



HEARTFAID

**D41 – 11th Quarterly Managerial
Report**

(MB and STAB meeting minutes)

Submission date: 18/12/08

Due date of document: 31/10/08



HEARTFAID

A KNOWLEDGE BASED PLATFORM OF SERVICES FOR SUPPORTING MEDICAL-CLINICAL MANAGEMENT OF THE HEART FAILURE WITHIN THE ELDERLY POPULATION

Project summary	
Project acronym:	HEARTFAID
Project identifier:	IST – 2005 – 027107
Duration of the Project:	01/02/2006 – 31/01/2009
Project Co-ordinator Name:	Domenico Conforti
Project Co-ordinator Organisation:	UNICAL University of Calabria (Italy)
Thematic Priority:	Information Society Technology-ICT for Health
Instrument:	Specific Targeted Research Project

Consortium
<ul style="list-style-type: none"> ➤ UNICAL- Università della Calabria (Italy) ➤ UNICZ- Università degli studi Magna Graecia di Catanzaro (Italy) ➤ UNIMIB- Università degli studi di Milano Bicocca (Italy) ➤ JUMC- Jagiellonian University Medical College (Poland) ➤ VMWS- Virtual Medical World Solutions Ltd (United Kingdom) ➤ FORTHNET S. A.- Hellenic Telecommunications and Telematic Applications Company S. A. (Greece) ➤ SYNAP- Synapsis s.r.l. (Italy) ➤ CNR- Consiglio Nazionale delle Ricerche (Italy) ➤ FORTH-Foundation for Research and Technology Hellas (Greece) ➤ RBI- Rudjer Boskovic Institute (Croatia) ➤ AUXOL- Istituto Auxologico Italiano (Italy)

D41 – 11th Quarterly Managerial Report MB and STAB meeting minutes

Document summary	
Document Title:	11 th Quarterly Managerial Report
Document Classification:	Deliverable D41
Dissemination level:	CO
Period covered:	From 1 August 2008 to 31 October 2008
Submission date:	18/12/2008
Due date:	31 October 2008
Authors:	Debora Minardi-UNICAL Domenico Conforti-UNICAL Angela Sciacqua-UNICZ Gianfranco Parati-UNIMIB Kalina Kawecka-Jaszcz-JUMC Franco Chiarugi-FORTH Sara Colantonio-CNR Dragan Gamberger- RBI Mariaconsuelo Valentini-AUXOL
Work package:	WP0 – Management
Report Version:	1.2

Short Description
This document describes the activities of the Consortium during the 11th quarterly of HEARTFAID project and its future activities.

Change Record		
Version Number	Changes	Release date
1.0	First draft of the Document	26/11/2008
1.1	Contributions from partners	12/12/2008
1.2	Final version of the document	17/12/2008

Table of contents

Executive Summary	1
Ongoing workpackages progress: WP0	2
Ongoing workpackages progress: WP2	4
Ongoing workpackages progress: WP4	6
Ongoing workpackages progress: WP7	8
Ongoing workpackages progress: WP8	9

Executive Summary

The 11th Quarterly Managerial Report describes the activities and the objectives reached by Heartfaid Consortium during the period August 1 - October 31, 2008.

In short the following WPs have been involved in the work:

- WP0: Management
- WP2: Biomedical Data Identification and Collection
- WP4: Knowledge, Representation, Discovery and Management
- WP7: Testing and validation
- WP8: Dissemination and Exploitation

In particular, the following activities have been satisfactorily carried out:

- WP0: management of technical and administrative activities. Request for Contract Amendment.
- WP2: finalization of data collection on the project clinical sites. Completion of the WP.
- WP4: further development of the KDD activities and refinement of the Medical Knowledge Base. Completion of the WP.
- WP7: the protocols for patient data collection have been implemented, including definition of the parameters to be collected and the devices to be used.
- WP8: dissemination activities and definition of suitable exploitation strategies.

In this period also the activities of WP5 and WP6 have been completed with the production of respectively D36 and D37 submitted on September 12 to the Commission.

Ongoing workpackages progress: WP0

WORK PACKAGE: 0
TITLE: MANAGEMENT
START DATE: MONTH 1
WORK PACKAGE LEADER: UNICAL
PARTNERS INVOLVED: UNICZ, UNIMIB, VMWS, FORTHNET, SYNOPSIS, CNR, RBI

STATUS OF DELIVERABLES DUE IN THIS PERIOD

DELIVERABLE	N°	DATE DUE	COMMENTS
11th Quarterly Managerial Report	D41	31/10/08	On time

FORECAST STATUS OF DELIVERABLES DUE IN THE NEXT 3 MONTHS

DELIVERABLE	N°	DATE DUE	COMMENTS
12 th Quarterly Managerial Report	D42	31/01/09	According to the Contract amendment Request, next quarterly will be D42-M36

MEETINGS OF THE PERIOD AND FORECASTED WP0- MB & STAB MEETINGS

ACTIVITY	ATTENDANTS	DATE/PLACE
MB & STAB meeting	Coordinated and hosted by FORTH and FORTHNET Attendants: Representatives from MB & STAB	Crete October 10/11

During this quarter the management of the Consortium has mainly focused on the outcome and handling of the following deliverable:

- D39: 10th Quarterly report

Together with the submission and the technical supervision and approval of D36: HEARTFAID Decision Support System prototype WP5 and D37: HEARTFAID end-user applications and services prototype WP6, all submitted on due deadline.

The activities have then focused on the technical and managerial aspects of the Consortium meeting hold in the period in Crete and on the submission of the Contract Amendment for the a 3 month extension of the project, after the advices of the PO Loukianos Gatzoulis which has been replaced on October 2nd by Tanguy Verraes new PO of the project.

Shortly the overall management will focus on the following tasks:

T 0.1 Overall management of the Consortium

- Handling of Deliverables and Extension of the Project
- Cooperation with FORTH/FORTHNET for next MB & STAB meeting

T 0.3: Management of contractual, legal, financial and administrative procedure of the consortium

- Handling of financial and administrative procedures for Contract Amendment

T 0.2: Co-ordination of the Consortium technical activities

The coordination of the scientific and technical activities has been further consolidated, by a more efficient tuning of the procedures for the effective collaboration among the several partners involved within each WP.

In particular, each WP Leader is responsible to:

- plan and organise the overall internal work;
- coordinate the contribution from the relevant partners;
- define the roadmap for the development of the deliverables;
- collect feedbacks from the WP group as far as Quarterly Reports are concerned.

Finally, each partner will be responsible for all other direct issues with the coordination unit within the deadlines.

T 0.4: Internal Communication infrastructure

The internal communication infrastructure has been mainly realized by the extensive use of e-mails, audio conference services and the services and functionalities provided by the Internal side of the Project Web Site.

Forecasted activities

During the following 3 months management activities will focus on the Contract Amendment procedure, manage the submission of D42-WP0, coordinate and supervise D38-WP8 and D40 WP7.

At the end of this quarterly the WPs involved until the end of the project will be WP0, WP7 and WP8.

Ongoing workpackages progress: WP2

WORK PACKAGE: 2
TITLE: BIOMEDICAL DATA IDENTIFICATION AND COLLECTION
START DATE: MONTH 3
WORK PACKAGE LEADER: VMWS
PARTNERS INVOLVED: UNICAL, UNICZ, UNIMIB, JUMC , FORTHNET, SYNAP, AUXOL

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 2.3	Data Collection	End of Task and WP

Description of the activities

T2.3.1 Homecare Data Collection Both UNIMIB and AUXOL have completed data collection from patients with chronic heart failure. This was done by considering patients referred to their CHF clinic or those seen in the emergency service setting for acute decompensation. After obtaining their recompensation, some of these patients were included in a remote monitoring program through telemedicine facilities. Data collected in the Home environment included systolic blood pressure, heart rate, respiratory rate, body weight, urine output and specific symptoms, all parameters known to be useful to achieve an early diagnosis of heart failure decompensation, as indicated in deliverable 5. The MagIC vest has also been used to collect additional data on the move also during physical exercise on a cycloergometer. This has allowed further improvement of the system of wearable sensors (MagIc vest) aimed at collecting data on ECG (and thus heart rate), physical activity and respiratory frequency in subjects monitored on the move. Further progress has also been made in the attempt to find better solutions for wireless communication between such a homecare device (for example Bluetooth technology) and for remote data transmission (e.g. through PDA or smartphone devices).

For homecare environment UNICZ has continued to collect, in a group of fifty-one patients the following parameters in a standardized manner: systolic blood pressure, heart rate, respiratory rate, % of body water and weight, body temperature, in order to achieve an early diagnosis of heart failure decompensation, so as indicated in deliverable 5. The collection of these data has been amplified and completed

T2.3.2 Healthcare Data Collection

In the frame of CHF patient management, UNIMIB and AUXOL have combined data obtained daily from patients followed up at home through telemonitoring technologies, with data obtained in the CHF clinic. This has been done to in the perspective of the final testing of the HEARTFAiD platform.

In the Hospital setting, the data from additional CHF patients have been introduced in the database of the CHF clinic of each center. In particular, biomedical signs and symptoms, and parameters of selected tests such as Electrocardiogram, Holter electrocardiography, Chest X-ray, Echocardiography,

Clinical chemistry, Thoracic Impedance, have been collected. Data have been obtained both from basal assessments (initial visits) and additional clinical visits.

During this period UNICZ has continued data collection from patients with Chronic Heart Failure (CHF), and other clinical data have been collected, as defined in previously agreed protocols by clinical partners.

UNICZ ha also completed data collection in the Hospital setting. The data have been introduced in a database of CHF ambulatory that contains all available list of biomedical signs and symptoms, list of parameters of selected tests so as: Electrocardiogram, Holter electrocardiography, Chest X-ray, Echocardiography, Clinical chemistry, and so on, that are useful for heart failure domain. The data have been collected according to eCRF developed as a tool for storage and utilization of the clinical data. The clinical assessment in these patients has been scheduled every one-two months, and also earlier if clinical conditions are worsening and every new change in clinical condition is reported in database. At this moment we have a database with data from One-hundred and three patients with heart failure diagnosis. In addition, we have continued the storage of digital ECG files in SCP format and the echocardiographic images in DICOM format.

JUMC: The data from ambulatory CHF patients have been collected as defined in previously agreed protocols by clinical partners. The data included the clinical anamnesis, physical examination, treatment, laboratory tests, ECG, treadmill test, echocardiography and quality of life assessment. The data have been collected according to eCRF developed as a tool for storage and utilization of the clinical data. Moreover for a selected group of patients also a daily questionnaire including the basal parameters (clinical symptoms, treatment, weight, respiratory rate, blood pressure, heart rate) have been performed. It was the part of JUMC own contribution as according to DoW JUMC is not included in the task regarding data collection.

Ongoing workpackages progress: WP4

WORK PACKAGE: 4
TITLE: KNOWLEDGE, REPRESENTATION, DISCOVERY AND MANAGEMENT
START DATE: Month 8
WORK PACKAGE LEADER: RBI
PARTNERS INVOLVED: UNICAL, SYNAP, CNR, FORTH

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 4.3	Implementation of Knowledge Discovery in database processes	The result related to the ANMCO dataset obtained by different approaches have been summarized into a short report on nine pages prepared for the submission to the ANMCO organization and for future publication. The novelty is identification of haemoglobin as a very relevant prognostic parameter and definition of a novel HF prognostic scale. After publication of the new HF guidelines we have started with the necessary update of the HF ontology.

Description of the activities

The results obtained on the ANMCO dataset by project partners FORTH, UNICAL, and RBI and presented in the deliverable D29 have been reinterpreted in the sense of their medical significance. Based on that a report for the ANMCO organization who collected the data has been prepared. The novel results included into this report and not available in the D29 are a) the analysis of relevant changes in the survival rate of HF patients in Italy depending on the year of the first visit and significant changes in the medication treatment in different years in the period 1995-2005 and b) construction and analysis of the HF prognostic scale that substitutes HFSS presented in D29. The report has been about 50 pages long and it was concluded that such form is not appropriate neither for ANMCO experts nor for publication. After that, a significantly shorter version of the report has been prepared. Comments obtained from medical partner UNICZ in respect to this version has been very useful and based on them the final version including some changes in the form of figures and analysis of the prognostic value of the hemoglobin laboratory test has been done. The later observation related to hemoglobin turned out as very relevant and it presents a significant medical result also for inclusion into the HF knowledge base. It is interesting that none of the used machine learning methodologies detected this test as relevant. It seems to be the consequence of the fact that hemoglobin has been measured for only about 40% of patients in the ANMCO dataset. The result undoubtedly demonstrates a significant problem of machine learning methodology in descriptive applications with many unknown values and it will be a topic for future research in descriptive knowledge discovery. The medical relevance of the obtained results related to the hemoglobin and the newly constructed HF prognostic scale opened the problem of the most appropriate form for their inclusion into the HF knowledge base. Currently a very promising solution seems integration of the Bayesian networks into the deterministic reasoning process based on the ontological form used for knowledge representation in the HF knowledge base. Regardless of the selected form, this results of the KDD process have to be integrated into the final platform version.

Recently published new version of HF guidelines stimulated the work on updating the HF ontology. Although it seems that most relevant changes in guidelines are not related to the used terminology, it is obvious that inclusion of some newly introduced concepts will be necessary. The work has already started and it can be expected it will be finished in the next period. In this activities it has been also detected that HF diagnostic procedures now stress the relevance of the natriuretic peptides (BNP) in the assessment of the diagnosis. This novel procedural knowledge has to be included into the procedural part of the HF knowledge base. Together with continuous updates of the knowledge base with expected results and comments of medical partners during the testing phase of the platform this remains our main task in the last phase of the project.

Ongoing workpackages progress: WP7

WORK PACKAGE: 7
TITLE: TESTING AND VALIDATION
START DATE: MONTH 25
WORK PACKAGE LEADER: UNIMIB/AUXOL
PARTNERS INVOLVED: UNICAL, UNICZ, UNIMIB, JUMC, VMWS, FORTHNET, SYNAP

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 7.1	Deployment of the prototypes in suitable clinical settings	According to the clinical testing and validation protocol, a set of suitable platform services has been integrate and deployed.
T 7.2	Clinical Validation	Clinical partners have started the patient enrolment and the testing of the platform services.

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°	COMMENTS
Clinical validation	T 7.2	Clinical management of the enrolled patients by the support of the deployed platform services.

STATUS OF DELIVERABLES DUE IN THIS PERIOD

DELIVERABLE	N°	DATE DUE	COMMENTS
Integration and configuration prototype	D40	31/07/08	In the Contract Amendment the request to postpone it from M32 to M33

Description of the activities

A prototype plan of the platform testing and validation proposed by UNIMIB/AUXOL have been agreed and accepted by JUMC. According to the proposal, JUMC has selected a group of CHF patients who currently are being enrolled into the platform and will follow the plan of clinical validation. The Nurse@Home application software developed for the clinical validation and testing have been installed and currently is being tested by JUMC.

AUXOL AND UNIMIB have included information on the goals and results of the HEARTFAID project in presentations given at national conferences on patients monitoring at home. The experience gathered with HEARTFAID has also supported the design of future studies planned on the management of patients with chronic heart failure

According to the protocol for platform testing and validation proposed by UNIMIB/AUXO and accepted by all clinical partners, UNICZ has selected a group of CHF patients who currently are being enrolled into the platform and will follow the plan of clinical validation with a CHF severity ranging from NYHA class II and NYHA class III. Moreover UNICZ has acquired Automatic Devices (A&D UA-767PBT and A&D UC-321PBT) for Blood Pressure, Heart Rate Weight monitoring. In particular UNICZ has selected three patients for “Automatic” acquisition devices (using the above mentioned Medical Devices) and four patients for “Manual” acquisition procedures. The Nurse@Home application software developed for the clinical validation and testing have been installed and currently is being tested by UNICZ.

Ongoing workpackages progress: WP8

WORK PACKAGE: 8
TITLE: DISSEMINATION AND EXPLOITATION
START DATE: MONTH 1
WORK PACKAGE LEADER: UNICAL
PARTNERS INVOLVED: ALL

STATUS OF TASKS DUE IN THIS PERIOD

TASK	TITLE	COMMENTS
T 8.1	Dissemination activities	The dissemination activities have been mainly characterized by internal dissemination, preparation and submission of scientific and technical papers, oral presentations at Conferences.
T 8.2.2	Cost/Benefit analysis	Definition and further assessment of the criteria for Cost/Benefits analysis
T 8.2.3	Exploitation plan	Preliminary definition of the exploitation strategies.

FORECAST STATUS OF TASKS DUE IN THE NEXT 3 MONTHS

TASK	N°	COMMENTS
Dissemination activities	T 8.1	The activities will carry out with more stressing to collaboration and involvement of the medical professional associations and patient associations
Cost/Benefit analysis	T 8.2.2	Final assessment and implementation of the criteria for Cost/Benefits analysis
Exploitation plan	T 8.2.3	Development of a detailed exploitation plan

STATUS OF DELIVERABLES DUE IN THIS PERIOD

DELIVERABLE	N°	DATE DUE	COMMENTS
Investigation on new models for health care delivery	D38	31/07/08	In the Contract Amendment the request to postpone it from M30 to M33

Description of the activities

All the partners have continued the dissemination activities, mainly by organizing specific events for internal dissemination of the current project results.

Particular attention is currently being addressed to the dissemination activities towards final end-users of the platform services.

More specifically, dissemination activities performed by FORTH in this period were:

- Participation to Computers in Cardiology, 2008 (Bologna, Italy) with two oral presentations and one poster:
 - A) "Morphological Classification of Heartbeats Using Similarity Features and a Two-Phase Decision Tree" (F. Chiarugi, D. Emmanouilidou, I. Tsamardinos, I.G. Tollis), Computers in Cardiology 2008, Bologna, Italy, September 2008.
 - B) "Measurement of Heart Rate and Respiratory Rate Using a Textile-Based Wearable Device in Heart Failure Patients" (F. Chiarugi, I. Karatzanis, G. Zacharioudakis, P. Meriggi, F. Rizzo, M. Stratakis, S. Louloudakis, C. Biniaris, M. Valentini, M. Di Rienzo, G. Parati), Computers in Cardiology 2008, Bologna, Italy, September 2008.

C) "ECG and Echocardiography Processing for Decision Support in Heart Failure" (F. Chiarugi, S. Colantonio, D. Emmanouilidou, D. Moroni, F. Perticone, O. Salvetti, A. Sciacqua), Computers in Cardiology 2008, Bologna, Italy, September 2008.

- Participation to IHIC 2008 (Hersonissos, Crete, Greece) oral presentation and demo session at FORTH booth:

A) "An Integrated and Interoperable Platform of Services for the Management of Heart Failure" (S. Di Bona, D. Guerri, M. Lettere, R. Fontanelli, F. Chiarugi, A. Marsh, O. Salvetti), IHIC 2008, Hersonissos, Crete, Greece, October 2008.

In the demo session done at FORTH booth, the demo has been performed by many participants at IHIC. Among them Mr. Yun Sik Kwak, Chairman-designate of ISO TC215, Health informatics.

- Submission of an article for Artificial Intelligence in Medicine (the acceptance will be shortly known):

A) "Decision Support in Heart Failure through ECG and Echocardiography Processing" (F. Chiarugi, S. Colantonio, D. Emmanouilidou, M. Martinelli, D. Moroni, O. Salvetti), submitted to "Artificial Intelligence in Medicine", October 2008.

JUMC have continued the previously started dissemination activities especially among patients enrolled into HEARTFAID platform, other CHF patients attending the hospital and ambulatory unit and their relatives

UNICZ has carried out its own internal dissemination activities, by increasing the awareness of Heartfaid activities and current results within its own institution. Moreover, UNICZ has consolidated the interactions with the following health care professional associations with the aim to keep informed about the Heartfaid activities: ANMCO (Italian Association of Hospital Cardiologists), SIC (Italian Society of Cardiology), SIMI (Italian Society of Internal Medicine). Other Societies are involved, so as the Italian Society of General practitioners (SIMG).

Dissemination activities of the period

Date	Channel	Event	Place/ Country	Partner responsible	Nature and size of audience
14.-17. September 2008.	Poster presentation	Conference Computers in Cardiology	Bologna, Italy	RBI+dr. Goran Krstacic	About 200 conference participants
17.-19. October 2008.	Organization and oral presentation	Workshop on Knowledge Discovery Applications	Porec, Croatia	RBI	28 Croatian scientists in the field of artificial intelligence
October 25-28, 2008		The National Congress of the Italian Society of Internal Medicine (SIMI)	Genoa, Italy	UNICZ	Poster presentation
14-17 Sept. 2008	International Conference	35th annual Computers in Cardiology Conference	Bologna, Italy	CNR, UNICAL, UNICZ, UNIMIB, JUMC, AUXOL, FORTH, RBI	100 International medical & technical audience
14-17 Sept 2008	International Conference	35th annual Computers in Cardiology Conference	Bologna, Italy	CNR, UNICAL, UNICZ	100 International medical & technical audience

Future activities and dissemination

Date	Place	Event	Partner responsible	Description
15.-19. December 2008.	Hanoi, Vietnam	Tenth Pacific Rim International Conference on Artificial Intelligence	RBI	Oral presentation
December 13-16, 2008	Rome (Italy)	National Congress of the Italian Society of Cardiology (SIC)	UNICZ	Abstract title: Early detection of decompensation in chronic heart failure by intelligent data analysis
19 Nov. 2008	La Spezia, Italy NATO Undersea Research Centre NURC	Geospatial Data in the Operational Decision Making Process	CNR	Oral Presentation