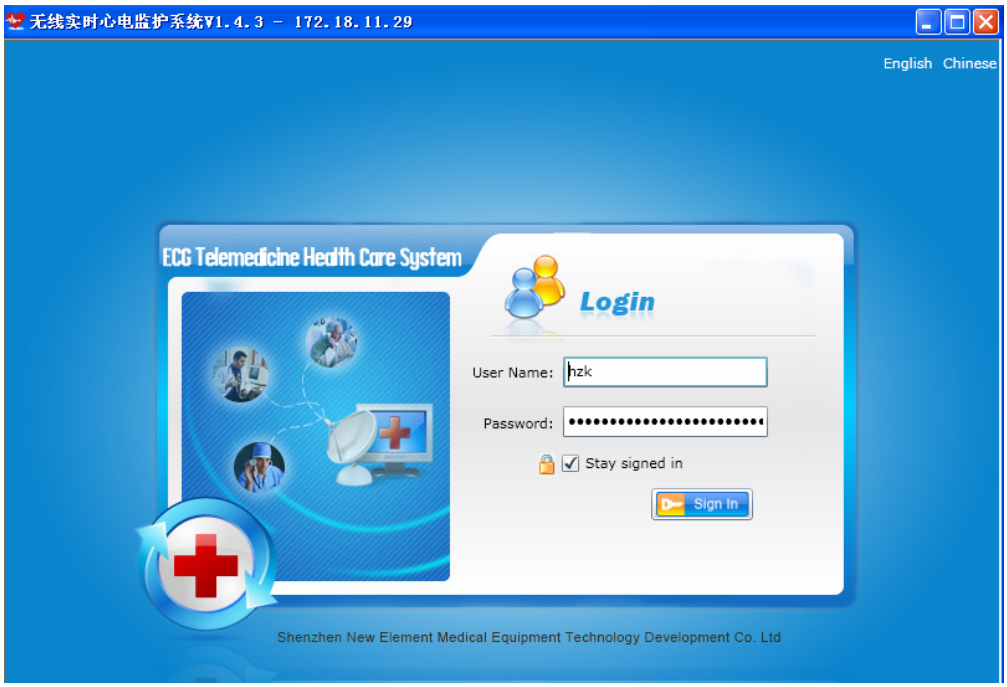


Figure 4-7

4.1.3 Registering COM Components

a） Copy the **XYSWRM** folder to the home directory of Drive C.

b） Double click **Register.bat.** A dialog box is displayed, as shown in Figure 4-8.

Figure 4-8

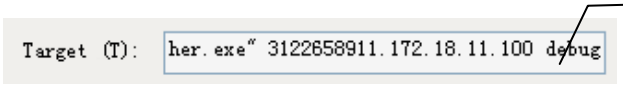
c）Click **OK**.

d）Double click **EcgDataSync.exe**. Components registration of Remote & Mobile ECG Monitoring System V1.4.3 is completed.

⚠**Caution:**

1. **Synchronization software needs to be installed before running Register.bat.**
2. **Make sure Drive D of the client computer is distributed to store data.**
3. **Edit the target of attribute of shortcut icon** **before performing synchronization on PC client.**

Steps: right click the shortcut icon on desktop -> Attribute -> add space+debug after the target, as shown in the following figure:



Add **Space+debug** aftter the attribute

5 ECG Collector Features

5.1 Parameters

ECG record channel: One channel (lead)

A/D shift accuracy: 12 bits

Sampling rate: 300 times/s

Dynamic range: 5.0 mVp-p

Amplitude-frequency: Meeting requirement of（0.05~60) Hz $^{+0.4dB}_{-3.0dB}$

Motion sensor: 3-axis

Record resolution: 8 bits

Record sampling rate: 75 times/s

Bandwidth: 0.05-60 Hz

Storage medium: SD card (1 GB /2 GB）

5.2 Normal Working Conditions

Temperature: 0℃-40℃

Relative humidity: 10%-95% (no condensation)

Atmospheric pressure: 700 hPa to 1060 hPa

5.3 Dimension & Weight

Size: 90 mm (L) x 40 mm (W) x 16 mm (H)

Weight: 55 g (battery loaded)

5.4 Power

Battery: 3.7 V lithium-ion rechargeable battery

Running: 24-hour continuous wireless transmission

5.5 Bluetooth

Version: Version 1.2

Classification: Class 2 (max. transmission range: 10 m)

Protocol: SPP Protocol

Running type: slave PTP

Antenna type: Built-in

5.6 Transportation & Storage Conditions

Temperature: 0℃-40℃

Relative humidity: 5%-85%, frostless

5.7 **FCC NOTE:**

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:(1)this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.