

iCARDEA Learning Unit for Core Activities

“An Intelligent Platform for Personalized Remote Monitoring of the Cardiac Patients with Electronic Implant Devices”

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Introduction

1.1 Overview

The objective of this learning unit is to introduce the user to the core functionalities of the Person Health Record (PHR) system. The learning unit introduces the main concepts, the learning activities and

The PHR system includes core functionalities to add, import or update health-related observations, action plan, and health profile information. Information saved can also be sent to the hospital system; however, access to this health information by doctors and nurses requires permission from the patient. The patient uses the Consent Manager User Interface to authorize who may access their health information.

1.2 Definitions, acronyms and abbreviations

| Abbreviation/Acronym | DEFINITION |
|----------------------|---|
| HIS | Hospital information System |
| OpenID ¹ | A login identifier that can be used with many internet systems |
| PHR Portal | The PHR portal is where a user interacts with the PHR system (PHRS) |
| PHR or PHRS | Personal Health Record System |
| UI | User Interface |

Table 1 List of Abbreviations and Acronyms

2 Activities for you, the Patient

The following activities, listed in Figure 1 - Personal Health Activities table, can be followed in the following order so that you can become familiar with the PHR application. The

¹ OpenID <http://openid.net/>,

| No. | Activity to try in this learning unit | Activity reference in this document |
|-----|---|--|
| 1 | Login using an iCARDEA Login identifier, an OpenID URL or a demonstration login identifier | Login 3.1 Logging in to the Personal Health System (PHR) Portal |
| 2 | Click on any plus-sign (+) to open a menu item. | 3.2 Navigation Menu Sidebar |
| 3 | Select Home in the menu sidebar. You can: Update the patient implant device serial number or Update the Contact information | 3.3 Home Under the home page, the patient is first presented with their contact information and either a CIED web form or a web form (dashboard) to collecting latest health data. |
| 4 | Set your CIED implant identifier | 3.3 Home |
| 5 | Edit your contact information | 3.3 Home |
| | | |
| | Manage Health Information | |
| 6 | Add a new Blood Pressure Observation | 3.5.1.1 Recording Blood Pressure |
| 7 | Add a new Body Weight Observation | 3.5.1.2 Recording Body Weight |
| 8 | Add new Problem Observation Update existing problem | 3.5.1.3 Reporting Health Problems (Symptoms) |
| 9 | Add or update a medication | 3.5.1.4 Medication Compliance |
| | | |
| | Manage your Action Plan | |
| 10 | Add an Action | 3.5.2 Action Plan |
| 11 | View the Calendar | 3.5.2 Action Plan |
| | | |
| | Manage your Profile Information | |
| 12 | Indicate your Risk Factors | 3.5.3.2 Indicating Risk Factors |
| 13 | Indicate Activities of Daily Living | 3.5.3.3 Activities of Daily Living |
| 14 | Indicate your physical activities | 3.5.3.4 Physical Activities |
| | | |
| | Monitor your health information | |
| 15 | Make health reports | 3.6.1 Health Reports |
| 16 | Monitor charts for your vital signs | 3.6.2 Monitoring Vital signs over time (display charts) |
| | | |
| | Privacy | |
| 17 | View Consent Editor (separate Help manual) | 3.8 Privacy – Patient Consent Editor |
| | | |
| | Patient Education | |
| 18 | View Health topics | 3.7.1 Health Topics |
| 19 | Select health topic and view the material | |

Figure 1 - Personal Health Activities table

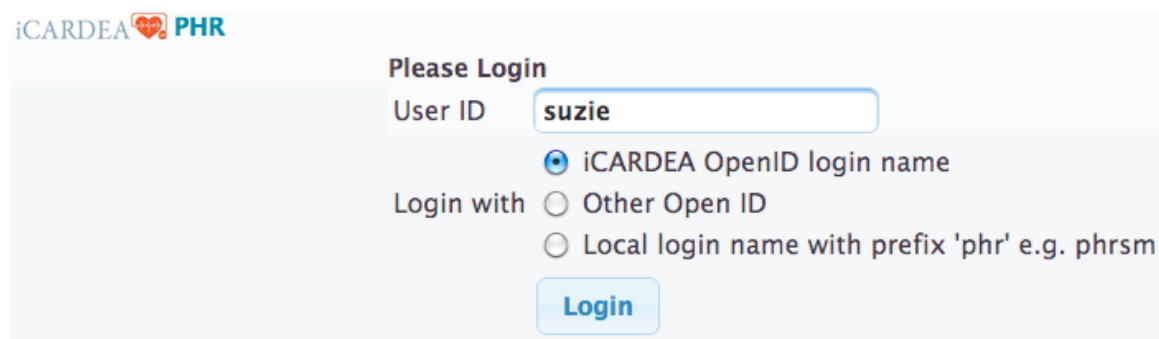
3 PHR Portal Functionalities


This chapter describes the main functionalities of the PHR web portal; the portal is split into three high level sections that are accessible in the portal's navigation menu:

- Patient Information – comprising the management of the patient's health data
- Information and People – offering information and health material for CIED patients, access to CIED communities and contact to care takers
- Feedback mechanism
 - If you are connected to a hospital system via your CIED implant identifier, then your data is shared with hospital using the iCARDEA clinical software. Your privacy settings (Consent Manager) control authorized access to your health information.
 - If configured, you might use a web-based forum to discuss issues with other patients or healthcare professionals
- Privacy and Administration – offering services for organising the patient's privacy

3.1 Logging in to the Personal Health System (PHR) Portal

Login with a user identifier created by the iCARDEA Identity provider as shown in Figure 2. Otherwise if you have another OpenID, choose “Other Open ID”. For testing and demonstration, please choose a local login name, Figure 3 that begins with ‘phr’ e.g. *phrhans123*. There is no password for this local login, please use sample health data. We will enable the use of Google mail account if the hospital security requirements allow this.




iCARDEA  PHR

Please Login

User ID

☒ iCARDEA OpenID login name
☐ Other Open ID
☐ Local login name with prefix 'phr' e.g. phrsm

Figure 2 - Login with iCARDEA Identity Provider



Please Login

User ID

☐ iCARDEA OpenID login name
☐ Other Open ID
☒ Local login name with prefix 'phr' e.g. phrsm

Figure 3 - Login by local user name ('phr' prefix), no password

3.2 Navigation Menu Sidebar

Health reports options. Patients must authorize who can access using the Consent Manager Editor.

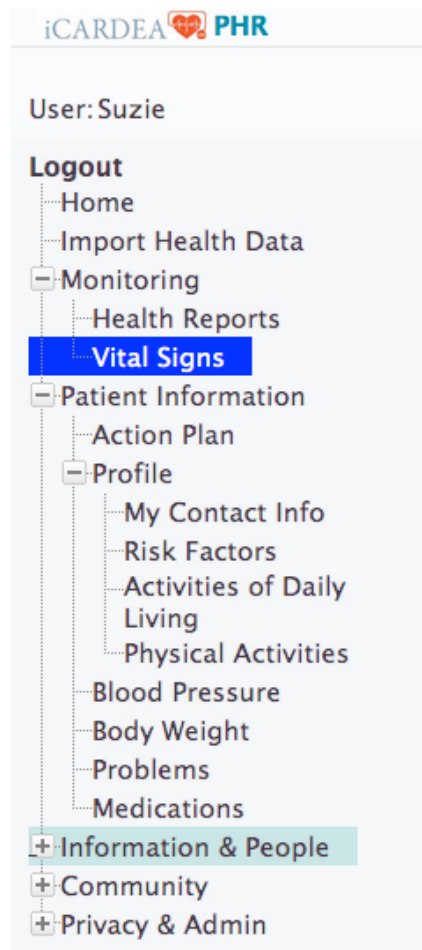


Figure 4 - Menu options for Patient information and monitoring your patient information

3.3 Home

Under the home page, the patient is first presented with their contact information and either a CIED web form or a web form (dashboard) to collecting latest health data.

The CIED form asks the patient for their CIED implant device serial number so that the PHR can connect to the Hospital health system and retrieve health data from the hospital health data. After submitting the CIED form, the patient identity is determined.

If the doctor role is detected, a simpler interface provided that only allows health reports to be viewed

The screenshot shows a web interface with a 'Home' tab. Below the tab, there is a message: 'Please use the [Consent Manager](#) (Privacy & Admin) to allow medical professionals to access your health information.'

Below this message is a section titled 'CIED or Patient Identifier'. It contains the following text: 'Your CIED Implant identifier or your patient identifier can be used for communicating information to or from the hospital. The status of your patient identifier will be indicated below. If your identifier is valid, you might click on: [Import Health Data](#)'. Below this text, it says 'For demonstration purposes, please use serial number PZC123456S'.

There are two input fields: 'ID Type' with a dropdown menu showing 'Implant model:Maximo', and 'Identifier /Serial No.' with a text box containing 'PZC123456S'. Below these fields is a button labeled 'Update'.

Below the 'CIED or Patient Identifier' section is a section titled 'My Contact Information'. It contains the text 'Please change, if necessary' and an 'Edit' button. Below this is a list of contact information:

| | |
|-------------------|---------------------|
| Family Name | Myer |
| First Name | Suzie |
| Telephone | 068899912 |
| Street Address | Hauptstrasse 11 |
| Postal Code | 5020 |
| City | salzburg |
| Country | Austria |
| Email | aaa@123.com |
| Internet Services | Chat Skype suzie123 |
| Comments | |

Figure 5 - Home with contact info and form for collecting the CIED Implant serial number

3.4 Import Electronic Health Information from the hospital

If you successfully connected to the hospital system, the import button will be displayed in the User Interface. If there is information to import, an overview list will be displayed.

Press the import button and data will be imported. If, for example, medications were imported, please check the Patient information section to update your medications. It is important to report the status of the medications, whether you are taking the medication or not. Once you have saved the medication, it will be reported to the iCARDEA clinical related tools that might be used by doctors. Please note that there might be no doctor monitoring your information. Please contact your doctor directly.

3.5 Patient Information

Patient Information comprises an overview of the patient's health data from different perspectives:

- Health observations – includes periodically or occasionally recorded patient data such as blood pressure or current symptoms or problems.
- Action Plan - includes an Action Plan allowing the patient to organize such observations of daily living or other health-related event such as an appointment with his/her cardiologist.
- Profile – describes the patient's profile from different categories such as risk factors, sport activities and activities of daily living
- Monitoring – refers to an overview for vital signs (e.g. blood pressure, weight) as graphics.

The following sections presents examples of UIs for gathering patient information.

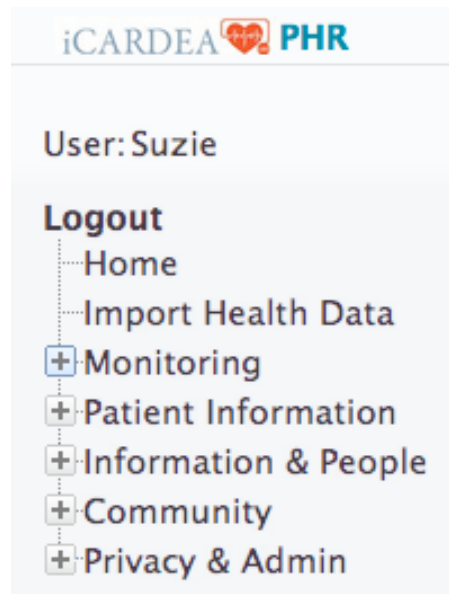


Figure 6 – Menu: Patient Information

3.5.1 Health Observations

The menu item “Health Observations” comprises patient data collected and recorded by the patients themselves. This includes in the current version of the PEF portal blood pressure, body weight, problems and medication compliance.

3.5.1.1 Recording Blood Pressure

Figure 7 shows the form for inserting blood pressure and heart rate on a daily basis. An overview form (see Figure 8) lists all recorded values. An historical overview of blood pressure and heart rate data can also be presented as a graphical view depicted in Figure 9.

The dialog box titled "Blood Pressure" contains the following fields and controls:

- Started***: A date picker set to 2011-11-01.
- Blood Pressure***: Two input fields showing 111 and 65, followed by the unit mmHg.
- Heart Rate***: An input field showing 123, followed by the unit bpm.
- Comments**: A text area containing the text "drank water before".
- Buttons**: "Save" and "Cancel" buttons at the bottom.

Figure 7 – Dialog view: Blood Pressure

| Blood Pressure | | | | |
|----------------|------------|----------------|------------|--------------------|
| + create Chart | | | | |
| Options | Date | Blood Pressure | Heart Rate | Comments |
| | 2011-11-01 | 111/65 mmHg | 123 bpm | drank water before |
| | 2011-11-09 | 150/91 mmHg | 99 bpm | nervous |
| | 2011-11-17 | 132/86 mmHg | 79 bpm | no worries |

Figure 8 - List view: Blood Pressure

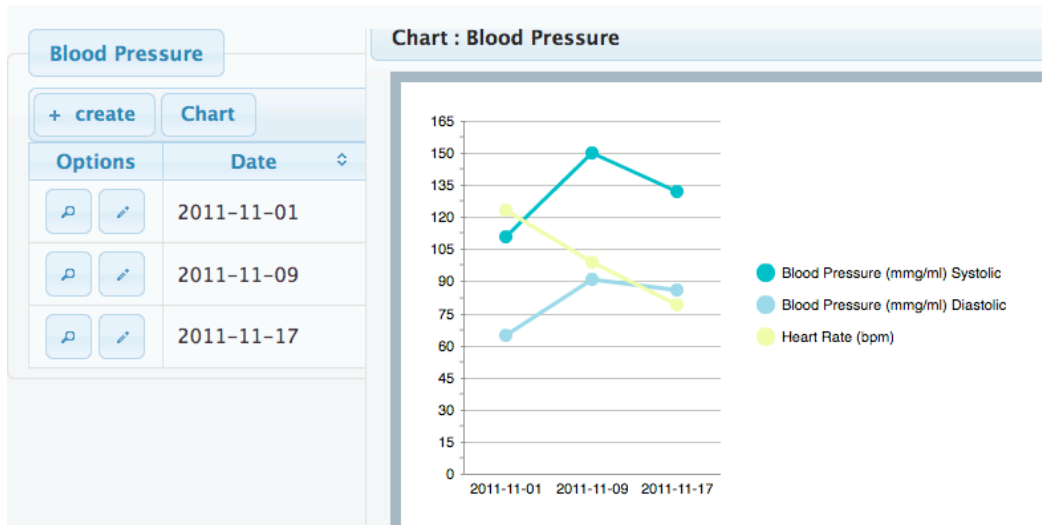


Figure 9 - Chart and List View: Blood Pressure

3.5.1.2 Recording Body Weight

Figure 10 shows the form for inserting body weight and height; the height is inserted from the known height and available here for modification. An overview form (see Figure 11) lists all recorded values and additionally calculates the **body mass index (BMI)** based on weight and height. An historical overview of body weight data can also be presented as a graphical view depicted in Figure 12.

Body Weight

Started: 2011-11-17

Weight: 82 kg

Height: 175 cm

Comments: exercise and less sweets

Save Cancel

Figure 10 – Dialog view: Body Weight







| Body Weight | | | | | |
|---|------------|-------------|------|----------|--------------------------|
| + create | | Chart | | | |
| Options | Started | Body Weight | BMI | Height | Comments |
|   | 2011-11-01 | 78.0 kg | 25.5 | 175.0 cm | good |
|   | 2011-11-09 | 80.0 kg | 26.1 | 175.0 cm | higher protein |
|   | 2011-11-17 | 82.0 kg | 26.8 | 175.0 cm | exercise and less sweets |

Figure 11 - List view: Body Weight

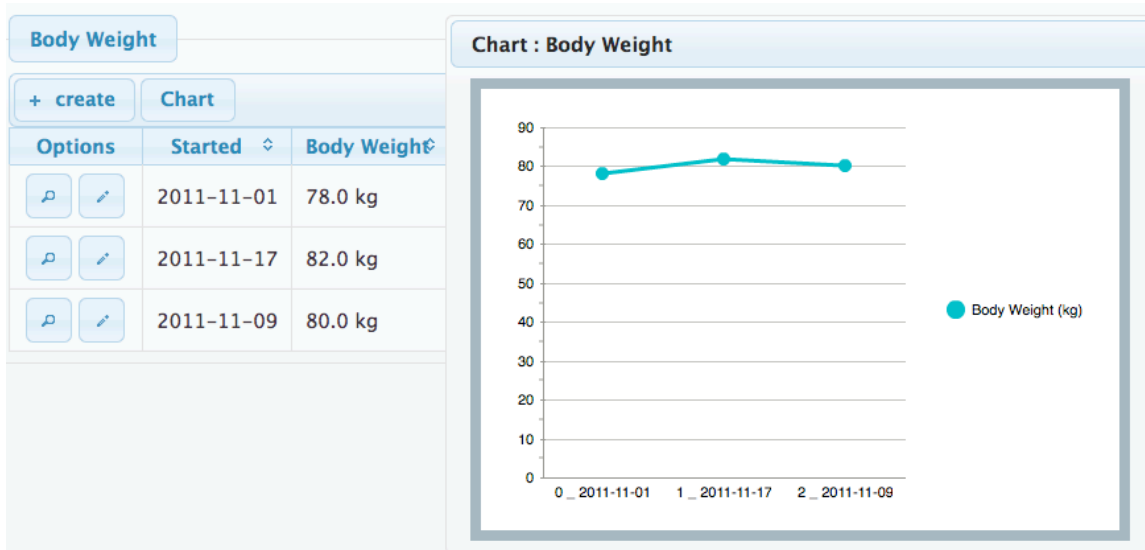


Figure 12 - Chart and List View: Body Weight

3.5.1.3 Reporting Health Problems (Symptoms)

The patients can provide a list of their health problems to share with their doctor either directly during consultation or by sharing via the interoperability services.

Figure 13 presents the dialog form for inserting an observed problem or symptom on a daily basis. The patient can indicate whether s/he has currently a problem or whether the problem disappeared. The list of problems comprises typical symptoms related to CIED

patients (see Figure 14). An overview of recorded problems and their status are presented in a chronological order in Figure 15.

Problem Description

What is the problem? Please Choose

Are you still having this problem? ☐ This is a current problem since ☒ This is no longer a problem as of

Date (yyyy-mm-dd) 2011-11-02

Comments

☒ Save ☐ Cancel

Figure 13 – Dialog view: Problems (Symptoms)

Problem Description

What is the problem? Please Choose

Are you still having this problem?

Date (yyyy-mm-dd)

Comments

Please Choose

- Ankle swelling
- Bleeding gums
- Bruising symptom
- Chest pain
- Diarrhea
- Extra bruising or bleeding
- Extra pillow to sleep at night
- Fatigue
- Fatigue - symptom
- Fever
- Foot swelling
- Palpitations
- Rashes
- Shortness of breath
- Temporary loss of speech
- Temporary weakness
- Vomiting
- Weakness present
- Weight increased

Figure 14 - Controlled vocabulary for UI and PHRS interoperability services

| Problem Description | | | | |
|---|----------------------|-----------------------------------|------------|----------------------|
| + create | | | | |
| Options | What is the problem? | Status ▾ | Date ▾ | Comments |
|   | Bleeding gums | This is a current problem since | 2011-11-02 | after brushing teeth |
|   | Ankle swelling | This is no longer a problem as of | 2011-11-09 | |

Figure 15 - List view: Health Problems (Symptoms)

3.5.1.4 Medication Compliance

The medications sections display three views: active and inactive medications and a history of updates to the medication items by the patient. The patient might manually enter their own medications, both prescription and over the counter. In iCARDEA medication data are also imported from the Hospital Information System (HIS). Figure 16 presents the dialog form for inserting a medication. The patient can indicate dosage, frequency and whether s/he is currently taking this medication or whether s/he stopped the intake. Figure 17 depicts an overview for medication compliance.

| Medication | |
|--|---|
| Medication Name | Ebetrexat(Methotrexat) |
| Begin Date (yyyy-mm-dd) | 2009/01/01 |
| Are you taking this medication now? | <input type="radio"/> Yes, I take it <input checked="" type="radio"/> No |
| Stop Date (yyyy-mm-dd) | |
| How many? | 20 milligram |
| How often? | Every day |
| When taken? | Not specified |
| Who prescribed the medication? | |
| Reason for taking this medication | Diabetes Mellitus |
| Comments | |
| <input checked="" type="button" value="Save"/> <input type="button" value="Cancel"/> | |

Figure 16 – Dialog view: Medications







| Medication | | | | | | |
|---|----------------------------------|------------|----------------|------------|---|--|
| All • Current • Inactive | | | | | | |
| + create | | | | | | |
| <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> </div> | | | | | | |
| Option | Medication Name | Start Date | Status | End Date | Dosage | |
|  | Concor | 1999-10-10 | No | | 5.0 milligram other Not specified | |
|  | Prednisone | 2008-12-01 | No | | 25.0 milligram other Not specified | |
|  | Ebtrexat(Methotrexate) | 2009-01-01 | Yes, I take it | | 20.0 milligram Every day Not specified | |
|  | Convulex <i>Imported Data</i> | 1980-10-10 | Yes, I take it | | 300.0 milligram Every day Not specified | |
|  | Pantoprazole (Pantoloc) | 2008-12-01 | Yes, I take it | | 40.0 milligram Every day Not specified | |
|  | Psychopax (Diazepam) | 1999-10-10 | No | 2000-11-11 | 1.0 drops Every day Not specified | |

Figure 17 - List view: Medications. Note the medication *imported* from a Hospital

3.5.2 Action Plan

The action plan tool provides a simplified means of recording actions or diary entries and viewing these entries from either a table list or calendar view. Optimally, actions should be planned over a two-week period or diaries (physical activities, medication diary) might be recorded on a daily basis. Figure 18 depicts the dialog view for inserting or updating actions and Figure 19 presents the inserted actions as a table.

It is possible to enter new actions directly using the calendar view (see Figure 20), however, this feature is not activated by default because not all users are accustomed to this interacting with electronic calendars.


Basically, the information about actions in the Action Plan is not shared with other persons (such as physicians). But the patient can grant access and e.g. share the status of physical actions as feedback to clinicians via the PHRS interoperability services.

Action Details

Action Name *

Category

Have you completed this action? ☒ Done ☐ To do

When? 

How long?

Comments

Briskly to the point of being slightly winded

Figure 18 – Dialog view: Actions

Actions **Calendar**

Actions List

[+ create](#)







| Options | Status | Action Name | Category | When? | How long? | Comments |
|---|--------|----------------|-----------------------|------------|------------|--|
|   | Done | Nordic Walking | Sport | 2011-11-18 | 30 minutes | brisk walking, almost winded but felt better this time |
|   | Done | Dr Wenger | Appointment | 2011-11-30 | All Day | ask about sleeping problems, low energy |
|   | To do | Dr. Iganiz | Appointment (Medical) | 2011-12-03 | 45 minutes | |

Figure 19 - List view: Actions

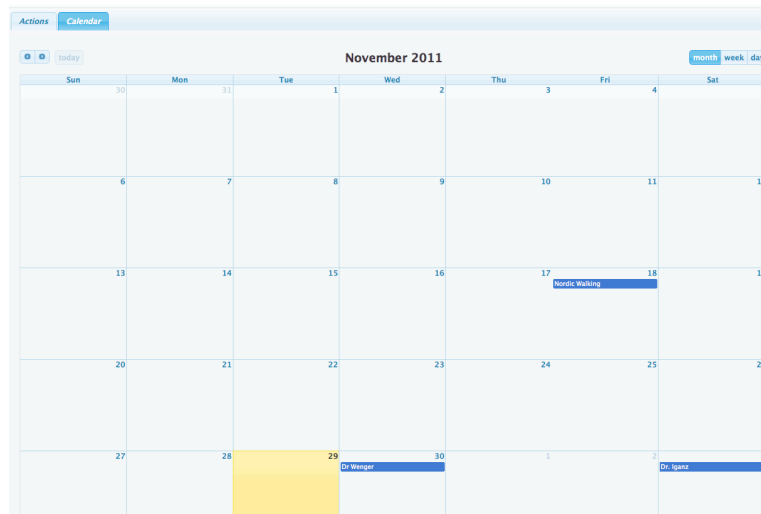


Figure 20 – Calendar view: Actions

3.5.3 Health Profile

3.5.3.1 Maintaining Contact Information

This menu item allows the patient to insert and update his/her contact information. Figure 21 presents the dialog form for managing the contact data.

Contact Information

✓ Save × Cancel

First Name

Last Name

Primary Telephone

E-Mail

Street Address

Postal Code City Country

Internet Chat Service

Comments

Figure 21 – Dialog view: Contact Information

3.5.3.2 Indicating Risk Factors

The patient can provide basic information about their risk factors. This might be additional information for physicians. Important risk factors related to CIED patients are cholesterol, smoking, diabetes and hypertension (see Figure 22). Figure 23 and Figure 24 presents examples how to describe the profiles for smoking and for diabetes.









| Risk Factor Description | | | | | |
|---|---|--------------|-------------------|------------|----------|
| | | Active | Risk Factor | Modified | Comments |
|  |  | Active | Cholesterol | 2011-11-10 | |
|  |  | Not answered | Smoker | | |
|  |  | Not answered | Diabetes Mellitus | | |
|  |  | Not answered | Hypertension | | |

Figure 22 - List view: Risk Factors

escription

| Smoker | |
|-------------------------------------|--|
| What do you smoke or did you smoke? | <input type="checkbox"/> Cigarette smoker <input type="checkbox"/> Cigar smoker <input type="checkbox"/> Pipe smoker |
| How long did you smoke? | I smoked for .. 1 year |
| Status | <input type="radio"/> Yes I currently smoke since <input type="radio"/> No, I no longer smoke as of |
| Date ended | |
| How much did you smoke? | 1 pack per day |
| Comments | |

✓ Save × Cancel

Figure 23 – Dialog view: Risk Factors – Smoking

| Diabetes Mellitus | |
|---|--|
| How do you treat this? | <input checked="" type="checkbox"/> Diet <input type="checkbox"/> Drug <input type="checkbox"/> No Special treatment |
| If you take a diabetes medication, which do you take? | <input type="radio"/> Insulin <input type="radio"/> pills <input type="radio"/> No Special treatment |
| Comments | <div></div> |

✓ Save × Cancel

Figure 24 – Dialog view: Risk Factors - Diabetes

3.5.3.3 Activities of Daily Living

Activities of Daily Living concern the patient profile and deliver insight how a patient is able managing his/her daily routine. This menu item provides a list of activities patient can either do or requires assistance (see Figure 25). Figure 26 presents the dialog view for climbing stairs and represents one example for indicating such activities.

| Activity Of Daily Living | | | |
|--------------------------|---------------------|----------------------|--------------------------------|
| Options | Activity Type | Activity Status | Comments |
| | Bathing activity | Not answered | |
| | Climbing stairs | I require assistance | breathless alone |
| | Driving a car | I can do | need glasses |
| | Gardening | I can do | Hobby daily indoor and outdoor |
| | House work | I can do | Share takes with roommate |
| | Shopping activities | Not answered | |

Figure 25 - List view: Activities of Daily Living

Activity Type

Climbing stairs

Activity Status

☐ I can do this without assistance

☒ I require assistance

☐ Not answered

Comments

breathless alone

✓ Save × Cancel

Figure 26 – Dialog view: Activities of Daily Living, climbing stairs

3.5.3.4 Physical Activities

Physical activity data concerns the patient profile, although these are not actions for organizing in the action plan. These are more similar to *Activities of Daily Living* as another means to access what physical activities, such as sports or exercise, the patient can do or has done. Figure 27 presents an example for indicating jogging as a physical activity that a patient performs on a regular basis several times per week. The overview form summarizes all current physical activities of the patient (see Figure 28).

Activity Details

Physical Activity

Jogging

Optional activity label

alternate walking

Status

☒ I am active with this activity since

☐ I am not currently active with this activity as of

Date (yyyy-mm-dd)

2010/05/11

How often do you do this activity?

Several times per week

How long do your perform this activity?

45 minutes

Comments

slow jog

✓ Save × Cancel

Figure 27 – Dialog view: Physical Activities

3.6 Monitoring

Health reports can be displayed from a variety of Observations of Daily Living (blood pressure, heart rate, body weight, medications, problems), profile information (contact info, activities of daily living)

Health reports can be displayed from a variety of Observations of Daily Living or even contact information. The following figures show a Body weight history report, Figure 29, and a Medications report,



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User: eliferylmz

Logout

Home

Health Reports

Monitor Personal Health Information

Display information about:

- ☐ Contact Information
- ☐ History Blood Pressure
- ☐ History Body Weight
- ☒ Medications
- ☐ Activities of Daily Living
- ☐ Problems

suzie (phrsm) **Display**

Health information for: suzie (phrsm)

| Medication Name | Start Date | Status | End Date | Dosage | Reason | Prescribed by |
|-------------------------|------------|----------------|------------|--|-------------------|---------------|
| Magnosolv(Magnesium) | 2012-03-26 | Yes, I take it | 2012-03-26 | 2.0 tablet Every day Not specified | Diabetes Mellitus | |
| prednisone | 2012-03-26 | Yes, I take it | 2012-03-26 | 25.0 milligram Every day Not specified | Diabetes Mellitus | |
| Folsan(Folic Acid) | 2012-03-26 | No | 2012-03-26 | 10.0 milligram other Not specified | ? | |
| Ebetrexat(Methotrexate) | 2012-03-26 | No | 2012-03-26 | 20.0 milligram other Not specified | ? | |
| Psychopax (Diazepam) | 2012-03-26 | No | 2012-03-26 | 1.0 tablet other | ? | |

Figure 30- Personal Health Reports - Medication Report

3.6.2 Monitoring Vital signs over time

Monitoring vital signs provides an overview of current health information and charts of historical information. Additional information and charts can be added as needed. The following are examples for date (body weight and blood pressure) that the patient might wish to follow and perhaps share with their physician:



Figure 31 - Monitoring Body Weight chart

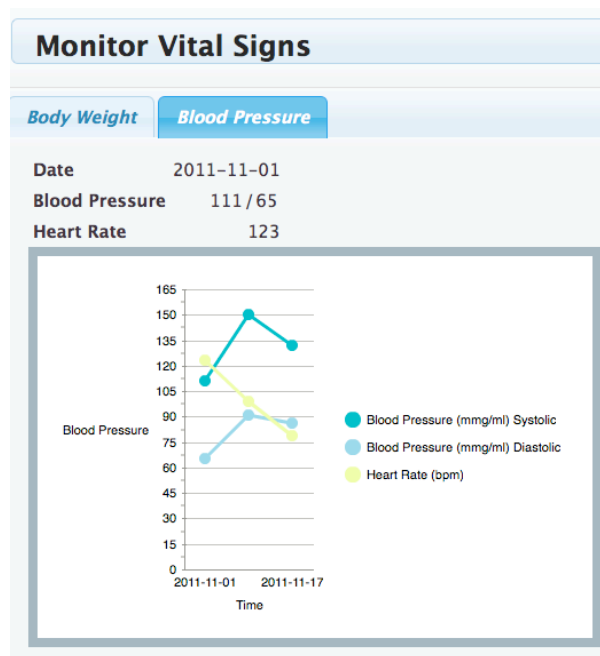


Figure 32 – Monitoring Blood pressure chart

3.7 Information and People

This menu item is dedicated to health information customized for CIED patients and comprises the following topics:

- Health Topics – includes information and education material and decision aids for CIED patients
- Community – allows patients to share information and experiences with other patients in similar situations by using social software tools
- Contacts – allows patients to insert contact data about medical persons such as the treating cardiologist or other persons.

3.7.1 Health Topics

The PEF provides light integration to a Content Management portal (CMS) where patient education materials can be created and managed for CIED patients. A detailed description about information and education material can be found in D521 “Patient Education Mechanisms for the PHR”. The main topics are listed in **Error! Reference source not found.**:

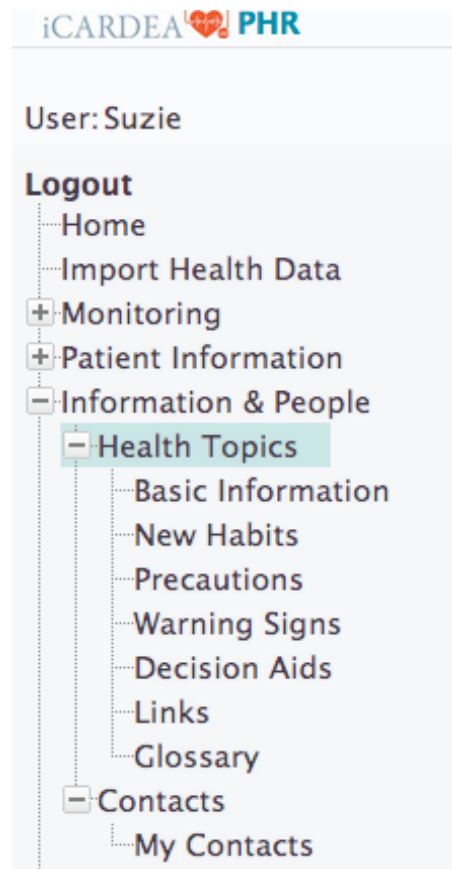


Figure 33 - Menu Options for Patient Education

An example for the sub menu items *New Habits* is presented in Figure 34.



New Habits

  1 Added by [mule](#), last edited by [Manuela](#) on 2011-10-13 ([view change](#))

- Introduction
- Changing your habits
- Work, profession and housework
- Free time, travelling and transport
- Questions and answers:
 - How do I live with my ICD?
- How do I live with my pacemaker?
- Getting started with your pacemaker: The first six weeks
- What I can do with my pacemaker?
- You and I are very well blended
 - Appliances
 - Mobile
 - Sports
 - Travel
 - Airports
 - Department stores
 - Hospitals
 - Family
 - Effect of magnets
- What things I can make carrying an ICD or a pacemaker?
- References:

Introduction

After you have left the hospital, you should allow some months to get used to the situation. Speak with your family and friends about the ICD.

Although this will not heal the underlying disease in your heart, it can make you feel more secure. Initial doubts and fears can often be allayed by conversing with your doctor. This can prevent the effect of possible tachycardia and the patients therefore benefit from a real improvement in their quality of life.

Changing your habits

You must pay attention to certain things immediately after the operation.

You should observe the scar and inform your doctor if it becomes red, swells or becomes moist. You should not move the affected shoulder too energetically. It is also inadvisable at the beginning.

After discussing the situation with your doctor, there is no problem with taking walks, playing sports or bathing. The clothing round the wound should not be too tight.

Once the wound has completely healed, there is nothing to stop you from taking up new pursuits. As long as your doctor has no objections, you can resume your normal activities.

With the implanted ICD, most patients can increase the scope of their activities - as the ICD removes the fear of being helpless during an attack of arrhythmia.

Work, profession and housework

You can also start being active again at your place of work and in the house. However, you should avoid some activities, such as climbing ladders, welding or using power tools.

Theft protection systems, as found in the entrances and exits of department stores, do not normally present a risk for someone with a defibrillator. However, you should inform the security staff that you have an ICD.

Figure 34 - Patient Education Example: New Habits

In the following Figure 35 is an example for a *Decision aid for Telemonitoring Y/N*. Commonly, decision aids describe different aspects of a decision situation such as advantages and disadvantages, risks and possible alternatives.



Decision Aid for Telemonitoring

Added by [mule](#), last edited by [Manuela](#) on 2011-10-13 ([view change](#))

Decision aid for telemonitoring Y/N

The aim of this decision aid is to help patients with a Cardiovascular Implantable Electronic Device (CIED) to decide whether or not be

Definitions

CIED, Cardiovascular implantable electronic device (CIED) (from the HRS_ERA Expert Consensus of CIEDs¹): Cardiovascular implant pacemaker (PM), implantable cardioverter-defibrillator (ICD), cardiac resynchronization device (CRT), implantable loop recorder (ILR) and (ICM). PM, ICD and CRT devices have been described in detail in the google site and will be implemented in the PHR and all of these cardiovascular implantable electronic devices (CIEDs).

Alerts: Some CIED have alert capabilities.

Home monitor/communicator (from the HRS_ERA Expert Consensus of CIEDs¹): A device designed to receive telemetry from a specific using telephone technology to a remote-secure monitoring center or file server. Often the home monitor/communicator is stationary and analog telephone line in a patient's home, but it can also be mobile/portable unit and connected via cellular technology.

In-Clinic Follow-up

Patients with a CIED must be followed-up in an out-patient clinic (include follow up guidelines), where the physicians can assess the de CIED collects a large amount of information such as technical device parameters and clinical relevant data. All this information may help

- Assess whether the device is working properly
- Detect present or anticipate future device dysfunction
- Keep track of the disease progress
- Help taking medical actions

Goals of monitoring CIEDs (HRS-ERA Expert Consensus of CIEDs):

| Goals | |
|------------------|---|
| Patients related | <ul style="list-style-type: none"> • Optimize the patient's quality of life. • Optimized pacemaker/ICD system function to meet the patient's clinical requirements. • Identify patients at risk and initiate appropriate follow-up with field safety corrective action and safe • Triage non CIED related health problems and make appropriate referrals. |
| CIED related | <ul style="list-style-type: none"> • Document appropriate CIED function. • Identify and correct abnormal CIED behavior. • Maximize pulse generator longevity while maintaining patient safety. • Identify CIEDs approaching end of battery life, to identify leads at risk of failure, and to organize CIE manner. |
| Disease related | |

Figure 35 – Patient Education Example: Decision Aids

3.7.2 Community related topics

The community related topics include a list of community links, forums for patients and healthcare providers, blogs, and information discovery via community bookmarks and by browsing content by keyword.

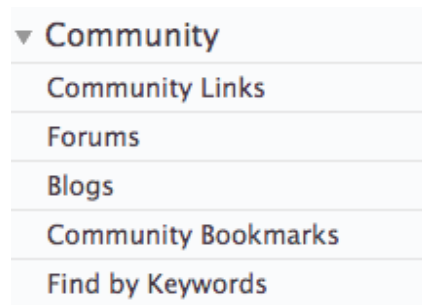


Figure 36 - Menu view: Community

3.7.3 Contacts

Contact information of a patient's healthcare providers can be viewed and managed. The telephone or email might be sufficient to facilitate feedback to patients, however, chat and VoIP (Voice over IP) will depend on how the healthcare professional wishes to communicate.

| Contact Information | |
|---|--|
| First Name | Manuela |
| Last Name | Mayer |
| Primary Telephone | 0680 12 34 567 |
| E-Mail | mm@gmail.com |
| Organization | |
| Healthcare Role | Other |
| Street Address | 123 Hauptstraße |
| Postal Code | 5020 |
| City | Salzburg |
| Country | Austria |
| Internet Chat Service | Skype |
| Internet Voice Service | Skype |
| Comments | Cardiologist, consultation hours: Monday - Friday 8:00 - 12:00 |
| <input type="button" value="Save"/> <input type="button" value="Cancel"/> | |

Figure 37 – Dialog view: Contact Information

3.8 Privacy – Patient Consent Editor

The PHR system includes functionalities to add, import or update health related information. Information saved is also sent to the hospital system; however, access to this health information by doctors and nurses requires permission from the patient. The patient uses the Consent Manager User Interface to authorize who may access their health information.

Privacy settings primarily affect the sharing of information with clinical systems via the PHRS interoperability services. A patient can manage privacy settings using the patient Consent Editor that is based on roles (e.g. physicians, nurses or family member) and can be granted for different categories of patient data such as medication.

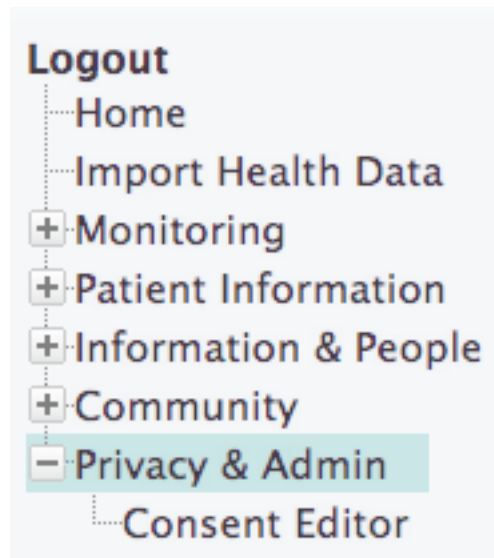


Figure 38 - Consent Editor for authorizing access to personal health information