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EXECUTIVE SUMMARY

HEARTEN project addresses the management of Heart Failure (HF) patients, aiming to improve their adherence according to the provided suggestions and recommendations from the healthcare professionals and the other involved ecosystem actors. In this scope the main objectives regarding the patients are: healthier living, being empowered and reduction of re-hospitalizations. The dissemination activities are identified by all members as the cornerstone of communicating the final platform solution and a specific strategy is followed during the project's period. This strategy employs all relevant dissemination and communication tools to effectively approach the professional and the general public. The HEARTEN Consortium recognises the importance of the dissemination activities; as a result all project partners are engaged in the dissemination which will be taking place throughout the project life-cycle. Expert teams - coming from multidisciplinary scientific fields - are participating in the project aiming to create the most appropriate and targeted pictures that represent in short the project vision and the usability. In the corresponding period, the consortium participated in a variety of health and scientific events, grouped in teams of expertise and the results are presented in this deliverable. A large amount of dissemination material was created through various forms for increasing the impact in all target audiences. More specific, HF patients were reached through healthcare experts and many organizations were contacted and informed for the HEARTEN project. Participations and presentations in International conferences were used at first level of the dissemination activities; related material was also distributed.

The dissemination activities performed this year were related to: (i) the development of a patient-centered collaborative HF environment, (ii) the innovations in the field of biomarkers utilized inside the breath/saliva biosensors and, (iii) the overall technological solution adopted within the framework of the project. Several communication channels are utilized focusing on the wide audience and on specific groups of stakeholders. According to the expertise of each organization, the dissemination activities of this period are suggesting a great achievement towards the project's objectives.

The deliverable is composed of different chapters and sub-sections.

Chapter 1 presents the overview of the dissemination activities and includes the dissemination strategy that is followed, the means for enabling the communication of the project results to the wide audience, as well as a summary of the planned dissemination activities for M13-M24.

Chapter 2 presents the dissemination activities for M13-M24 conducted by each partner accompanied with a description of the activity and other useful information, such as the objective and the target audience.

Chapter 3 presents the planned dissemination activities for the following months per partner.

1. Introduction

1.1 Overview of the Dissemination strategy

Task 2.2 “Dissemination Planning and Activities” is dedicated to the dissemination planning and activities by including all actions from project design to the final results. Specifically, all technical, scientific and clinical partners of the project are involved in the dissemination activities, throughout the project life-cycle. The objectives of the dissemination strategy is to reach the worldwide Heart Failure (HF) community by including all stakeholders and furthermore to increase the impact of results’ commercial exploitation.

1.2 Dissemination strategy

Regarding the different phases of the project’s design and development, the dissemination activities were accommodated in different levels of procedures, priorities and pathways. This strategy was necessitated by the fact that technical, scientific and clinical activities were performed during the parallel implementation of HEARTEN project’s tasks. By this way, specific communications channels and the target audience were reached during the project’s workplan and appropriate decisions were taken into account for satisfying future actions and the definition of an efficient exploitation strategy.

1.3 Target audience

During the requirements analysis of the HEARTEN project, as delivered in the “D 2.9 - Dissemination plan and activities 1”, a large community of target audience was identified. More specific the related stakeholders were grouped as:

- Potential customers of the HEARTEN platform in the partners’ countries.
- HF-patients worldwide.
- HF healthcare community.
- The industry of sensors that record vital-signs on wearable and portable devices.
- The scientific community of biosensors research.
- Public and private HF-patients’ organizations.
- Experts in the field of knowledge extraction by applying intelligent methods in cloud-hosted data.

1.3.1 What is the target audience’s availability in terms of time?

An amount of press releases and leaflets were created and distributed in a short and concise format aiming to directly spot the key aspects of the HEARTEN project, without the need of detailed descriptions that requires time spent by the target audience. Expert teams from the different scientific fields participating in the project created the most appropriate and targeted pictures that represent in short the project vision and objectives.

To gain time in the most efficient way, the consortium decided from the beginning of the project to participate in a variety of health and scientific events, grouped in teams of expertise by targeting on presentations and discussions regarding their specific activities inside project’s tasks. This strategy helped each individual team of the project to earn time by speeding up its plan towards objectives and taking the required feedback for effective dissemination material production. To establish the most efficient communication channels between the experts and the users (HF patients and other ecosystem actors), the pilot sides of the consortium were fully employed in a two-fold way: the

healthcare experts were involved as the target audience to create a communication channel with their patients. A long time that has been initially foreseen for the enrollment of the shortest communication strategy, as part of the dissemination material, was finally gathered in the minimum time by expert teams. Finally, teams of partners - according to their related expertise and effort in the project - are also participating in specific events (conferences, press releases, national/international group meetings), thus providing the best dissemination results and minimizing time and resources allocation.

1.3.2 How can the levels of interest and levels of understanding of the different target audiences best be accommodated in the dissemination material?

The dissemination material is composed of information that comes from the multidisciplinary scientific and clinical community. The corresponding material that is updated in a regular basis through various forms, aims at increasing the impact of the overall dissemination activities to all target audiences. To succeed in this process (i) the clinical experts, (ii) the researchers working on the field of biosensors development, (iii) the researchers of the knowledge extraction from multivariate data, (iv) the technical developers and, (v) the management teams are collecting and filtering all the produced results by taking into account the corresponding impact from the target audience to best accommodate the material of dissemination. More specific, feedback from target groups, discussions in national and international conferences, and contacts with HF-related healthcare experts are used as the main activities of collecting and updating the appropriate material.

1.4 Best means of dissemination

Internal dissemination was established from the beginning of the project as an important process, focusing to bring all consortium members at the same level of project's details; the HEARTEN project joins scientists and researchers coming from different "worlds" of expertise that work in a closed loop to reach the final outcome and concurrently share the same vision during the overall project's period. Internal meetings, teleconferences and group discussions were performed from the beginning of the project to carry out all reports and create the appropriate communication structure between technicians, researchers and clinical experts. Sharing the same project's vision and targeting the same results, the dissemination strategy and planning was acknowledged and agreed by all members. Innovative research activities are carried out and performed, in multidisciplinary scientific fields, from the projects' beginning. Besides, HF patients reached through healthcare experts and organizations, were contacted and informed for the HEARTEN project.

1.5 Summary table of intended dissemination activities at the project start

In Table 1, the communication and dissemination activities that were foreseen at the project start are presented.

Table 1: Intended dissemination activities at the project start.

Dissemination activities	1 st Phase (M1-M12)	2 nd Phase (M13-M24)	3 rd Phase (M25-M36)	No. of succeeded dissemination activities
	Initial dissemination approach	Work progress	HEARTEN launch	
Brochures	✓	✓		7
Posters	✓	✓		10
Conferences	✓	✓	✓	20

(attendance)				
Conferences (presentation)	✓	✓	✓	14
Workshops		✓	✓	2
Project website	✓	✓	✓	1
Social Media		✓	✓	5
HEARTEN reports/deliverables		✓	✓	43
Academic journals		✓	✓	10

1.6 Planned dissemination activities for M13-M24

In Table 2, the potential dissemination activities as foreseen by the HEARTEN partners in the first year of the project, are presented.

Table 2: Planned dissemination activities for M13-M24 (all partners).

Partner	Means of dissemination	Event/Media
BIOAXIS-CAREDOME	Pharmaceutical Event/ (Presentation, Leaflet)	10 th Pharmaceutical Marketing Conference (Greece)
	Healthcare Professionals Event/ (Presentation, Leaflet)	42 nd Panhellenic Medical Conference (Greece)
	HEARTEN state of the art from clinical perspective (Newsletter)	42 nurses cooperating with BIOAXIS-CAREDOME
	Cardiologists presentations (Meetings in Portugal and Greece)	Medical Office / Clinic visits
	Abbvie Pharmaceuticals (Meeting - Greece)	Company Visit
	Roche (Meetings in Portugal and Greece)	Company Visit
	Novartis (Meetings in Portugal and Greece)	Company Visit
	Bayer (Meetings in Portugal and Greece)	Company Visit
	Amgen (Meeting in Greece)	Company Visit
	Takeda (Meetings in Greece and Rest of Balkans)	Company Visit
	MSD (Meetings in Portugal and Greece)	Company Visit
	Boehringer Ingelheim (Meetings in Portugal and Greece)	Company Visit
	UCB (Meetings in Portugal and Greece)	Company Visit
	Pfizer (Meetings in Portugal and Greece)	Company Visit
SESA	Presentation of Funded Project, Research and HEARTEN Project	Corporate Site
	IEO – European Institute of Oncology	Meetings with Italian customers

Partner	Means of dissemination	Event/Media
	[30]	
	Centro Cardiologico Monzino	
	Lombardia Informatica	
YOURDATA	Presentations, newsletters, brochures, announcements, papers etc.	Website
		Facebook and LinkedIn accounts
		Conferences
		Local and national press and television
		Sardinian local health care system
SAS	Clinical sessions in Virgen del Rocío University Hospital	Internal diffusion
	Conferences about HF or Medical Informatics	Flyers /brochures
		Newsletters
	Poster and/or oral communications in national (Spanish) and international conferences	Conferences
	Scientific papers in relevant journals like: <ul style="list-style-type: none"> Journal of the American Medical Informatics Association. Journal of Medical Systems. Journal of Biomedical Informatics. IEEE Journal of Biomedical and Health Informatics. 	Scientific publications
UNIP	Presentation of the outcomes of its research related to the analysis and identification of breath and saliva biomarkers.	Conferences
		Scientific publications
UMOR	Transport and disseminate new knowledge into a broad international research community	International association for breath research (IABR)
		Task force for standardisation
CSIC	Poster and/or oral communications in national and international conferences, as well as, journals related to the development of saliva and breath biosensors	Conferences
		Scientific journals
	Dissemination of both CSIC-specific results and general overviews of the project development to Spanish media (press releases, press conferences, interviews, web pages and social networks)	Press and outreach offices/CSIC communication department
FORTH	Scientific papers in relevant journals: <ul style="list-style-type: none"> 38th Annual International Conference of the IEEE 	Scientific publications

Partner	Means of dissemination	Event/Media
	Engineering in Medicine and Biology Society (EMBC'16) <ul style="list-style-type: none"> Federated conference on computer science and information systems (FedCSIS) 	
AppART	Dissemination in several online and on-paper magazines, webspots and congresses	Greek Media Agency
EVERIS	Presentations, newsletters, brochures, announcements, papers etc.	Company website, Social media, Company presentations, Media
UCBL	Scientific papers in relevant journals like: <ul style="list-style-type: none"> Journal "Materials Science and Engineering: C" Journal "Trends in Analytical Chemistry" 	Scientific publications

2. Dissemination during months M13-M24

2.1 Summary of dissemination activities conducted by each partner

UCBL

The main goal of the dissemination activities carried out by UCBL is to spread the knowledge obtained during the whole period, project accomplishment among specialists in the field of bio-analysis and end-user, especially among the experts working in clinical diagnostics. The industrial and academic parties were approached using the following channels: conferences (International conference on Nanomedicine, World Congress on Biosensors, Annual Eurosensors Conference, International Conference on Micromechanics and Microengineering, etc) publications (Biosensors and bioelectronics, Sensors and Transducers, electroanalysis Analytical Chemistry, Materials Sciences and engineering, etc.), workshops, seminars and press releases.

EVERIS

EVERIS has taken the opportunity of its attendance in different Conferences to distribute the promotional materials of HEARTEN and also create a poster presenting the objectives of the project. EVERIS has participated along with SAS and CSIC in the development of the Spanish version of the HEARTEN brochure, which provides information concerning the project. Additional dissemination activities performed by EVERIS include:

- Poster generation and presentation in the I Congress on Coordination and Management of EU-funded Health Research Projects.
- Leaflet distribution in the HIMSS Europe World of Health IT (WoHIT) Conference & Exhibition and in the European Summit on Digital Innovation for Active and Healthy Ageing.
- Presentation of HEARTEN project during internal event in promoting Healthcare products (ehCOS Week)
- Submission of an abstract along with SAS submitted (pending acceptance) for presenting the results during the Informatics for Health 2017 Congress concerning the SAS Electronic Health Record integration with the HEARTEN platform.

AppArt

AppArt has managed to perform two important dissemination activities. The first one is a corporate meeting, arranged with Vodafone, a large Telecommunications Company in Greece that has an important social profile and is constantly proceeding in activities that improve the life of several vulnerable groups, including patients. This Telco Company is already familiar with health related activities for the outlying Greek islands contributing to the amelioration of preventive medicine for the inhabitants.

In addition, AppArt has organized a meeting to present the HEARTEN project to a significant number of key professionals from the Marketing Departments, who are already involved in related projects. The meeting took place on November 2nd and the feedback was positive. The participants found the project extremely challenging mentioning the need for such projects in countries like Greece, where there are many areas which are deprived of big hospitals and hospitalization is not an easy task to do. Another dissemination activity that took place during this period is a presentation in the 9th International Scientific Conference –Energy and Climate Change, organised by the National and Kapodistrian University of Athens, that took place on the 12th of October. In this Conference, AppArt participated in the Section “Machine to Machine implementations” and presented the case of the HEARTEN project in front of a Scientific and Academic audience.

FORTH

HEARTEN project vision, objectives and related activities were presented at international scientific conferences, national conferences and journals. FORTH came also into contact with the following EU projects; (i) Homage project [1], and, (ii) Media project [2] to receive feedback and discuss the outcomes of these projects and present the overall HEARTEN concept and approach. In addition the target population was approached through the communication of FORTH with the Hellenic organization of HF (Greece) as well as the participation in the event that was performed by the Cardiology department of University Hospital of Ioannina. The objective of this event was to raise the awareness of HF patients and inform them on their disease management and FORTH had the opportunity to discuss with the patients, present them the HEARTEN platform and the advantages gained from its adoption and receive their feedback about further improvements that could be implemented.

CSIC

The activities of CSIC have focused in the dissemination of the results achieved on the HEARTEN biosensors in scientific journals and conferences. This has been done in collaboration with UCBL, because the biosensors are a joint development of both beneficiaries. In addition, CSIC has given an invited presentation of the HEARTEN concept at the Annual conference of the Spanish Society of Cardiology (SEC 2016) [3]. In cooperation with the Spanish partners, CSIC has contributed to the translation to Spanish of the HEARTEN leaflet.

UMOR

The focus of the UMOR dissemination activities was the transport and dissemination of new scientific knowledge into a broad international research community in the biomedical/(bio)analytical field. HEARTEN results were part of presentations/ lectures at four international conferences. Basic scientific findings were published in a Q1 open access journal (Scientific Reports – a Nature Journal) to reach a broad scientific audience. Most recent findings (e.g. those on effects of hemodynamics on marker concentrations) were also disseminated to other international/ EU projects (among others the Marie Curie training networks PIMMS and IMPACT) and will be taken into account within the task force for standardization from the International Society for Breath Research (IABR).

UNIPi

UNIPi dissemination activities were focused on the presentation to the scientific community of the outcomes of its research in developing innovative analytical methodologies for the determination of HF biomarkers in saliva and exhaled breath for patients monitoring. Furthermore, UNIPi presented the HEARTEN project to expert participants in EU projects on e-Health promoting the objectives and activities of the HEARTEN and highlighting the advantages which could be gained from its adoption. In summary, the following dissemination activities were conducted:

- Two poster presentations in the XXVI Congresso della Divisione di Chimica Analitica della Società Chimica [4].
- An oral presentation in the XXVI Congresso della Divisione di Chimica Analitica della Società Chimica Italiana [4].
- An oral presentation of HEARTEN project in the 6th EAI International Conference on Wireless Mobile Communication and Healthcare -EU e-Health projects'
- Leaflet distribution during the Researchers' Night - Bright 2016 Night held in Pisa on September 30th [5].

- Leaflet distribution during the 6th EAI International Conference on Wireless Mobile Communication and Healthcare -EU e-Health projects.

SAS

SAS led the development of promotional material (Flyer in Spanish, conference abstract, poster) for dissemination. Furthermore, SAS has participated in the development of a Spanish leaflet covering information general related to the project. Additional dissemination activities have been performed by SAS, including:

- A poster communication in the 15th European Congress of Internal Medicine (ECIM) [6].
- Leaflet distribution to the ECIM conference, as well as within the national conference - XXXVII Congreso Nacional de la Sociedad Española de Medicina Interna.
- An in-depth explanation of the project vision and targets to several professionals from the Internal Medicine Unit of the Virgen del Rocío University Hospital.
- Oral communication of HEARTEN project directed to their science students.

YOURDATA

YourDATA has participated to the Lean LaunchPad Pilot (LLP) event, held in Rome in January and February 2016, during which a potential investors and entrepreneurs discovered HEARTEN characteristics. At the same time, useful comments about HEARTEN business strategy and market analysis have been collected. Another important event, SINNOVA 2016 Sardinian Innovation Fair, took place in Cagliari (Italy) in October 2016. YourDATA team explained HEARTEN solution to general public, researchers and investors, through the presentation of HEARTEN poster, leaflets and video.

BIOAXIS-CAREDOME

BIOAXIS-CAREDOME has focused on disseminating the progress of HEARTEN to the pharmaceutical industry, healthcare professionals and cooperating caregivers (nurse agents). BIOAXIS-CAREDOME has developed the necessary presentations and newsletter which were used to achieve the dissemination targets during this period. In addition, the HEARTEN project video has been used in face-to-face presentations. In summary, the following dissemination activities were conducted:

- Face to face meetings and presentations to 17 international pharmaceutical companies in Portugal and Greece.
- Face to face presentation to 49 cardiologists located in Portugal and Greece.
- Newsletter to 61 nurse agents cooperating with BIOAXIS-CAREDOME.

SITAL

HEARTEN has been promoted through SITAL corporate website. Dedicated focus was on the collaborative platform and the whole environment where all the components are deployed. The platform integration has been exhibited in two clinical institutes, IEO and Centro Monzino.

2.2 Summary of overall activities

2.2.1 Publications

UCBL

Journal paper accepted in International Journal of Cardiovascular Research

A paper entitled “Electrochemical Biosensor for Interleukin-10 Detection in Real Human Plasma Patients: Heart Failure Biomedical Application” has been accepted to be published in the International Journal of Cardiovascular Research [7] (Figure 1). This paper reports the analysis of the real human plasma effect for the detection of the cytokine biomarker; interleukin-10 (IL-10) using an electrochemical impedance spectroscopy (EIS) based biosensor.

Baraket et al., Int J Cardiovasc Res 2016, 6:1
DOI: 10.4172/2324-8602.1000304



**International Journal of
Cardiovascular Research**

Review Article

A SCITECHNOL JOURNAL

Electrochemical Biosensor for Interleukin-10 Detection in Real Human Plasma Patients: Heart Failure Biomedical Application

Abdoulatif Baraket¹, Michael Lee¹, Nadia Zine¹, Raffaele Caruso², Maria Giovanna Trivella³ and Abdelhamid Errachid^{1*}

[1]. However, facing the difficulty of obtaining a sufficient number of organ donors, several bioelectronic devices such as pressure sensors and left ventricle assisted device (LVADs) have been implanted into the patient's body in order to monitor or facilitate the continuation of patient's life until such a donor becomes available. The problem of organ biocompatibility as a direct cause to implanted LVADs can trigger increased pro- and anti-inflammatory cytokine levels, which is amongst the principle origins of HF. Generally, the signs of such an inflammation are highlighted by a secretion of pro-inflammatory (interleukin 6 (IL-6) and interleukin-1 beta (IL-1 b)) and anti-

Figure 1: Paper entitled “Electrochemical Biosensor for Interleukin-10 Detection in Real Human Plasma Patients: Heart Failure Biomedical Application”.

Table 3: Details of the paper entitled “Electrochemical Biosensor for Interleukin-10 Detection in Real Human Plasma Patients: Heart Failure Biomedical Application”.

Journal Title	International Journal of Cardiovascular Research	Impact Factor	0.45
Targeted audience	Health specialized scientific, Biosensor researchers and developers		
Paper title	Electrochemical Biosensor for Interleukin-10 Detection in Real Human Plasma Patients: Heart Failure Biomedical Application		
Volume	6	Date	2016

Journal paper accepted in Biosensors and Bioelectronics

A paper entitled “A fully integrated electrochemical biosensor platform fabrication process for cytokines detection” has been published in “Biosensors and Bioelectronics” Journal [8] (Figure 2). This paper reports the development of a fully integrated electrochemical biosensor platform for cytokine detection. Using eight gold working microelectrodes (WEs) the design allows a simultaneous detection of varying cytokine biomarkers. Monoclonal antibodies of anti-human IL-1b and anti-human IL-10 were electroaddressed onto the gold WEs through functionalization with 4-carboxymethyl aryl diazonium (CMA). The biosensor platform was highly sensitive to the corresponding cytokines (IL-10

and IL-1b were detected within the range of 1 pg mL⁻¹ to 15 pg mL⁻¹) and no interference with other cytokines was observed.

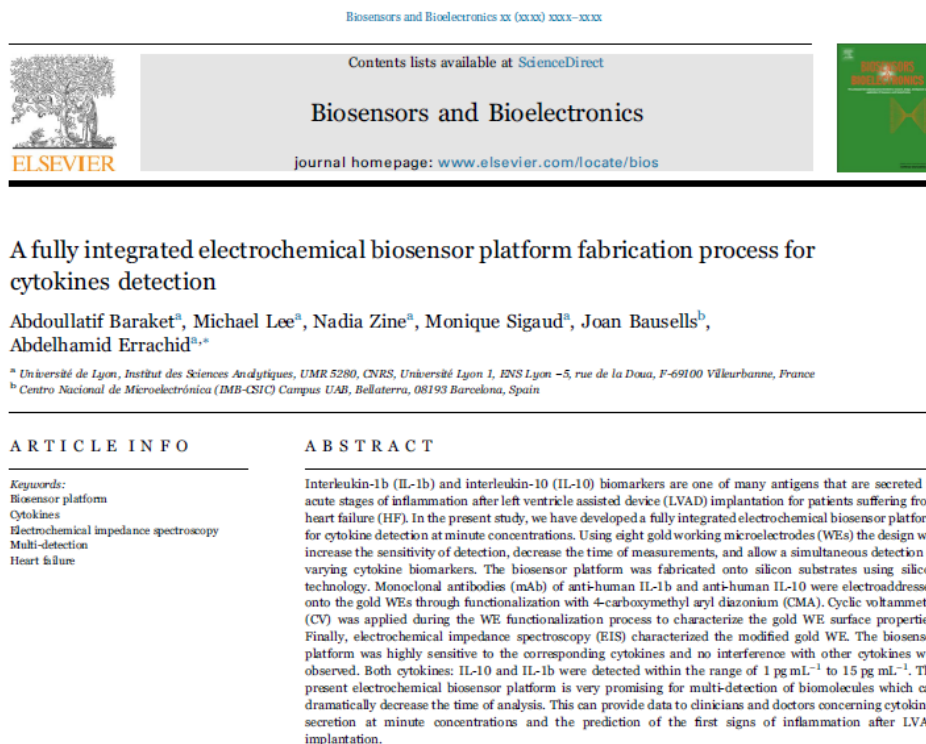


Figure 2: Paper entitled “A fully integrated electrochemical biosensor platform fabrication process for cytokines detection”.

Table 4: Details of paper “A fully integrated electrochemical biosensor platform fabrication process for cytokines detection”.

Journal Title	Biosensors and Bioelectronics	Impact Factor	7.476
Targeted audience	Health specialized scientific, Biosensor researchers and developers		
Paper title	A fully integrated electrochemical biosensor platform fabrication process for cytokines detection		
Volume	-	Date	2016

Journal paper accepted in Biosensors and Bioelectronics

A paper entitled “Novel strategy for sulfapyridine detection using a fully integrated electrochemical Bio-MEMS: application to honey analysis” has been published in “Biosensors and Bioelectronics” Journal (Figure 3). This paper reports the synthesis and characterization of a novel electrochemical biosensor based on gold microelectrodes modified with a new structure of magnetic nanoparticles (MNPs) coated with poly(pyrrole-co-pyrrole-2-carboxylic acid)(Py/Py-COOH) for high efficient detection of Sulfapyridine (Spy). This analyte was quantified through a competitive detection procedure with antigens toward polyclonal antibody (Ab-155). This biosensor was found to be highly sensitive and specific for SPy, with a limit of detection of 0.4 ng L⁻¹.

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Biosensors and Bioelectronics ■■■■■■■■■■



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Novel strategy for sulfapyridine detection using a fully integrated electrochemical Bio-MEMS: Application to honey analysis

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ABSTRACT

Sulfapyridine (SPy) is a sulfonamide antibiotic largely employed as veterinary drugs for prophylactic and therapeutic purposes. Therefore, its spread in the food products has to be restricted. Herein, we report the synthesis and characterization of a novel electrochemical biosensor based on gold microelectrodes modified with a new structure of magnetic nanoparticles (MNPs) coated with poly(pyrrole-co-pyrrole-2-carboxylic acid) (Py/Py-COOH) for high efficient detection of SPy. This analyte was quantified through a competitive detection procedure with 5-[4-(amino)phenylsulfonamide]-5-oxopentanoic acid-BSA (SA2-BSA) antigens toward polyclonal antibody (Ab-155). Initially, gold working electrodes (WEs) of integrated biomicro electro-mechanical system (BioMEMS) were functionalized by Ppy-COOH/MNPs, using a chronoamperometric (CA) electrodeposition. Afterward, SA2-BSA was covalently bonded to Py/Py-COOH/MNP modified gold WEs through amide bonding. The competitive detection of the analyte was made by a mixture of a fixed concentration of Ab-155 and decreasing concentrations of SPy from 50 $\mu\text{g L}^{-1}$ to 2 ng L^{-1} . Atomic Force Microscopy characterization was performed in order to ensure Ppy-COOH/MNPs electrodeposition on the microelectrode surfaces. Electrochemical measurements of SPy detection were carried out using electrochemical impedance spectroscopy (EIS). This biosensor was found to be highly sensitive and specific for SPy, with a limit of detection of 0.4 ng L^{-1} . This technique was exploited to detect SPy in honey samples by using the standard addition method. The measurements were highly reproducible for detection and interferences namely, sulfadiazine (SDz), sulfathiazole (STz) and sulfamerazine (SMz). Taking these advantages of sensitivity, specificity, and low cost, our system provides a new horizon for development of advanced immunoassays in industrial food control.

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Figure 3: Paper entitled “Novel strategy for sulfapyridine detection using a fully integrated electrochemical Bio-MEMS: application to honey analysis”.

Table 5: Details of paper “Novel strategy for sulfapyridine detection using a fully integrated electrochemical Bio-MEMS: application to honey analysis”.

Journal Title	Biosensors and Bioelectronics	Impact Factor	7.476
Targeted audience	Biosensor researchers and developers		
Paper title	Novel strategy for sulfapyridine detection using a fully integrated electrochemical Bio-MEMS: application to honey analysis		
Volume	-	Date	2016

Journal paper accepted in Trends in Analytical Chemistry

A paper entitled “Magnetic particles: From preparation to lab-on-a-chip, biosensors, microsystems and microfluidics applications” has been published in “Trends in Analytical Chemistry” Journal [9]. More details have been already presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in Microchim Acta

A paper entitled “A flexible electrochemical micro lab-on-chip: application to the detection of interleukin-10” has been published in “Microchimica Acta” Journal [10]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper published in Sensors and Actuators B: Chemical

A paper entitled “Development of a novel capacitance electrochemical biosensor based on silicon nitride for ochratoxin A detection” has been published in “Sensors and Actuators B: Chemicals” Journal [11]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in Electroanalysis

A paper entitled “Boron-doped Diamond Electrodes Modified with $\text{Fe}_3\text{O}_4/\text{Au}$ Magnetic Nanocomposites as Sensitive Platform for Detection of a Cancer Biomarker, Interleukin-8” has been published in “Electroanalysis” Journal [12]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in Electroanalysis

A paper entitled “Electrochemical Capacitive K^+ EMIS Chemical Sensor Based on the Dibromoaza[7]helicene as an Ionophore for Potassium Ions Detection” has been published in “Electroanalysis” journal [12]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in International Journal of Environmental Analytical Chemistry

A paper entitled “A novel amperometric inhibition biosensor based on HRP and gold sononanoparticles immobilised onto Sonogel-Carbon electrode for the determination of sulphides” has been published in “International Journal of Environmental Analytical Chemistry” Journal [13]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in Materials Research Bulletin

A paper entitled “Preparation of gold nanoparticles and determination of their particles size via different methods” has been published in “Materials Research Bulletin” Journal [14]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in Materials Science and Engineering C

A paper entitled “Submicron magnetic core conducting polypyrrole polymer shell: Preparation and characterization” has been published in “Materials Science and Engineering C” Journal [15]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in Materials Science and Engineering C

A paper entitled “A novel EIS field effect structures coated with TESUD-PPy-PVC-dibromoaza[7]helicene matrix for potassium ions detection” has been published in “Materials Science and Engineering C” Journal [15]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

FORTH

Conference paper accepted in Medicon

A paper entitled “The evolution of mHealth interventions in Heart Failure” was accepted in the XIV Mediterranean Conference on Medical and Biological Engineering and Computing (Medicon Conference) [16], where an extended review of the evolution of mHealth interventions in cardiology and HF and the emerging potential these resources were provided.

The evolution of mHealth interventions in Heart Failure

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Abstract—Heart Failure (HF) is among the most deadly diseases globally with reduced quality of life (QoL), repeatable hospitalizations, and early mortality. For effectively managing HF patients should systematically monitor their symptoms and follow the experts’ guidelines. While the precise mechanism behind HF disease has not been fully delineated, risk factors for HF have been identified. Though the risk factors are known, there is a compelling need for efficient and effective management and monitoring the progress of HF. Mobile health (mHealth) intervention has the potential to offer personalized services for predictive, participatory and preventative care and contribute to more accessible, faster and reliable disease monitoring. In this work we present an extended review of the evolution of mHealth interventions in cardiology and HF and the emerging potential these resources provide.

Keywords— Heart Failure, mHealth, personalized management, ecosystem, patient empowerment.

B. Description of the condition

Current guidelines of the European Society of Cardiology (ESC) for HF management call for optimal management in hypertension, medication, nutrition, weight, physical activity. In parallel individualized education and counseling of HF self-care is a critical element [12]. The evolution in the field of medicine contributed to a widely available amount of medication for HF (Angiotensin-converting-enzyme inhibitor, Aldosterone Inhibitor, Angiotensin II Receptor Blocker, Beta-Blockers, Calcium Channel Blockers, Cholesterol -Lowering drugs, etc.). In specific HF stages, patients are more likely to be prescribed more than one kind of medication [13]. HF patients should also pay attention to the diet they follow and also include physical activity in their daily practice. Among other factors, weight moni-

Figure 4: Conference paper accepted in Medicon Conference.

Journal paper accepted in the Computational and Structural Biotechnology Journal

A paper entitled “Heart Failure: Diagnosis, Severity Estimation and Prediction of Adverse Events Through Machine Learning Techniques” was accepted (Figure 5) in the Computational and Structural Biotechnology Journal [17], that is an online journal publishing research articles and reviews related to Algorithms and Hypothesis in Bioinformatics, among other. This review paper presented the state-of-the-art of the machine learning methodologies applied for the assessment of HF, focusing on models predicting the presence, estimating the subtype, assessing the severity of HF and predicting the presence of adverse events, such as destabilizations, re-hospitalizations, and mortality.



Computational and Structural Biotechnology Journal




Volume 15, 2017, Pages 26–47




Open Access

Mini Review

Heart Failure: Diagnosis, Severity Estimation and Prediction of Adverse Events Through Machine Learning Techniques

Evanthia E. Tripoliti^{a, b}, Theofilos G. Papadopoulos^a, Georgia S. Karanasiou^{a, b}, Katerina K. Naka^{c, d},
Dimitrios I. Fotiadis^{a, b},   

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<http://dx.doi.org/10.1016/j.csbj.2016.11.001>

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Abstract

Heart failure is a serious condition with high prevalence (about 2% in the adult population in developed countries, and more than 8% in patients older than 75 years). About 3–5% of hospital admissions are linked with heart failure incidents. Heart failure is the first cause of admission by healthcare professionals in their clinical practice. The costs are very high, reaching up to 2% of the total health costs in the developed countries. Building an effective disease management strategy requires analysis of large amount of data,

Figure 5: Journal paper accepted in the Computational and Structural Biotechnology Journal.

Table 6: Details of paper “Heart Failure: Diagnosis, Severity Estimation and Prediction of Adverse Events Through Machine Learning Techniques”.

Journal Title	Computational and Structural Biotechnology Journal	Impact Factor	2.06
Targeted audience	Bioinformatics, healthcare professionals		
Paper title	Heart Failure: Diagnosis, Severity Estimation and Prediction of Adverse Events Through Machine Learning Techniques		
Volume	15	Date	2017

Journal paper accepted in the Healthcare Technology Letters Journal

A paper entitled “Predicting adherence profile of patients with heart failure through machine learning techniques” was accepted (Figure 6) in the Healthcare Technology Letters Journal [18], that is a journal bringing together interdisciplinary experts, such as biomedical and electrical engineers, physical and computer scientists and mathematicians to allow for the exchange of the latest ideas and advances in the area of biomedical informatics, biomedical signal processing and bioinstrumentation (sensors, wearable, etc). The aim of this work was to predict the adherence profile of patients with HF, through the application of machine learning techniques and specifically to classify a patient not only as medication adherent or not, but also as adherent or not in terms of medication, nutrition and physical activity (global adherent).

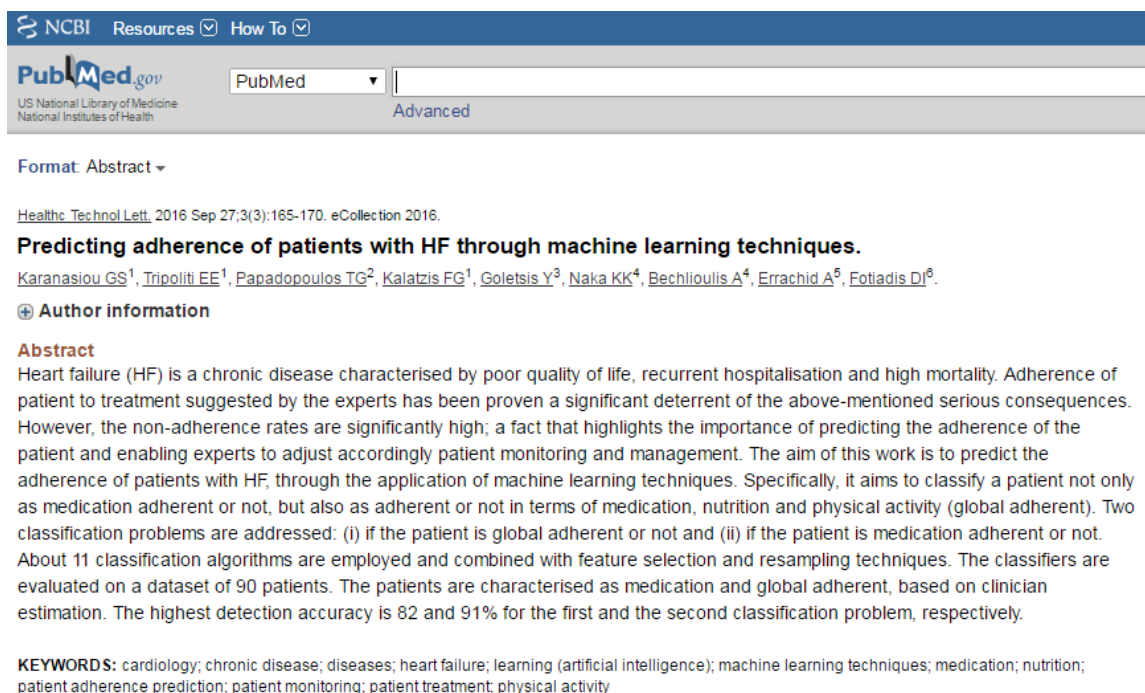


Figure 6: Paper entitled “Predicting adherence profile of patients with heart failure through machine learning techniques”.

Table 7: Details of the paper entitled “Predicting adherence profile of patients with heart failure through machine learning techniques”.

Journal Title	Healthcare Technology Letters Journal	Impact Factor	-
Targeted audience	Bioinformatics, healthcare professionals		
Paper title	Predicting adherence profile of patients with heart failure through machine learning techniques		
Volume	3	Date	2016

Conference paper accepted in the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'16)

This paper presented the HEARTEN Knowledge Management System (KMS) focusing on: (i) the nine (9) modules of the KMS, (ii) a description of the data that will be collected during the retrospective data gathering phase, (iii) the frequency of the measurements, (iv) number of the enrolled patients. More details have already been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Conference paper submitted in the IEEE International Conference on Biomedical and Health Informatics (BHI2016)

The paper entitled “Estimation of New York Heart Association class in Heart Failure Patients Based on Machine Learning Techniques” has been submitted in the IEEE International Conference on Biomedical and Health Informatics (BHI2017) [19] that is a special topic conference of IEEE Engineering in Medicine and Biology Society. It presents present an automated method for the early identification of New York Heart Association (NYHA) class change in patients with HF using classification techniques.

Estimation of New York Heart Association class in Heart Failure Patients Based on Machine Learning Techniques*

Evanthia E. Tripoliti, *Member, IEEE*, Theofilos G. Papadopoulos, Georgia S. Karanasiou, Fanis G. Kalatzis, Aris Bechlioulis, Yorgos Goletsis, *Member, IEEE*, Katerina K. Naka, Dimitrios I. Fotiadis, *Senior Member, IEEE*

Abstract—The aim of this work is to present an automated method for the early identification of New York Heart Association (NYHA) class change in patients with heart failure using classification techniques. The proposed method consists of three main steps: a) data processing, b) feature selection, and c) classification. The estimation of the severity of heart failure in terms of NYHA class is addressed as two, three and, for the first time, as four class classification problem. Eleven classifiers are employed and combined with resampling techniques. The proposed method is evaluated on a dataset of 378 patients, through a 10-fold-cross-validation approach. The highest detection accuracy is 97, 87 and 67% for the two, three and the four class classification problem, respectively.

subtypes of HF can be estimated based on the measurement of the left ventricular ejection fraction (LVEF). The experts classify the severity of HF using either the New York Heart Association (NYHA) or the American College of Cardiology/American Heart Association Guidelines (ACC/AHA) [1] classification systems that provide useful and complementary information. ACC/AHA stages of HF emphasize on the development and progression of HF, whereas NYHA focuses on the exercise capacity of the patient and the symptomatic status of the disease [1, 2].

Although the patho-physiology of HF has been understood in great extent by the medical community, the

Figure 7: Conference paper under review in the IEEE International Conference on Biomedical and Health Informatics (BHI2017).

Table 8: BHI2016 event details.

Conference Title	IEEE International Conference on Biomedical and Health Informatics (BHI2016)
Location	Florida
Date	February 2017
Theme of the Conference	Informatics for smart, precision and preventive medicine
Targeted audience	Researchers, clinicians, and industrial partners from the biomedical, life sciences, medical, and industrial communities

CSIC

Journal paper published in Sensors and Actuators B: Chemical

A paper entitled “Development of a novel capacitance electrochemical biosensor based on silicon nitride for ochratoxin A detection” has been published in “Sensors and Actuators B: Chemicals” Journal [11]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper published in Microchimica Acta

A paper entitled “A flexible electrochemical micro lab-on-chip: application to the detection of interleukin-10” has been published in “Microchimica Acta” Journal [10]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Journal paper accepted in Biosensors and Bioelectronics

A paper entitled “A fully integrated electrochemical biosensor platform fabrication process for cytokines detection” has been published in “Biosensors and Bioelectronics” Journal [8](Figure 8). This paper reports the development of a fully integrated electrochemical biosensor platform for cytokine detection. Using eight gold working microelectrodes (WEs) the design allows a simultaneous detection of varying cytokine biomarkers. Monoclonal antibodies of anti-human IL-1b and anti-human IL-10 were electroaddressed onto the gold WEs through functionalization with 4-carboxymethyl aryl

diazonium (CMA). The biosensor platform was highly sensitive to the corresponding cytokines (IL-10 and IL-1b were detected within the range of 1 pg mL⁻¹ to 15 pg mL⁻¹) and no interference with other cytokines was observed.

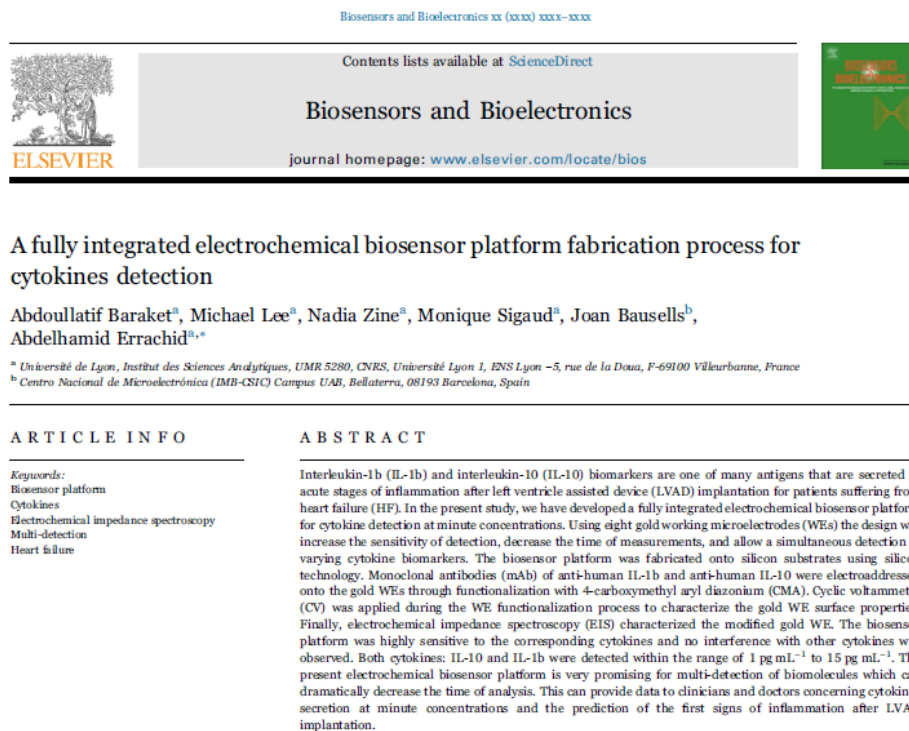
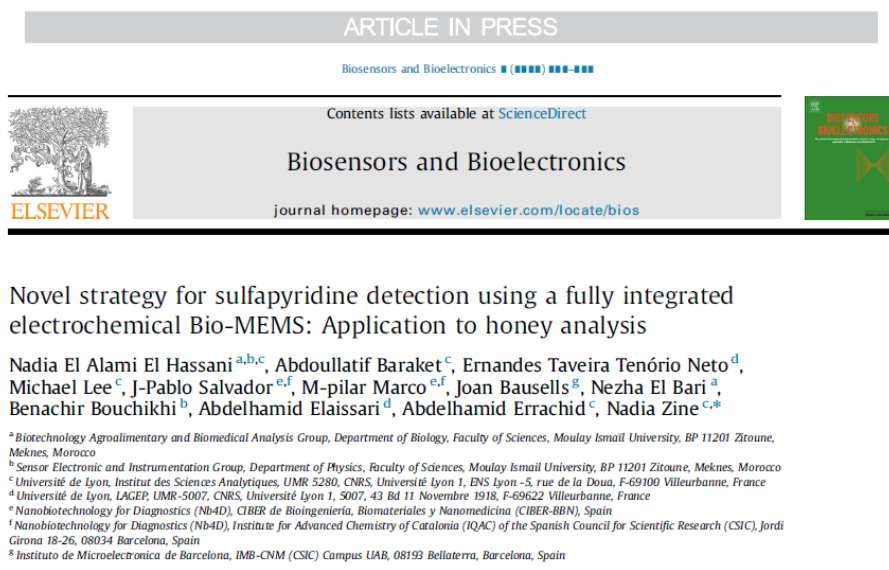


Figure 8: Paper entitled “A fully integrated electrochemical biosensor platform fabrication process for cytokines detection” accepted in “Biosensors and Bioelectronics” Journal (first page).

Journal paper accepted in Biosensors and Bioelectronics

A paper entitled “Novel strategy for sulfapyridine detection using a fully integrated electrochemical Bio-MEMS: application to honey analysis” has been published in “Biosensors and Bioelectronics” Journal [8] (Figure 9). This paper reports the synthesis and characterization of a novel electrochemical biosensor based on gold microelectrodes modified with a new structure of magnetic nanoparticles (MNPs) coated with poly(pyrrole-co-pyrrole-2-carboxylic acid)(Py/Py-COOH) for high efficient detection of Sulfapyridine (Spy). This analyte was quantified through a competitive detection procedure with antigens toward polyclonal antibody (Ab-155). This biosensor was found to be highly sensitive and specific for SPy, with a limit of detection of 0.4 ng L⁻¹.



Novel strategy for sulfapyridine detection using a fully integrated electrochemical Bio-MEMS: Application to honey analysis

Nadia El Alami El Hassani^{a,b,c}, Abdoulatif Baraket^c, Ernandes Taveira Tenório Neto^d, Michael Lee^c, J-Pablo Salvador^{e,f}, M-pilar Marco^{e,f}, Joan Bausells^g, Nezha El Bari^a, Benachir Bouchikhi^b, Abdelhamid Elaissari^d, Abdelhamid Errachid^c, Nadia Zine^{c,*}

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^b Sensor Electronic and Instrumentation Group, Department of Physics, Faculty of Sciences, Moulay Ismail University, BP 11201 Zitoun, Meknes, Morocco

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ABSTRACT

Sulfapyridine (SPy) is a sulfonamide antibiotic largely employed as veterinary drugs for prophylactic and therapeutic purposes. Therefore, its spread in the food products has to be restricted. Herein, we report the synthesis and characterization of a novel electrochemical biosensor based on gold microelectrodes modified with a new structure of magnetic nanoparticles (MNPs) coated with poly(pyrrole-co-pyrrole-2-carboxylic acid) (Py/Py-COOH) for high efficient detection of SPy. This analyte was quantified through a competitive detection procedure with 5-[4-(amino)phenylsulfonamide]-5-oxopentanoic acid-BSA (SA2-BSA) antigens toward polyclonal antibody (Ab-155). Initially, gold working electrodes (WEs) of integrated biomicro electro-mechanical system (BioMEMS) were functionalized by Ppy-COOH/MNPs, using a chronoamperometric (CA) electrodeposition. Afterward, SA2-BSA was covalently bonded to Py/Py-COOH/MNP modified gold WEs through amide bonding. The competitive detection of the analyte was made by a mixture of a fixed concentration of Ab-155 and decreasing concentrations of SPy from 50 $\mu\text{g L}^{-1}$ to 2 ng L^{-1} . Atomic Force Microscopy characterization was performed in order to ensure Ppy-COOH/MNPs electrodeposition on the microelectrode surfaces. Electrochemical measurements of SPy detection were carried out using electrochemical impedance spectroscopy (EIS). This biosensor was found to be highly sensitive and specific for SPy, with a limit of detection of 0.4 ng L^{-1} . This technique was exploited to detect SPy in honey samples by using the standard addition method. The measurements were highly reproducible for detection and interferences namely, sulfadiazine (SDz), sulfathiazole (STz) and sulfamerazine (SMz). Taking these advantages of sensitivity, specificity, and low cost, our system provides a new horizon for development of advanced immunoassays in industrial food control.

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Figure 9: Paper entitled “Novel strategy for sulfapyridine detection using a fully integrated electrochemical biosensor Bio-MEMS: application to honey analysis” accepted in “Biosensors and Bioelectronics” Journal (first page).

Journal paper accepted in Electroanalysis

A paper entitled “Electrochemical capacitive K^+ EMIS chemical sensor based on the dibromoaza[7]helicene as an ionophore for potassium ions detection” has been published in “Electroanalysis” Journal [12]. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

UMOR

Paper accepted in “Scientific Reports” Journal

In pre-pilot studies we found that the variations of concentrations for the selected biomarkers were much higher in HF patients. To identify the reasons for that behaviour we initiated further basic in depth studies in volunteers. We measured breath VOC profiles under changed hemodynamic and ventilatory conditions to mimic conditions (shortness of breath, changes in stroke volume/ cardiac output) regularly occurring in HF patients. We demonstrated that both – hemodynamic as well as ventilatory changes immediately affect certain breath biomarkers concentrations (e.g. isoprene). Based on these findings the setup for the study of breath biomarkers in HF patients was modified. More details have been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

UNIFI

Conference paper accepted in the XXVI Congresso della Divisione di Chimica Analitica della Società Chimica Italiana

A paper entitled “Determination of biomarkers in oral fluid for monitoring heart failure patients” was accepted in the XXVI Congress of the National Analytical Chemistry Division of the Italian Chemical Society (Analitica 2016) (Figure 10), where the major research activities in the field of the analytical chemistry covering a broad spectrum of advancements in analytical technologies as well as their applications in various and challenging fields were presented and discussed.

Analytical methods

13/24

Analyte	Analytical method	Sample amount	Investigated concentration range (R ²)	Dilution or concentration factor	LOQ
TNF- α	ELISA	200 μ L	1 – 1000 pg/mL (0.9989)	-	1.6 \pm 0.5 pg/mL
IL-10	ELISA	200 μ L	1 – 500 pg/mL (0.9988)	-	3.4 \pm 0.5 pg/mL
sAA	UV-vis	10 μ L	35 – 5000 U/mL (1)	2000	0.035 \pm 0.010 U/mL
Uric acid	HPLC-UV	20 μ L	1 – 1000 μ g/mL (0.9997)	50	0.010 \pm 0.001 μ g/mL
Lactate	HPLC-FLD	20 μ L	5 – 500 μ g/mL (0.9987)	500	5 \pm 1 μ g/mL
Aldosterone	UHPLC-ESI-QQQ	300 μ L	0.003 – 20 ng/mL (0.9986)	10	0.003 \pm 0.001 ng/mL
Cortisol			0.003 – 100 ng/mL (0.9998)	10	0.003 \pm 0.001 ng/mL
8-isoPGF _{2α}			0.003 – 20 ng/mL (0.9985)	10	0.003 \pm 0.001 ng/mL

Figure 10: Slides of the oral presentation in Analitica 2016.

Table 9: Details of Analitica 2016 congress event.

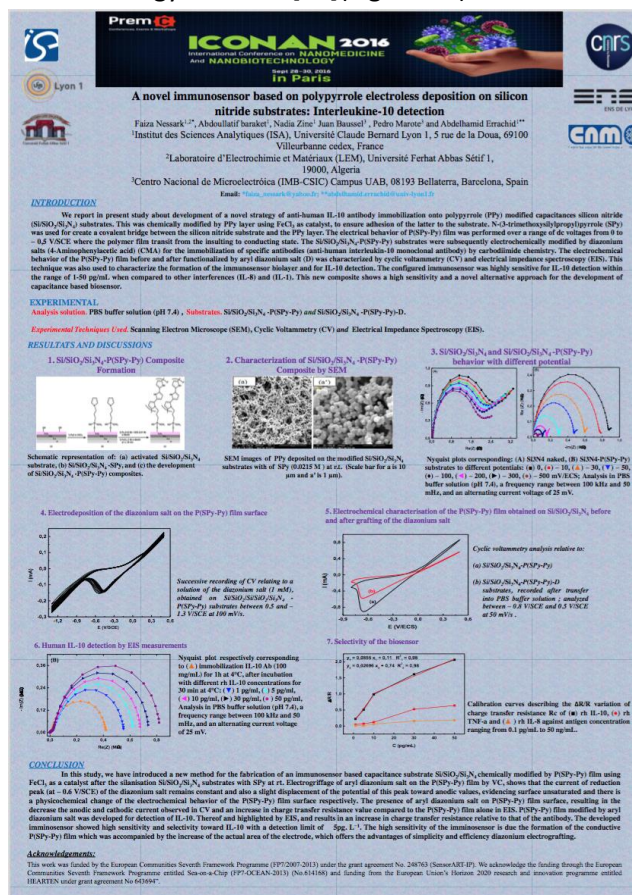
Conference Title	XXVI Congresso della Divisione di Chimica Analitica della Società Chimica Italiana
Location	Giardini Naxos, Messina (Italy)
Date	18 th – 22 nd September 2016
Theme of the Conference	Analytical chemistry
Targeted audience	Experts in analytical chemistry

2.2.2 Poster presentations

UCBL

Poster presented in the International Conference On Nanomedicine And Nanobiotechnology ICONAN event

HEARTEN presented a poster entitled “A novel immunosensor based on polypyrrole electroless deposition on silicon nitride substrates: Interleukine-10 detection” in the International Conference On Nanomedicine And Nanobiotechnology ICONAN [20](Figure 11).



Poster presented in the Biosensors 2016 event

HEARTEN presented a poster entitled “A novel immunosensor based on polypyrrole electroless deposition on silicon nitride substrates: Interleukine-10 detection” in the Biosensors 2016 event [21].

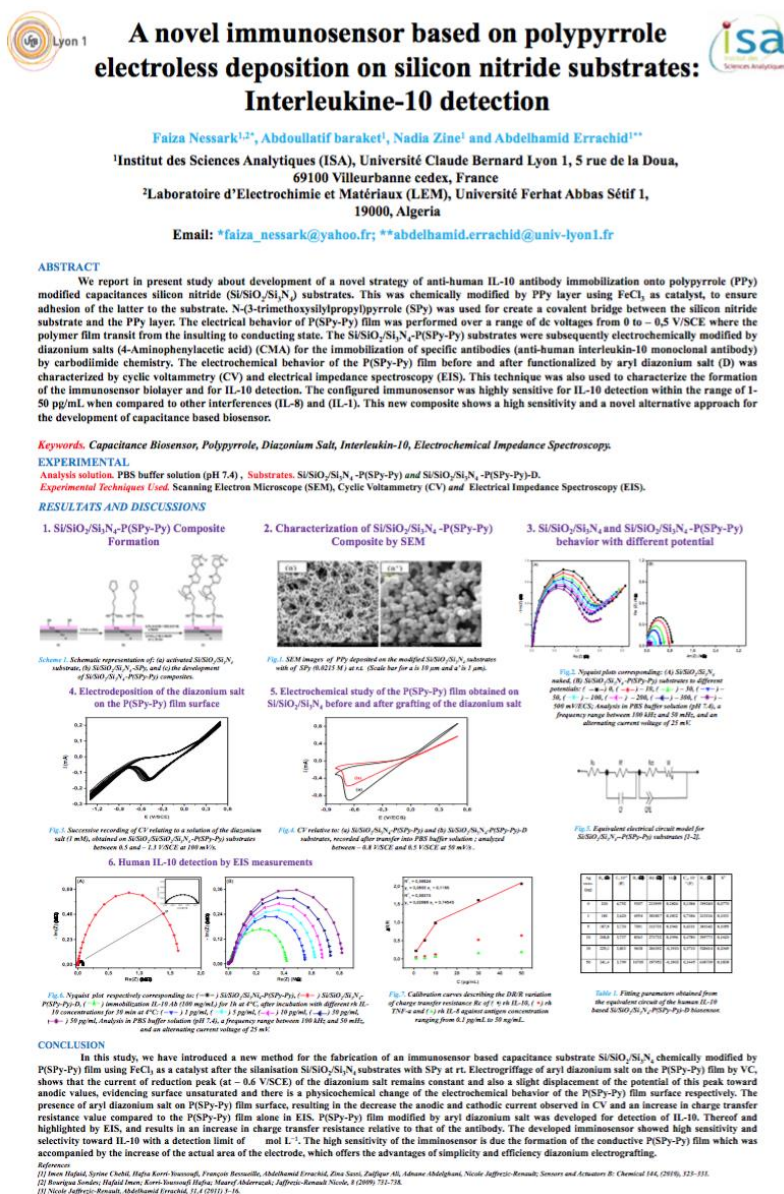


Figure 12: Poster entitled “A novel immunosensor based on polypyrrole electroless deposition on silicon nitride substrates: Interleukine-10 detection”.

Table 11: Details of the poster entitled “A novel immunosensor based on polypyrrole electroless deposition on silicon nitride substrates: Interleukine-10 detection”.

Conference Title	Biosensors 2016
Location	Gothenburg, Sweden
Date	May, 2016
Theme of the Conference	A novel immunosensor based on polypyrrole electroless deposition on silicon nitride substrates: Interleukine-10 detection
Targeted audience	Biosensor researchers and developers

EVERIS

Poster presented in I Congress on Coordination and Management of EU-funded Health Research Projects

HEARTEN presented a poster in the I Congress on Coordination and Management of EU-funded Health Research Projects concerning the project objectives and key elements.



Figure 13: Poster presented in the I Congress on Coordination and Management of EU-funded Health Research Projects.

Table 12: Details of the poster presented in the Congress on Coordination and Management of EU-funded Health Research Projects.

Event	I Congress on Coordination and Management of EU-funded Health Research Projects
Location	Valencia, Spain
Date	8 November, 2016
Organization	European Health Projects Office- Valencia Region (www.opesval.eu)
Targeted audience	Researchers, R&D managers, Companies, European Commission Representatives

Presentation of abstract for poster submission in the Informatics for Health Congress 2017

EVERIS collaborated with SAS in the writing on an abstract concerning the integration between the SAS EHR and HEARTEN in order to prepare, if accepted, the presentation of a poster for the Informatics for Health Congress, in Manchester, that will take place on 24 – 26 April 2017. The abstract was presented during November 2016 and we are waiting for its acceptance.

Integrating a mHealth application into the EHR Ecosystem of Andalusian Health Public System

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Introduction. HEARTEN project aims to develop and validate a collaborative mHealth application that engages all actors related to the management of Heart Failure disease, enables the patients to achieve sustainable behavior change regarding their adherence, and improve patients' quality of life. As part of this project, a specific task covers the integration of this mHealth application with the Electronic Health Record Ecosystem (named Diraya) of Andalusian Health Public System (AHPS).

Figure 14: Abstract for poster submission in the Informatics for Health Congress 2017.

FORTH

Poster presented in the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'16)

HEARTEN presented a poster in EMBC 2016 focusing on the KMS and the main modules that KMS design was based on. Researchers in the area of data mining and application of artificial intelligence showed high interest on how each of these modules will be developed and implemented.

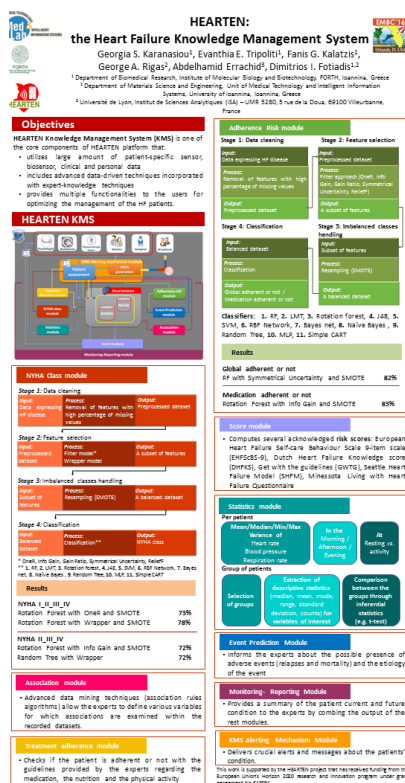


Figure 15: Poster presented in the 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'16).

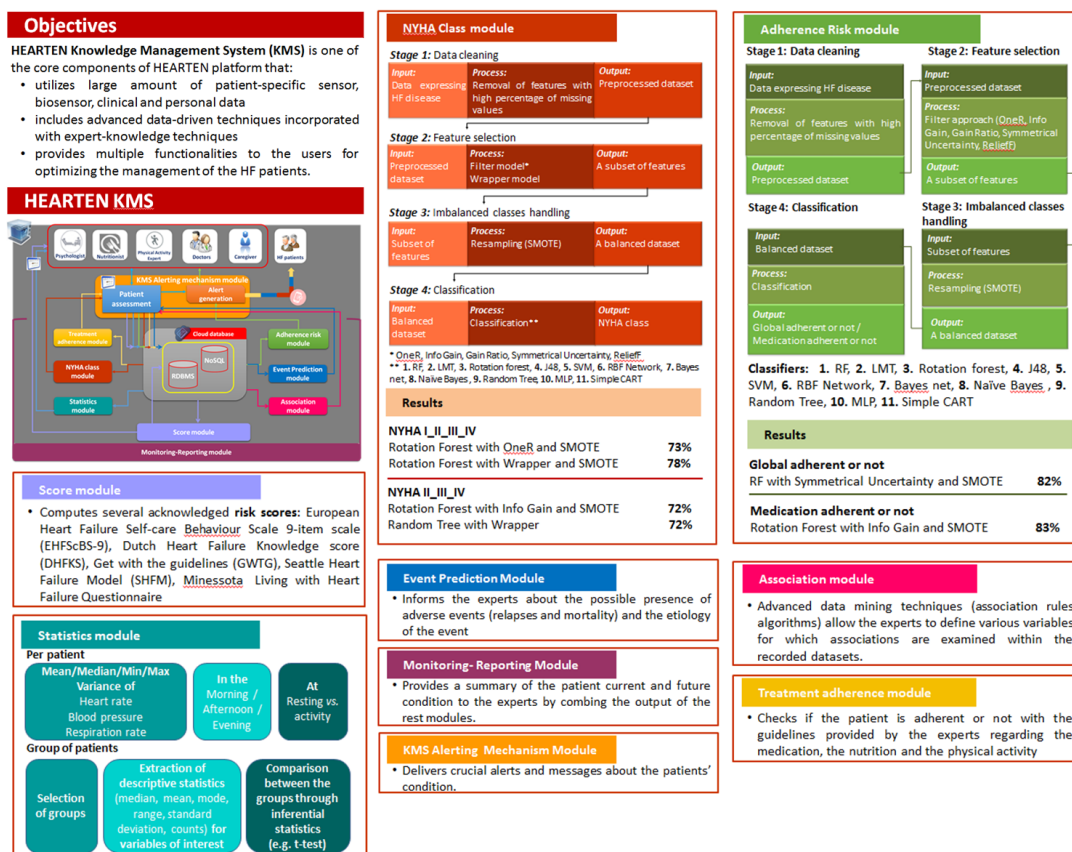


Figure 16: Overview of the content included in the EMBC2016 poster.

Poster presented in the Nanotechnology 2016

HEARTEN presented a poster in International Conference @ exhibition on nanotechnologies 2016 [22] that is an event for experts in the field of biosensors, wearable devices and bioinformatics. The overall vision of HEARTEN project was presented with special emphasis on the development of biosensor technology and materials innovation.

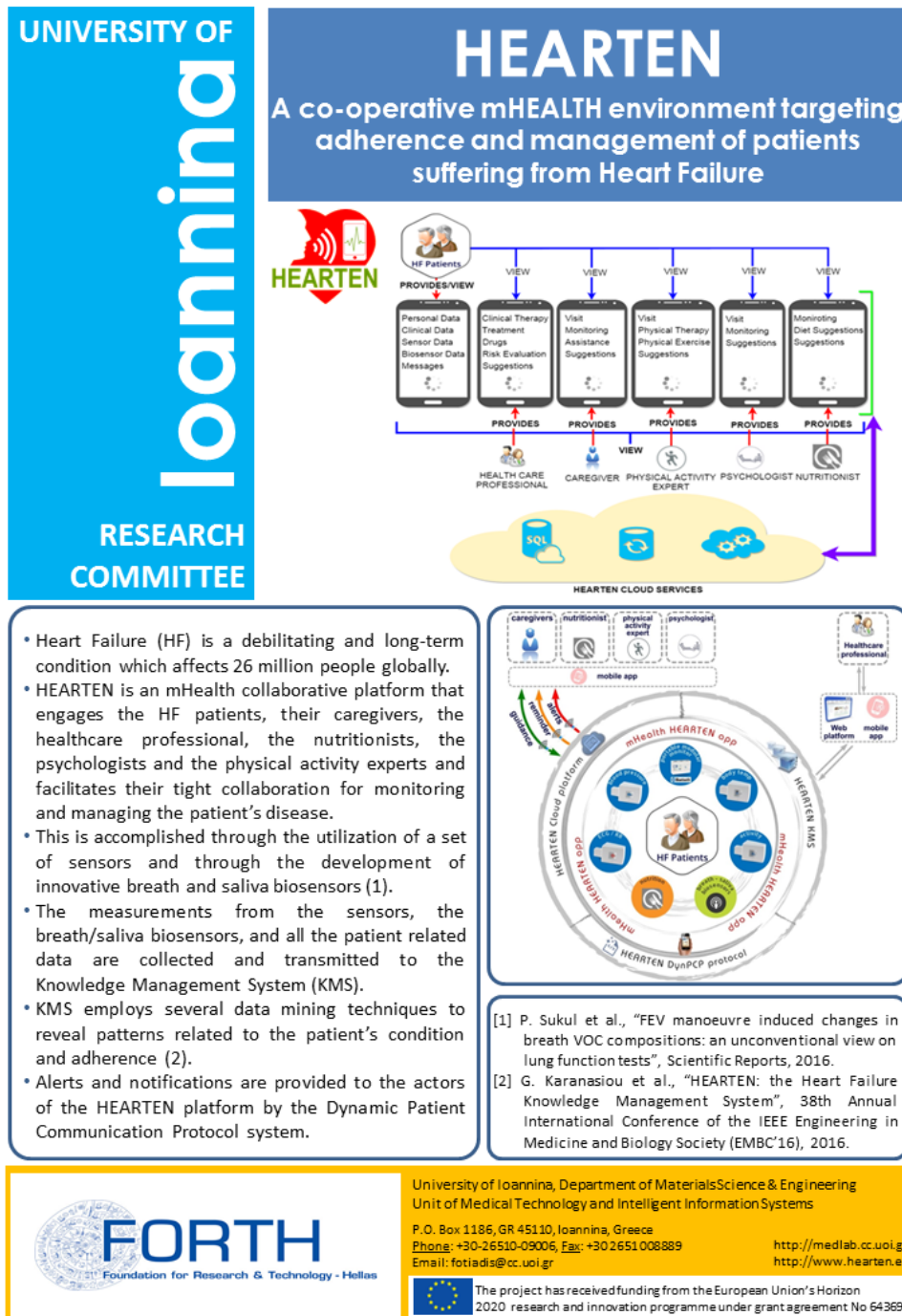


Figure 17: Poster presented in the Nanotechnology 2016.

Table 13: Details of the Nanotechnology 2016 event.

Event	Nanotechnology 2016
Location	Thessaloniki, Greece
Date	4-9 July, 2016
Targeted audience	Material, biosensor, wearable devices and bioinformatics experts

CSIC

Poster presented in Micro and Nano Engineering 2016

HEARTEN presented a poster at the 42nd International Conference on Micro and Nano Engineering [23]. It is the premium European conference on micro and nanofabrication and its applications. The work presented discussed the structure and fabrication technology of the HEARTEN breath biosensor devices.

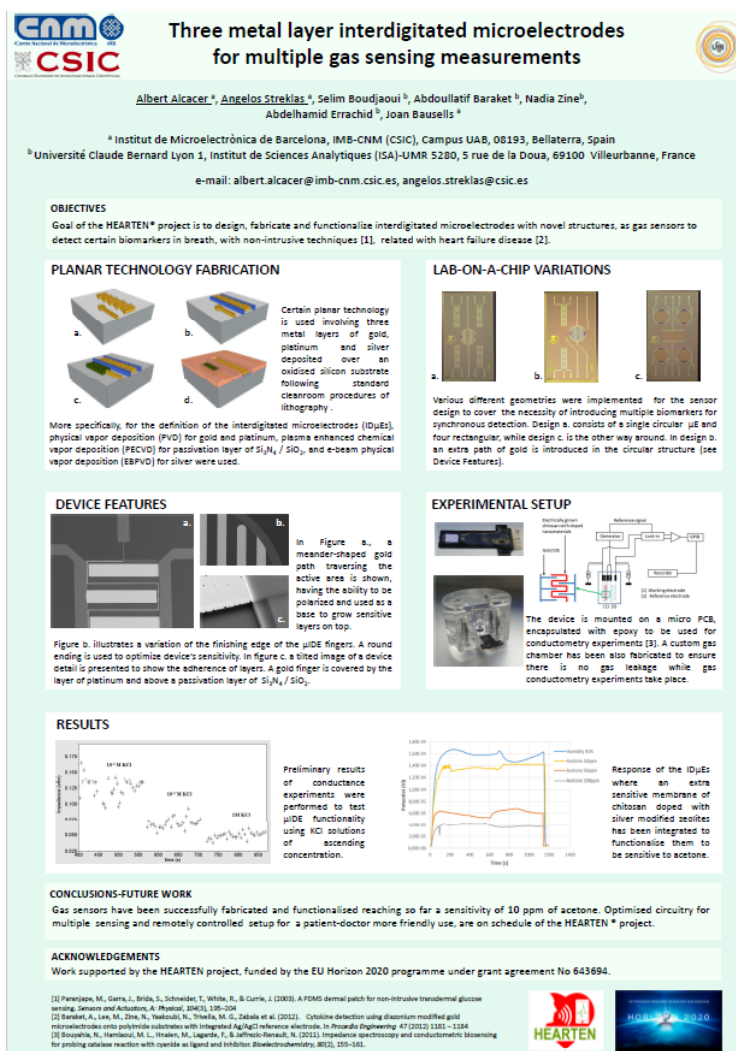


Figure 18: Poster presented in Micro and Nano Engineering 2016.

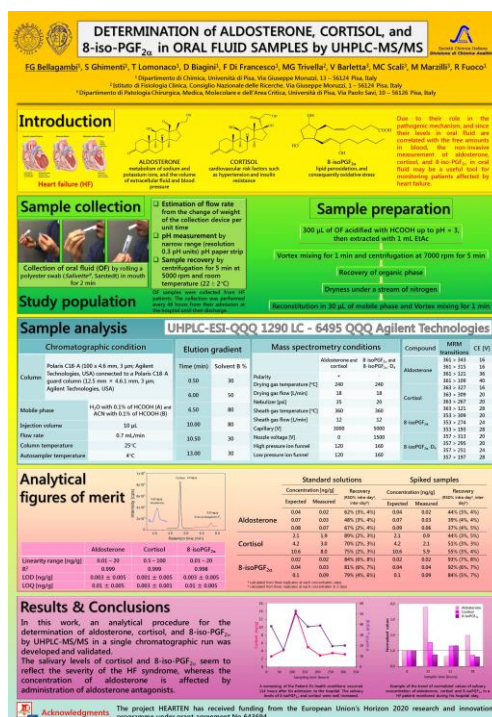
Table 14: Details of the poster presented in Micro and Nano Engineering 2016.

Event	Micro and NanoEngineering 2016
Location	Vienna, Austria
Date	19-23 September, 2016
Targeted audience	Engineers and scientists expert in the fabrication and application of micro- and nanostructures and devices. This includes applications in life sciences and medicine.

UNIFI

Poster presented in the XXVI Congresso della Divisione di Chimica Analitica della Società Chimica Italiana (Analitica 2016)

HEARTEN participated in the XXVI Congresso della Divisione di Chimica Analitica della Società Chimica Italiana (Analitica 2016) and presented two posters: “Determination of aldosterone, cortisol, and 8-iso-PGF_{2α} in oral fluid samples by UHPLC-MS/MS” and “Needle Trap Micro-Extraction: an innovative approach for the one step sampling and pre-concentration of volatile organic compounds in exhaled breath” in front of the participants and invited speakers. XXVI Congresso della Divisione di Chimica Analitica della Società Chimica Italiana is an Italian conference on analytical chemistry annually organized by the Italian Chemical Society in collaboration with the national academic institutions. The aim of the scientific event is to present and discuss the major research activities in the field of the analytical chemistry covering a broad spectrum of advancements in analytical technologies as well as their applications in various and challenging fields. The event took place in Giardini Naxos, Messina (Italy).


Figure 19: Poster I presented in the Analitica 2016.

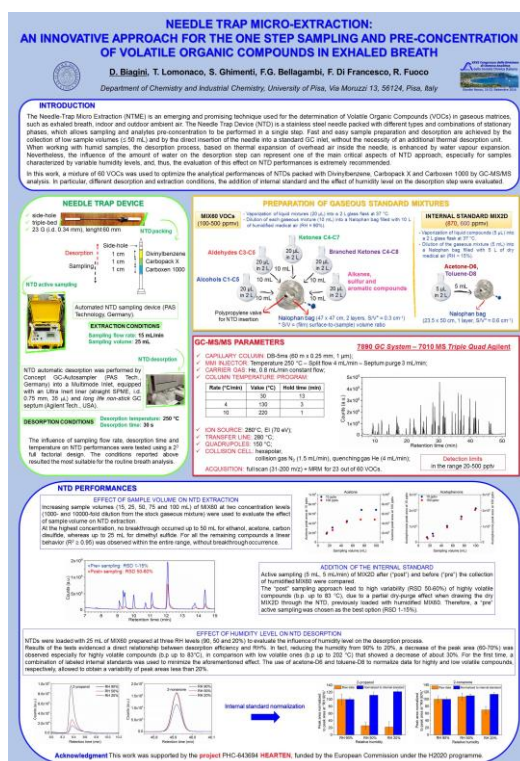


Figure 20: Poster II presented in the Analytica 2016.

Table 15: Analytica 2016 event details.

Event	XXVI Congresso della Divisione di Chimica Analitica della Società Chimica Italiana
Location	Giardini Naxos, Messina (Italy)
Date	18 – 22 September 2016
Organization	University of Messina and Italian Chemical Society
Targeted audience	Experts in analytical chemistry

SAS

Poster presented in the 15th European Congress of Internal Medicine (ECIM)

SAS participated in the 15th European Congress of Internal Medicine (ECIM) in September 2016, and presented a poster related to the prospective data gathering that is been performed in the context of HEARTEN project. The ECIM conference is organized by the European Federation of Internal Medicine, and this edition took place in Amsterdam.

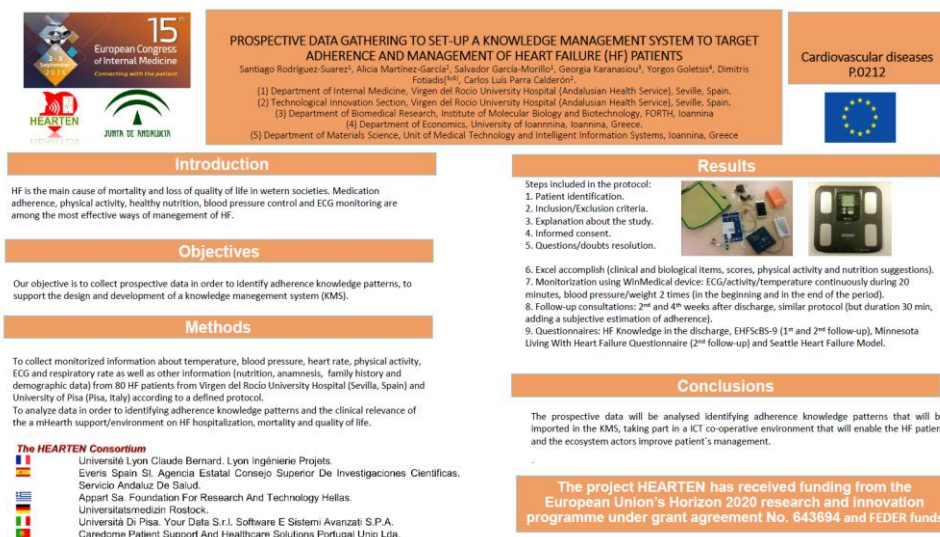


Figure 21: Poster presented in the 15th European Congress of Internal Medicine.

Table 16: ECIM conference details.

Event	15th European Congress of Internal Medicine (ECIM)
Location	Amsterdam
Date	2-3 September 2016
Organization	European Federation of Internal Medicine
Targeted audience	Internal Medicine professionals

YOURDATA

Poster presentation in Sinnova 2016

In this event, HEARTEN distributed the project's poster (**Error! Reference source not found.**), and came into contact with several entrepreneurs and foreign investors disseminating HEARTEN solution, findings and progress. Also, general public in Sardinia had the opportunity to hear for the first time HEARTEN potential.

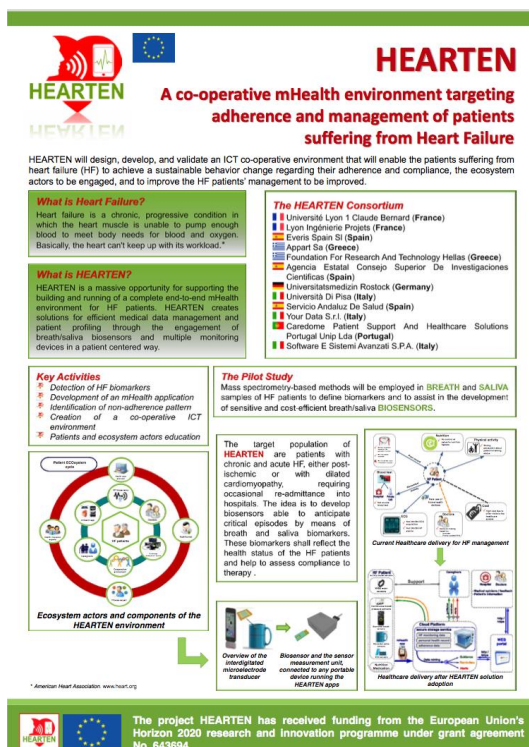


Figure 22: Poster presentation in Sinnova 2016.

Table 17: SINNOVA event details.

Event	SINNOVA 2016
Location	Cagliari (ITALY)
Date	6-7 October 2016
Organization	Autonomous region of Sardinia
Targeted audience	Researchers, entrepreneurs, general public

2.2.3 Project presentations

UCBL

The results related to HEARTEN scientific domain were presented into worldwide conferences as oral presentation and posters. In these events the new solution to a very relevant audience (Health specialized scientific, biosensor researchers and developers) was demonstrated ensuring the future success of the platform for breath and saliva analysis focused on HF application.



Figure 23: Presentation in the International conference EuroSensors XXX.

Table 18: Details of the International conference EuroSensors XXX event.

Conference Title	International conference EuroSensors XXX
Location	Budapest, Hungary
Date	September, 2016
Theme of the Conference	Highly Sensitive Electrochemical biosensor platform for TNF- α Detection in Human Saliva: Heart Failure
Targeted audience	Biosensor researchers and developers

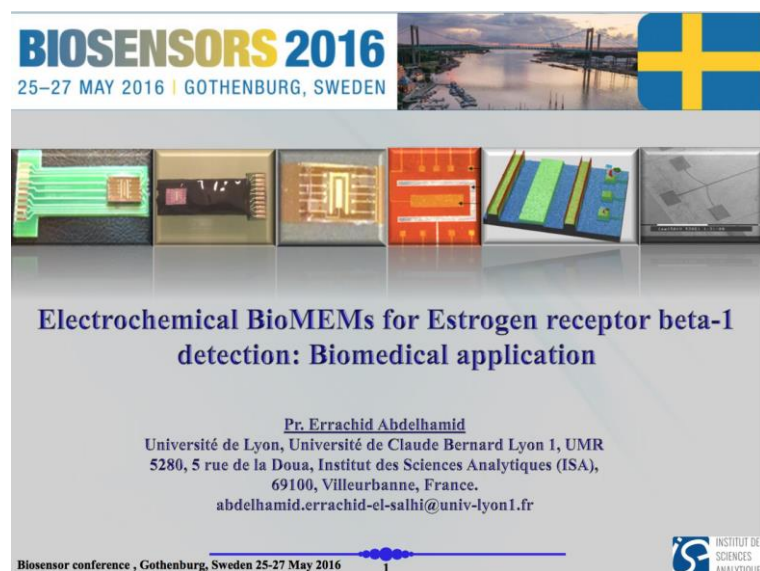


Figure 24: Presentation in the Biosensors 2016.

Table 19: Details of the Biosensors 2016 event.

Conference Title	Biosensors 2016
Location	Göteborg, Sweden
Date	May, 2016
Theme of the	Electrochemical BioMEMS for Estrogen receptor beta-1 detection: Biomedical

Conference	application
Targeted audience	Biosensor researchers and developers

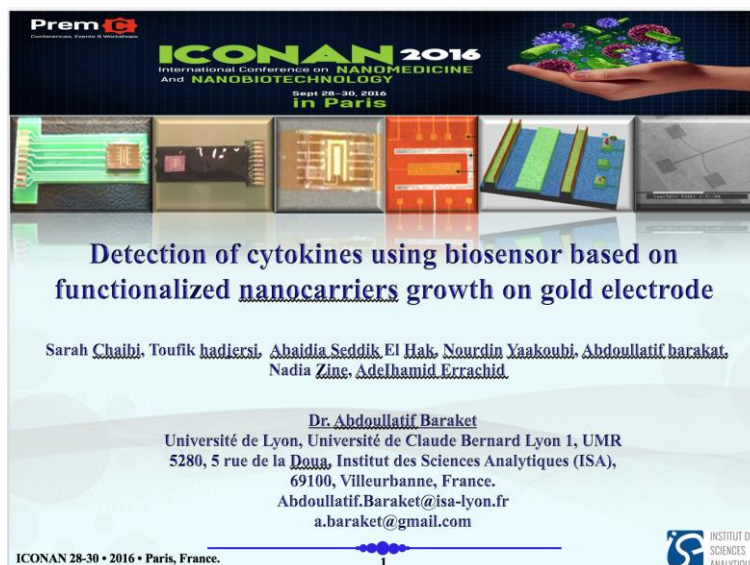


Figure 25: Presentation in the International Conference On Nanomedicine And Nanobiotechnology ICONAN.

Table 20: Details of the International Conference On Nanomedicine And Nanobiotechnology ICONAN event.

Conference Title	International Conference On Nanomedicine And Nanobiotechnology ICONAN
Location	Paris, France
Date	September, 2016
Theme of the Conference	Detection of cytokines using biosensor based on functionalized nanocarriers growth on gold electrode
Targeted audience	Health specialized scientific, Biosensor researchers and developers

EVERIS

HEARTEN presentation in the ehCOS Week

EVERIS celebrated the ehCOS Week in Valencia from September 26th to 30th 2016. In this event promoted by the ehCOS department of everis, which deals with a suite of products oriented to the Healthcare sector, different Directors, Managers and Clinicians of the ehCOS department that are doing commercial exploitation in Europe, USA and Latam attended the meeting where different presentations concerning ehCOS products were done. We took the opportunity in this internal event to present the different Research & Development projects we are dealing, including the HEARTEN Project.

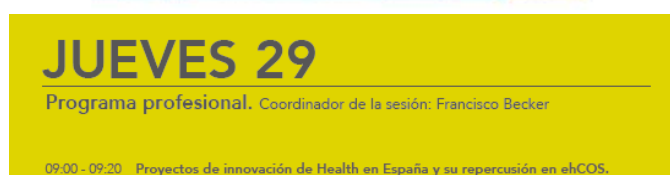


Figure 26: Excerpt of the programme of the ehCOS Week where R&D projects including HEARTEN were presented.

AppArt

HEARTEN presentation in the 9th International Scientific Conference for The Energy and Climate Change

AppArt participated in the 9th International Scientific Conference for The Energy and Climate Change [24], organized by the National and Kapodistrian University of Athens, The Conference took place on the 12th of October in Athens. In the Conference framework, AppArt participated in the section related to machine-to-machine implementations discussing the innovative HEARTEN project.

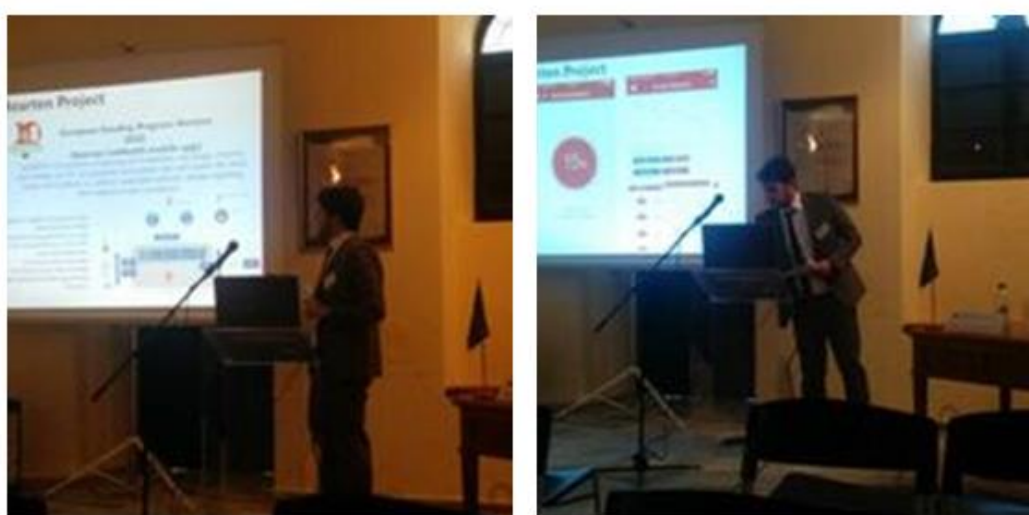


Figure 27: HEARTEN presentation in the 9th International Scientific Conference for The Energy and Climate Change.

Table 21: 9th International Scientific Conference for The Energy and Climate Change event details.

Event	9 th International Scientific Conference for The Energy and Climate Change
Location	Athens
Date	October 2016
Targeted audience	Researchers from Scientific and Academic backgrounds

FORTH

HEARTEN presentation in Fabulous Conference

FORTH participated in the 2nd EAI International Conference on Future Access Enablers of Ubiquitous and Intelligent Infrastructures (Fabulous 2016) [25] that was held in Belgrade, Serbia in October 24–25, 2016. The objective of Fabulous Conference is to gather prominent researchers from research institutions, universities and industry, as well as innovators and entrepreneurs in the broad areas of healthcare delivery, future wireless networks, assisted living and smart infrastructures towards their interaction and exchange of ideas, expertise, experience and know-how and for further discussing the latest outcomes and achievements. FORTH presented HEARTEN concept and progress in the KMS development and trigger important discussions related to patient empowerment and monitoring.

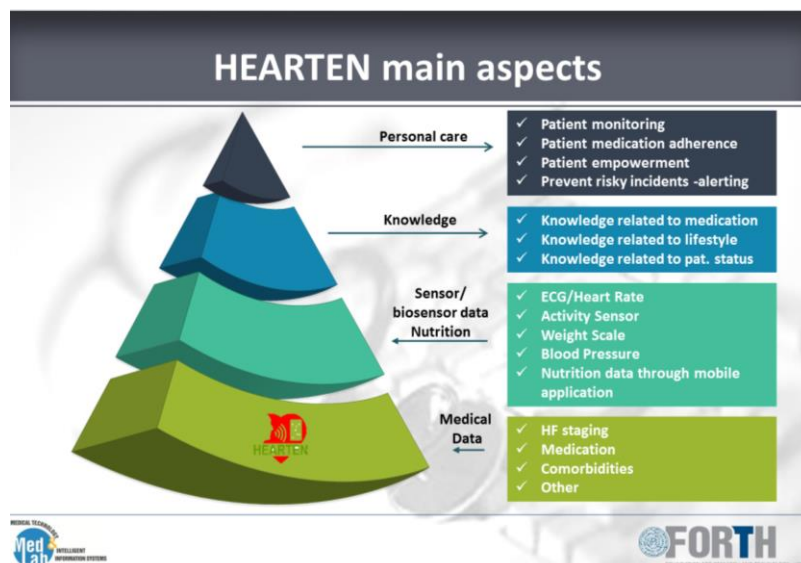


Figure 28: HEARTEN presentation in Fabulous Conference (slide 10).



Figure 29: Photo taken during the Fabulous presentation.

Table 22: Fabulous conference details.

Event	Fabulous Conference
Location	Belgrade
Date	October 2016
Targeted audience	Researchers from research institutions, universities and industry, as well as innovators and entrepreneurs

HEARTEN presentation in XIV Mediterranean Conference on Medical and Biological Engineering and Computing (MEDICON 2016)

HEARTEN participated in Medicon Conference and presented the paper entitled “The evolution of mHealth interventions in Heart Failure: A Review and Framework for Development”. More details have already been presented in “D2.3 - HEARTEN Presentations and Promotional Material2”.

Table 23: Medicon conference details.

Event	Medicon Conference
Location	Paphos, Cyprus
Date	May-April 2016
Targeted audience	Medical and Biological Engineering and Computing experts

CSIC

Conference paper (invited) presented in the Annual Conference of the Spanish Society of Cardiology (SEC 2016)

This presentation aimed to introduce the HEARTEN project to an audience of cardiologists. The specific session in which the paper was presented was entitled “Digital technology, biosensors and telemonitoring in heart failure”. The overall approach of the project was discussed, with emphasis (at the request of the organizers) in presenting the biosensors for the detection of HF biomarkers in breath and saliva.

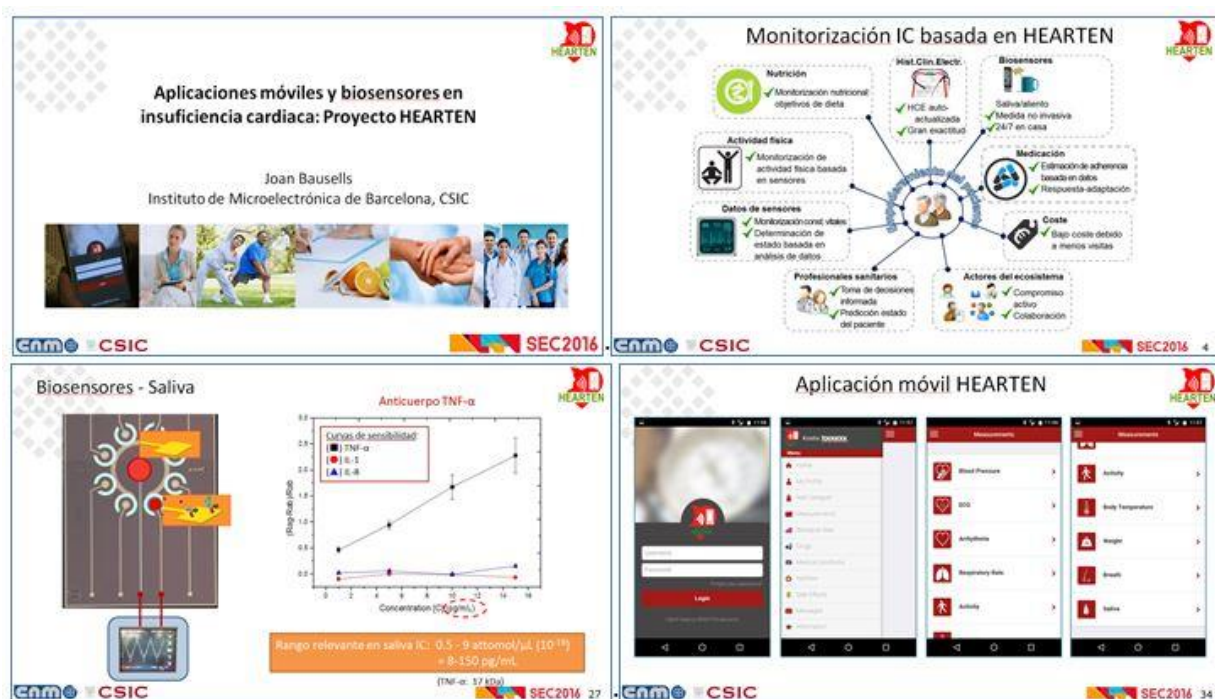


Figure 30: Slides of the HEARTEN presentation in SEC 2016.

Table 24: Details of SEC 2016 Conference event.

Conference Title	Annual Conference of the Spanish Society of Cardiology (SEC 2016)
Location	Zaragoza, Spain
Date	October 2016
Theme of the Conference	Cardiovascular diseases
Targeted audience	Cardiologists

UNIPI

HEARTEN presentation in the 6th EAI International Conference on Wireless Mobile Communication and Healthcare -EU e-Health projects'

Hearten was invited to participate to the 6th EAI International Conference on Wireless Mobile Communication and Healthcare -EU e-Health projects' dedicated Round Table which was held in Milan (Italy) on November, 17th 2016, where an extended review of the EU projects on e-Health was presented by several clinicians and cardiologists. The emerging potential of these resources was also provided. The following projects were presented: PEGASO -Fit for Future- (Andreoni), HEARTEN (Trivella), PAEON (Tronci), NEPHRON+ and SMARTER-SI (Lanting), PALANTE (Bertelé), JASeHN (Weber). Interaction among the various projects were stimulated in respect to (i) Motivational aspects and effectiveness in e-Health initiatives, (ii) Ethical, privacy and security issues faced in the projects, (iii) Technological prospects and Exploitation in e-Health projects.

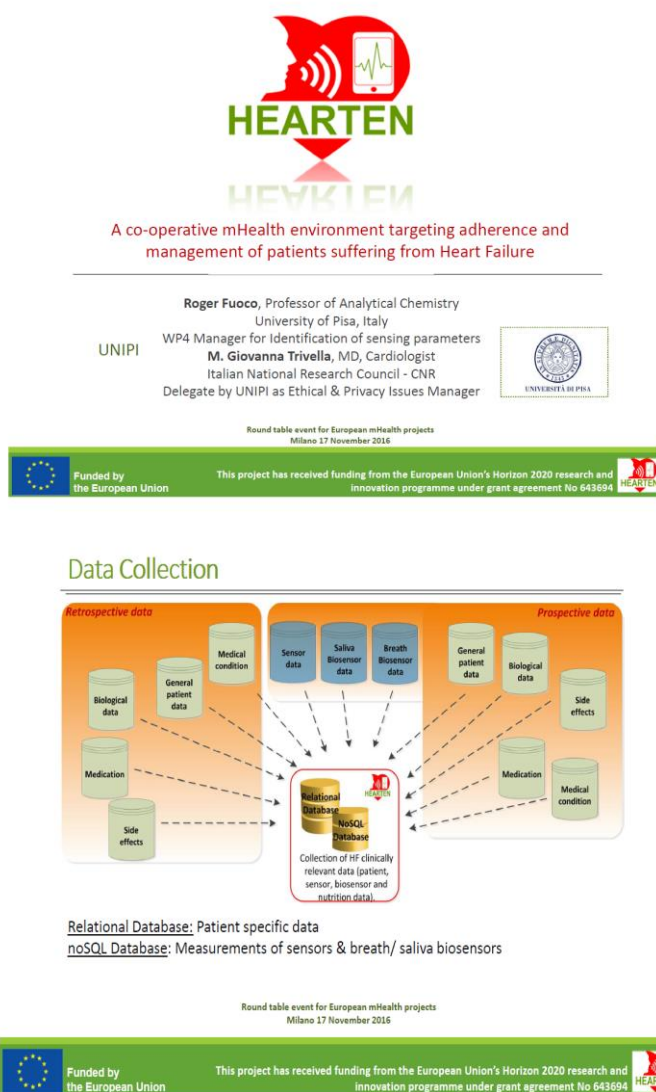


Figure 31: HEARTEN presentation in the 6th EAI International Conference on Wireless Mobile Communication and Healthcare -EU e-Health projects.

Table 25: 6th EAI International Conference on Wireless Mobile Communication and Healthcare -EU e-Health projects details.

Event	6th EAI International Conference on Wireless Mobile Communication and Healthcare -EU e-Health projects
Location	Milan, Italy
Date	17 th November 2016
Targeted audience	Expert participant in EU projects on e-Health

YOURDATA

Project presentation in SINNOVA 2016 event

In this event, YOURDATA presented HEARTEN project to investors and entrepreneurship coming from all over the world (Figure 32). Also, the project has been described to general public in Sardinia and scientific researchers.



Figure 32: Project presentation in SINNOVA 2016 event.

BIOAXIS-CAREDOME

BIOAXIS-CAREDOME presented HEARTEN and its progress to Pharmaceutical Executives in 17 international pharmaceutical companies operating in Greece and Cyprus. The aim of the meetings was to introduce HEARTEN as a potential service which could be provided from pharmaceutical companies in companion to their HF medication. Furthermore, BIOAXIS-CAREDOME has presented HEARTEN to 49 cardiologists in Portugal and Greece in order to present the potential value of patient management through the HEARTEN platform.

UMOR

UMOR presented results from the HEARTEN investigations as part of presentations on international meetings to transport and disseminate new knowledge into the broad international research community.

Table 26: Details of the UMOR presentations in various events .

Event	The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy
Location	Atlanta (US)
Date	2016, March 6-9th
Title/ Presider	Real-Time PTR-TOF-MS Measurements Reveal Effects of Respiratory Maneuvers onto Exhaled Breath Biomarker Profiles / P Sukul, J K Schubert, W Miekisch
Targeted audience	International; (Bio)analytical experts, researchers from research institutions, universities and industry, as well as innovators and entrepreneurs
Event	Metabolomics and Volatilomics Symposium
Location	Pune (India)

Date	2016, May 14-16th
Title/ Presider	Keynote lecture: Breath analysis: A promise to non-invasive diagnosis / P Sukul, J K Schubert, W Miekisch
Targeted audience	International; Biomedical Experts, researchers from research institutions, universities and industry
Event	2nd European Indian (New Indigo-HCV) Meeting
Location	Rostock (Germany)
Date	2016, June 13-15th
Title/ Presider	Physiological influences on real-time breath biomarker profiles / P Sukul, J K Schubert, W Miekisch
Targeted audience	International; Medical & Biomedical Experts, researchers from universities and industry
Event	Breath Summit - International Association of Breath Research (IABR)
Location	Zurich (CH)
Date	2016, September 13-16th
Title/ Presider	Keynote lecture: On the way to new horizons - breath VOCs for personal monitoring / W Miekisch
Targeted audience	International; Experts of breath research, researchers from universities and industry

2.2.4 Leaflets

EVERIS

EVERIS along with SAS and CSIS worked on the Spanish version of the HEARTEN leaflet. EVERIS also was invited to participate in different disseminations events where we took the opportunity to distribute the HEARTEN flyer. The events where EVERIS attended are as follows:

HIMSS Europe World of Health IT (WoHIT) Conference & Exhibition

EVERIS was invited to this event and took this opportunity to distribute among researchers, health professionals and health organizations managers, information concerning the HEARTEN project by providing the latest version of the flyer (Figure 33).



Figure 33: HEARTEN flyer distribution in WoHIT Conference & Exhibition.

Table 27: HIMSS Europe World of Health IT (WoHIT) Conference & Exhibition.

Event	HIMSS Europe World of Health IT (WoHIT) Conference & Exhibition
Location	Barcelona, Spain
Date	21–22 November 2016
Targeted audience	Healthcare stakeholders

European Summit on Digital Innovation for Active and Healthy Ageing

EVERIS, as coordinator of one of the objectives within C2 Action Group of EIPAHA, has been invited to attend the European Summit on Digital Innovation for Active and Healthy Ageing that will take place in Brussels from December 6th - 8th 2016 [26]. EVERIS is taking this chance of having access to healthcare researchers and stakeholders to distribute the HEARTEN flyer during this event.

Table 28: European Summit on Digital Innovation for Active and Healthy Ageing

Event	European Summit on Digital Innovation for Active and Healthy Ageing
Location	Brussels, Belgium
Date	6–8 November 2016
Targeted audience	Healthcare stakeholders

FORTH

HEARTEN participation in Cardiovascular Training Conference for HF

HEARTEN distributed the project's flyer and presented HEARTEN project main objectives in the Cardiovascular Training Conference for HF that took place in Ioannina [27], 3 December 2016. Specifically, several cardiologists and clinical experts of HF who participated in this event had the opportunity to be informed about HEARTEN collaborative platform and share their opinion about the added value of the tight communication between the HF patients and their doctors, as well as provide feedback and suggestions for further system improvement.

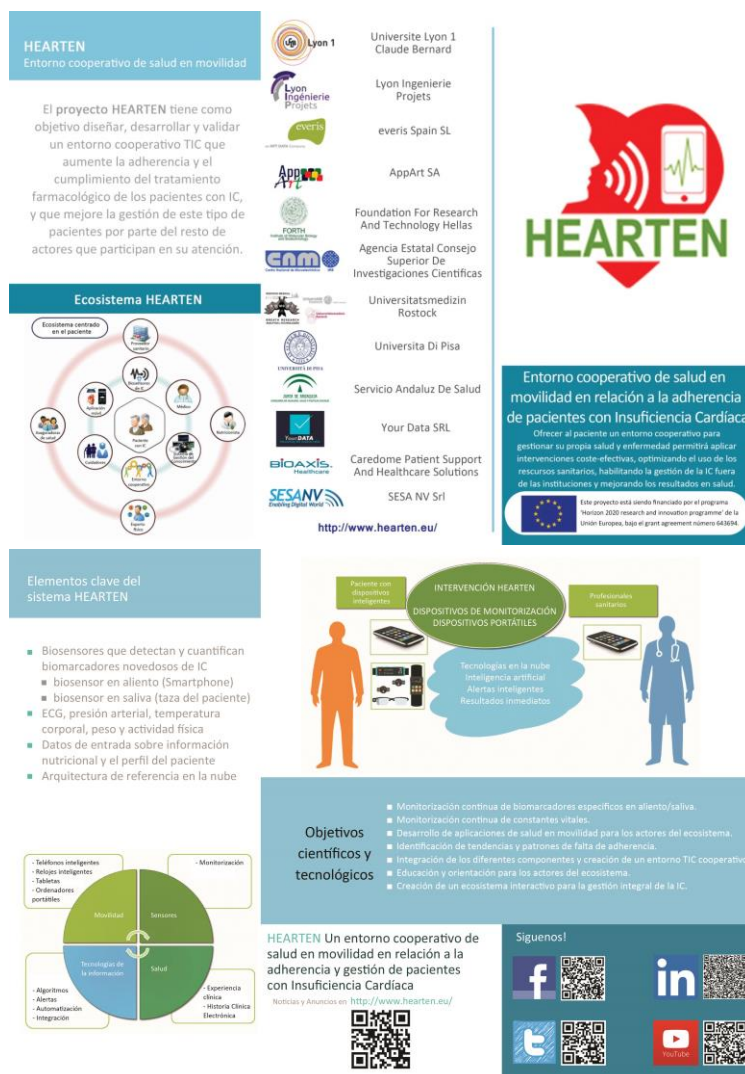

Figure 34: Photos of the HEARTEN participation in the Cardiovascular Training Conference for HF event in Ioannina.

Table 29: Details of the Cardiovascular Training Conference for HF event.

Event	Cardiovascular Training Conference for HF
Location	Ioannina, Greece
Date	December 2016
Targeted audience	Cardiologists, general practitioners, clinical experts in HF

CSIC

CSIC collaborated with SAS and EVERIS for the translation of the HEARTEN leaflet into Spanish (January 2016).


Figure 35: Spanish version of the HEARTEN leaflet.

UNIPi

Flyer distribution in Bright 2016 event

UNIPi promotes the HEARTEN project distributing the HEARTEN leaflet during the Researchers' Night - Bright 2016 Night held in Pisa on September 30th. This event is a European Commission initiative coordinated by the University of Siena, which gives everyone the chance to meet researchers and find out about their latest discoveries in more than 300 cities of 24 European countries. The event aims to promote active participation of people in talks, shows, and debates intended to demonstrate the importance and relevance of modern research.

SAS

Flyer distribution in the 15th European Congress of Internal Medicine (ECIM) and in the “XXXVII Congreso Nacional de la Sociedad Española de Medicina Interna” (SEMI) Spanish conference

In this event, SAS distributed the project's flyer, approached and came into contact with several internal medicine professionals, disseminating HEARTEN vision, findings and progress.

Flyer distribution in the “XXXVII Congreso Nacional de la Sociedad Española de Medicina Interna” (SEMI) Spanish conference

In this event, SAS distributed the project's flyer in Spanish, approached and came into contact with several internal medicine professionals, disseminating HEARTEN vision, findings and progress.

Table 30: SEMI 2016 conference details.

Event	XXXVII Congreso Nacional de la Sociedad Española de Medicina Interna (SEMI)
Location	Zaragoza, Spain
Date	02-03 September 2016
Targeted audience	Internal Medicine professionals

YOURDATA

Flyer distribution in SINNOVA 2016 event

In this event, HEARTEN distributed the project's flyer, and came into contact with several entrepreneurs and foreign investors disseminating HEARTEN solution, findings and progress. Also, general public in Sardinia had the opportunity to hear for the first time HEARTEN potential.

2.2.5 Website

The project website [28] is regularly updated and includes all the new dissemination activities of the project. In the main page of the website the visitor can be informed about the participation of HEARTEN Consortium in different events (Figure 36).

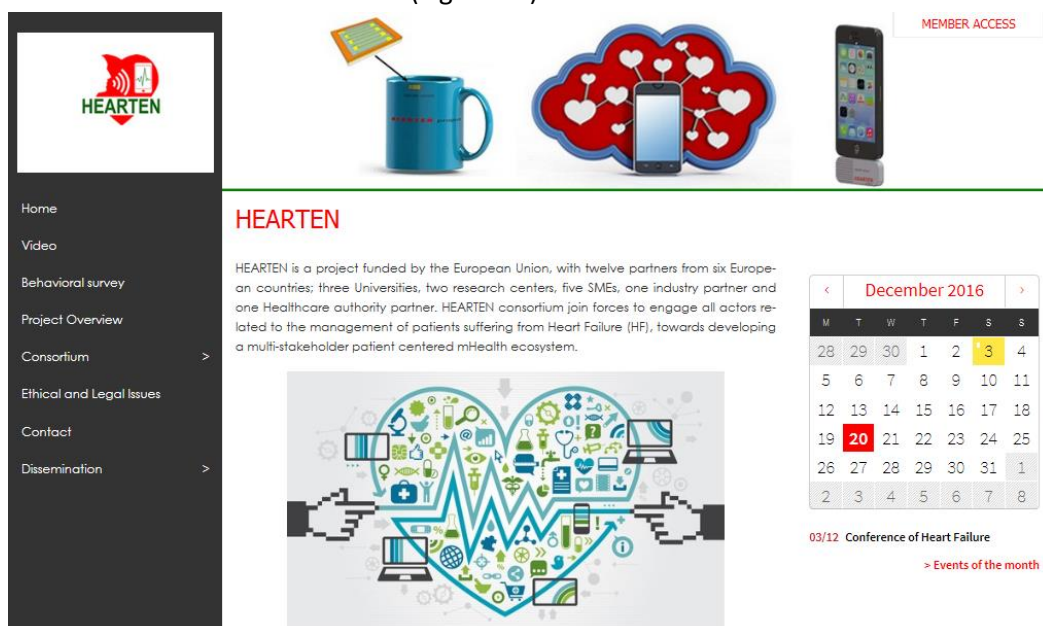


Figure 36: Overview of the HEARTEN website main page.

Due to the different types of communication activities performed by the consortium, the dissemination section has been split in five different subsections: publications, presentations, posters, media and follow us. In each of these sections a detailed presentation of the project activities is enabled (Figure 37).

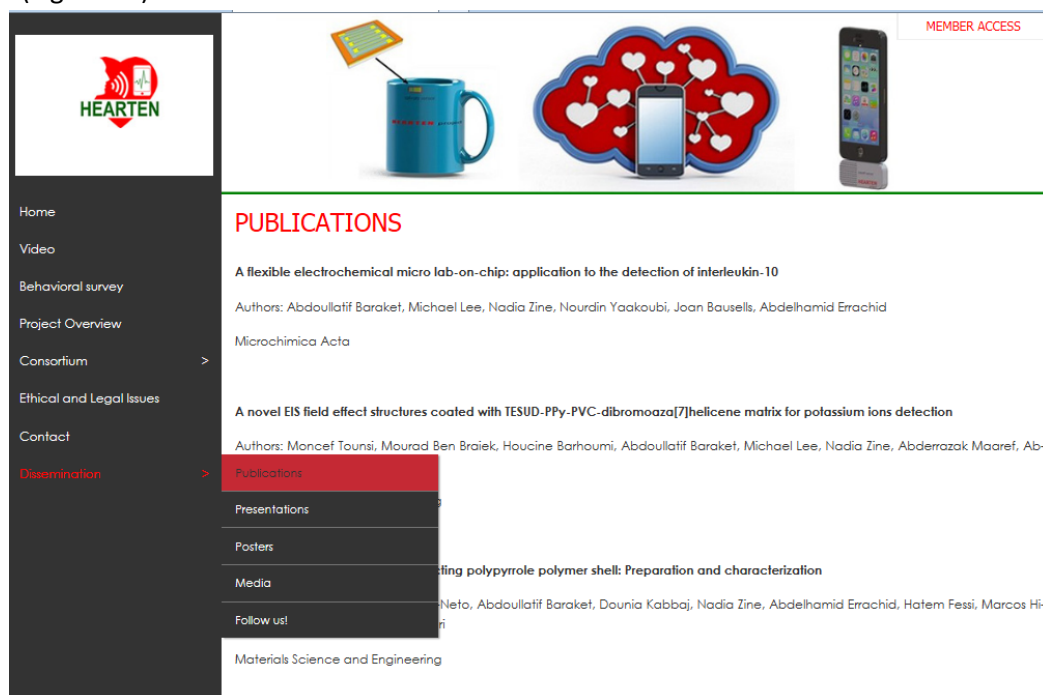


Figure 37: HEARTEN website – Dissemination section.

To communicate the overall vision and approach of HEARTEN project a video has been prepared and is available in HEARTEN website (Figure 38) as well as in the project social media. This video presents the key components of HEARTEN platform, the way their communication is enabled, the technology used for their development, and the gained benefits after the platform adoption by the HF patients and the involved ecosystem actors.

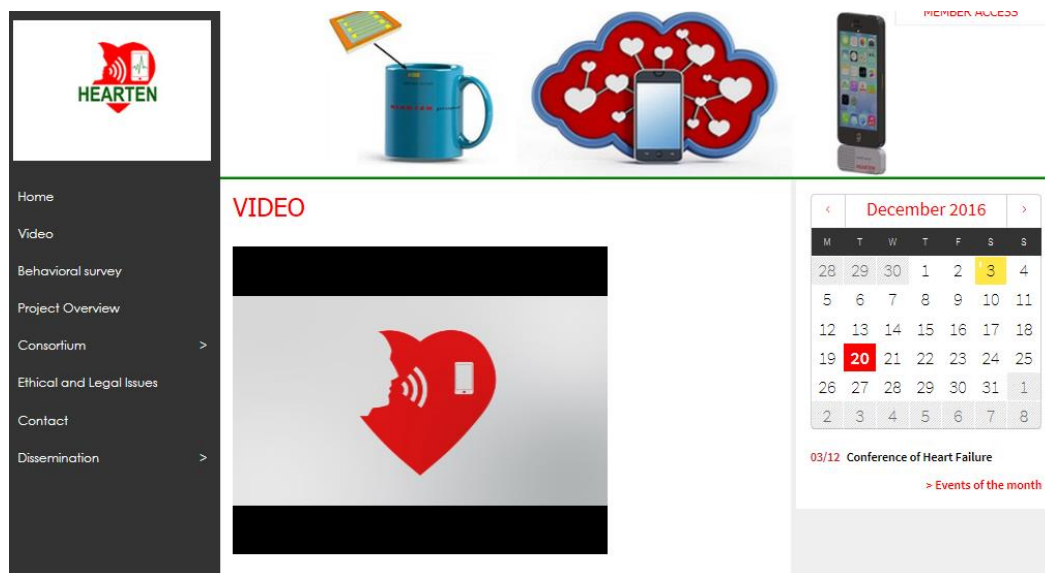


Figure 38: HEARTEN website – video section.

To enhance the attractiveness of the website, two new sections are under preparation and should be online/completed by the beginning of 2017:

- Behavioral Survey section: a dedicated page is being created explaining the survey on the expected intention to use the HEARTEN platform (a link to a well-designed questionnaire will be included) (Figure 39).
- Pilot dedicated section: a page will be online explaining the pilot study that will be conducted (February 2017). The page will provide clear information to patients, healthcare professionals and other actors.

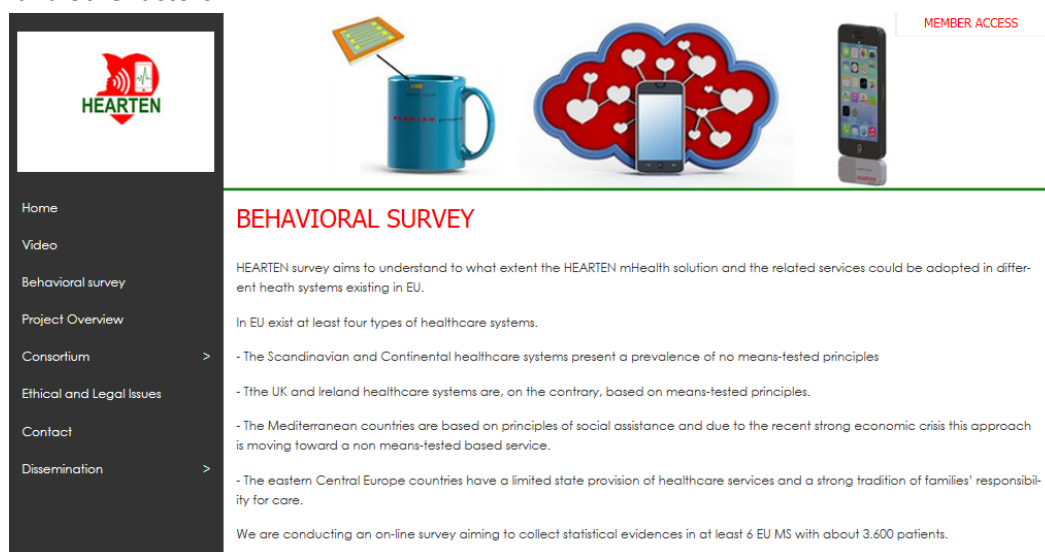


Figure 39: HEARTEN website – behavioral survey section.

In addition, a statistics tool is also available showing the visits in the website. (eg please see number of visits from 23rd September to 30th November). In addition the following info is available:

- Number of connections: 497
- Users: 307
- Pages seen: 1620
- Pages per connection: 3.26
- Average of time per connection: 3.04





Figure 40: Overview of the website visits.

2.2.6 Dissemination via the social media

Social media (Facebook, twitter, LinkedIn) are popular social tools that bring together people with their friends, co-workers or class-mates. There is also a powerful and quick way to disseminate HEARTEN among the wider society. HEARTEN partners agree that these dissemination tools can increase the people's awareness about the vision and the outcomes of the project as well as enhance the rapid commercialization of the final HEARTEN platform. Being part of the right communities is crucial for dissemination via Social Media platforms. Information about the latest updates on the website, new events, discussions and news are being provided via the social networks in a continuous basis. In the following table the posts performed in Facebook and Twitter from M13-M24 is provided.

Table 31: Facebook and Twitter posts (M13-M24).

Number of posts		M13-M18	M19-M24	M13-M24
	Facebook	18	71	89
	Twitter	38	86	124

Facebook, Twitter and LinkedIn

Facebook [29] and Twitter [30] are both an efficient way of informing the wide audience about the status of the project in terms of the achieved results and overall progress, but also keep them informed regarding the presence of the Consortium in events where the project is communicated to different type of stakeholders, experts and different users.



Figure 41: Overview of HEARTEN posts in Facebook.

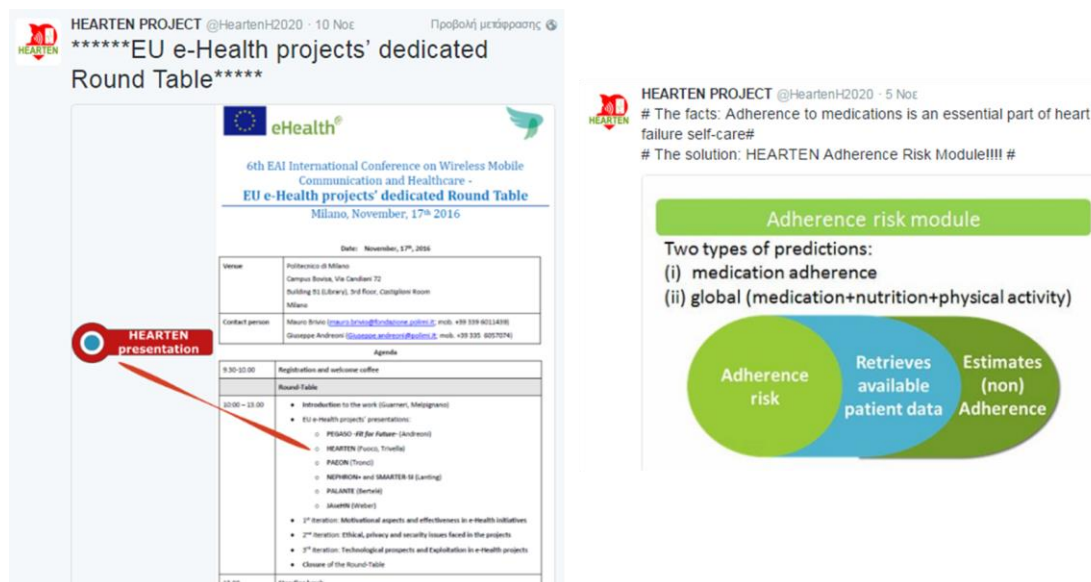


Figure 42: Overview of HEARTEN posts in Twitter.

LinkedIn

In the early beginning of HEARTEN project an account in LinkedIn has been created [31] for informing the research and technology community for the project outcomes. In particular HEARTEN LinkedIn account has reached includes the following sections: (i) general description, (ii) publications, (iii) posts and has managed to reach 217 connections with people for different fields of expertise including Biostatistics experts, Researchers of Medical Science, Psychotherapy consultants, Cardiologists and other clinical experts of Cardiology, Software Developers, Physicians, nutritionists, Business Developers, Health Unit managers and Consultants for medical devices.

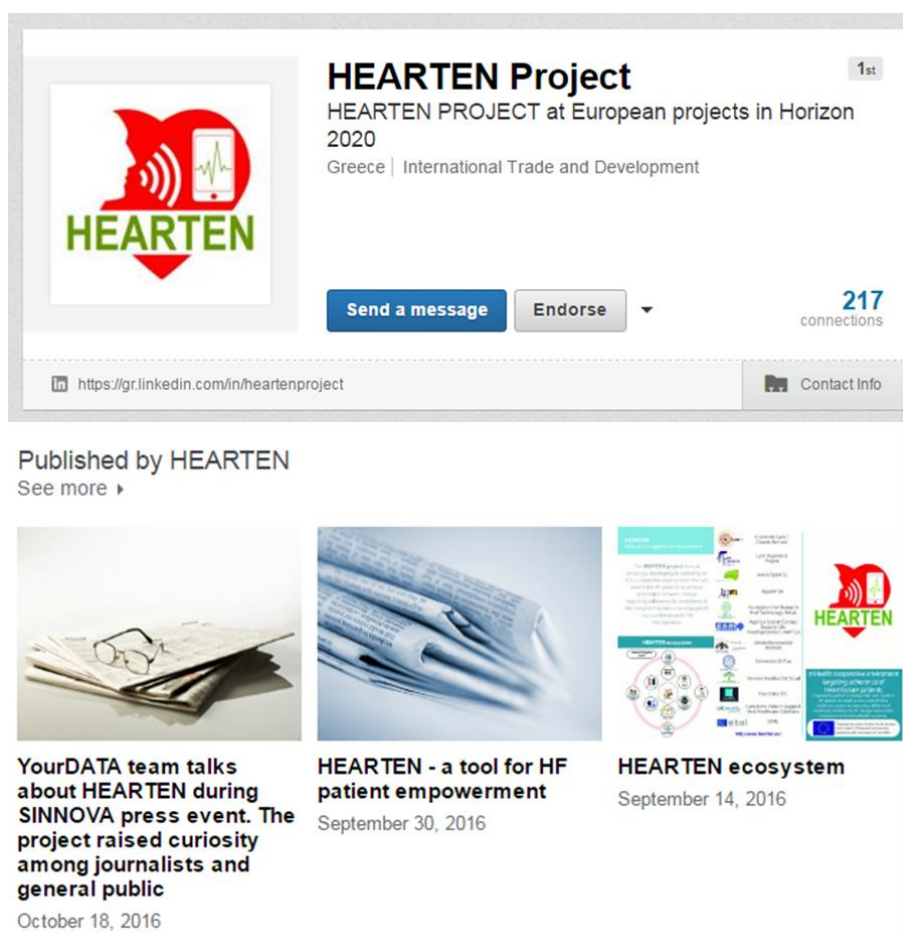


Figure 43: Overview of HEARTEN profile in LinkedIn.

2.2.7 Other dissemination activities

FORTH

HEARTEN and Synehizo organization

HEARTEN puts the HF patient in the center of the attention, this is why in all of the development stages a close communication with HF patients is achieved. Apart from the patients enrolled in the pre-pilot study (SAS, UNIPI) that are the first actors using an initial approach of the HEARTEN platform, other dissemination activities are in parallel conducted for bringing together the patient community with the world of technological development. FORTH has come into contact with the Hellenic organization of patients with HF, called “Synehizo”, presented the overall concept of HEARTEN platform, received initial feedback regarding the problems patient’s face, their perception about their adherence in the provided by the doctors suggestions and suggestions that could be integrated in the HEARTEN platform for enabling the improvement of these patient’s health outcomes and quality of life.



ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΠΑΙΔΕΙΑΣ, ΕΡΕΥΝΑΣ ΚΑΙ ΘΡΗΣΚΕΥΜΑΤΩΝ
ΓΕΝΙΚΗ ΓΡΑΜΜΑΤΕΙΑ ΕΡΕΥΝΑΣ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑΣ



ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ ΚΑΙ ΕΡΕΥΝΑΣ
ΙΝΣΤΙΤΟΥΤΟ ΜΟΡΙΑΚΗΣ ΒΙΟΛΟΓΙΑΣ
ΚΑΙ ΒΙΟΤΕΧΝΟΛΟΓΙΑΣ
ΤΜΗΜΑ ΒΙΟΙΑΤΡΙΚΩΝ ΕΡΕΥΝΩΝ

HEARTEN

Το έργο “mHealth πλατφόρμα για τη διαχείριση ασθενών με καρδιακή ανεπάρκεια” με ακρωνύμιο HEARTEN χρηματοδοτείται από το πρόγραμμα “Ορίζοντας 2020” (Horizon 2020) της Ευρωπαϊκής Επιτροπής για την Έρευνα και την Καινοτομία. Σκοπός του HEARTEN είναι να διευκολύνει την παρακολούθηση ανθρώπων που υποφέρουν από την νόσο της καρδιακής ανεπάρκειας, με χρήση τεχνολογιών που δεν παρεμβαίνουν στην καθημερινότητα και την φυσιολογική ζωή τους, τόσο από αυτούς που τους παρέχουν φροντίδα (συγγενείς, αποκλειστικές κτλ) όσο και από την διεπιστημονική ομάδα (ιατροί, φυσιοθεραπευτές, διατολόγοι κτλ) που φροντίζει για την διαχείριση της κατάστασής τους.

Ο ασθενής θα χρησιμοποιεί σε καθημερινή βάση φορέσιμες συσκευές για την καταγραφή και μέτρηση της αρτηριακής πίεσης, της καρδιακής δραστηριότητας, της φυσικής δραστηριότητας καθώς και θα κάνει χρήση μιας ζυγαριάς για την καταμέτρηση του βάρους του. Επίσης θα χρησιμοποιεί έναν βιοαισθητήρα σάλιου που θα είναι προσαρμοσμένος στην κούπα του και έναν βιοαισθητήρα αναπνοής που θα είναι προσαρμοσμένος στο κενό του. Κατά την καθημερινή χρήση της κούπας και του αισθητήρα, σημαντικοί βιοδείκτες ενδεικτικοί για την πορεία και εξέλιξη της υγείας του θα συλλέγονται και θα αποστέλλονται μαζί με τις υπόλοιπες μετρήσεις των φορέσιμων συσκευών στο κινητό του ασθενή. Επίσης ο ασθενής, ή όποιος τον φροντίζει, θα συμπληρώνει καθημερινά το τι έφαγε και πότε.

Τα δεδομένα θα αναλύονται από ειδικό λογισμικό και θα στέλνονται στον γιατρό, και όσους ακόμη ειδικούς εμπλέκονται στη θεραπεία του. Ο γιατρός θα παρακολουθεί από απόσταση συνεχώς την κατάσταση του ασθενή και θα λαμβάνει ενημέρωση σχετικά με:

- την αναγνώριση σημαντικών κλινικών και παρακλινικών παραμέτρων για την πρόγνωση του ασθενή,
- την αναγνώριση ειδικών βιοδεικτών στον εκπνεόμενο αέρα και το σάλιο που να σχετίζονται με την εξέλιξη της νόσου
- την κλινική πορεία του ασθενή και τη συμμόρφωσή του με τη θεραπεία.

Με αυτόν τον τρόπο ο γιατρός θα

- παρακολουθεί στενά τον ασθενή
- έχει ξεκάθαρη εικόνα και θα μπορεί να αξιολογήσει καλύτερα την κατάσταση του
- βοηθάει και θα παρακινεί τον ασθενή να είναι συνεπής στις υποδείξεις

Από τη άλλη ο ασθενής θα:

- βρίσκεται στο κέντρο της προσοχής όλων των εμπλεκόμενων στην υγεία του
- ενθάρρυνεται στο να συμμετέχει ενεργά στην διαχείριση της υγείας του

Figure 44: Overview of the letter provided to the “Synexizo” organisation.

SAS

SAS has performed the following additional dissemination activities related to HEARTEN project:

- An online presentation called “HEARTEN - A CO-OPERATIVE MHEALTH ENVIRONMENT TARGETING ADHERENCE AND MANAGEMENT OF PATIENTS SUFFERING FROM HEART FAILURE” in the Andalusian Regional Government webpage: http://www.juntadeandalucia.es/fundacionprogresoysalud/investigamas/files/proyectosInternacionales/Abriendo_Fronteras.pdf (01/02/2016).
- An oral presentation related to the HEARTEN project oriented to Internal Medicine Professionals, in the Virgen del Rocío University Hospital (27/09/2016).
- Oral presentations related to the HEARTEN project directed to science students, in the context of the “Andalusian Science Week Open Days” workshop, in the Virgen del Rocío University Hospital (08/11/2016 - 11/11/2016).
- An oral presentation related to the HEARTEN project directed to science students, in the context of the “Bridging the gap between companies and students” workshop, in the University of Seville (25/11/2016).

YOURDATA

In November 2016, YourDATA presented HEARTEN to Dr. Maurizio Porcu, head of Cardiology Unit of Brotzu Hospital in Cagliari. Dr. Porcu expressed his interest in HEARTEN solution, expecting to be

updated about project progress and willing to implement it also in Brotzu Hospital at the end of the project. He also is ready to cooperate during HEARTEN Survey among HF patients in 2018 (see D2.7 for more details on this).

BIOAXIS- CAREDOME

In May 2016, BIOAXIS-CAREDOME has sent a newsletter related to HEARTEN to its cooperating caregivers (nurse agents) in Portugal and Greece. The targeted audience consisted of 61 nurses, whose main role is to support, manage and monitor patients during their disease lifespan. The newsletter was pointing out the clinical state-of-the-art of HEARTEN. In addition, the newsletter was presenting how telemonitoring is contributing in reducing healthcare costs and improving patient management and support. Concluding, the newsletter was presenting how HEARTEN is offering added value to all actors in the monitoring and management of patients with HF.

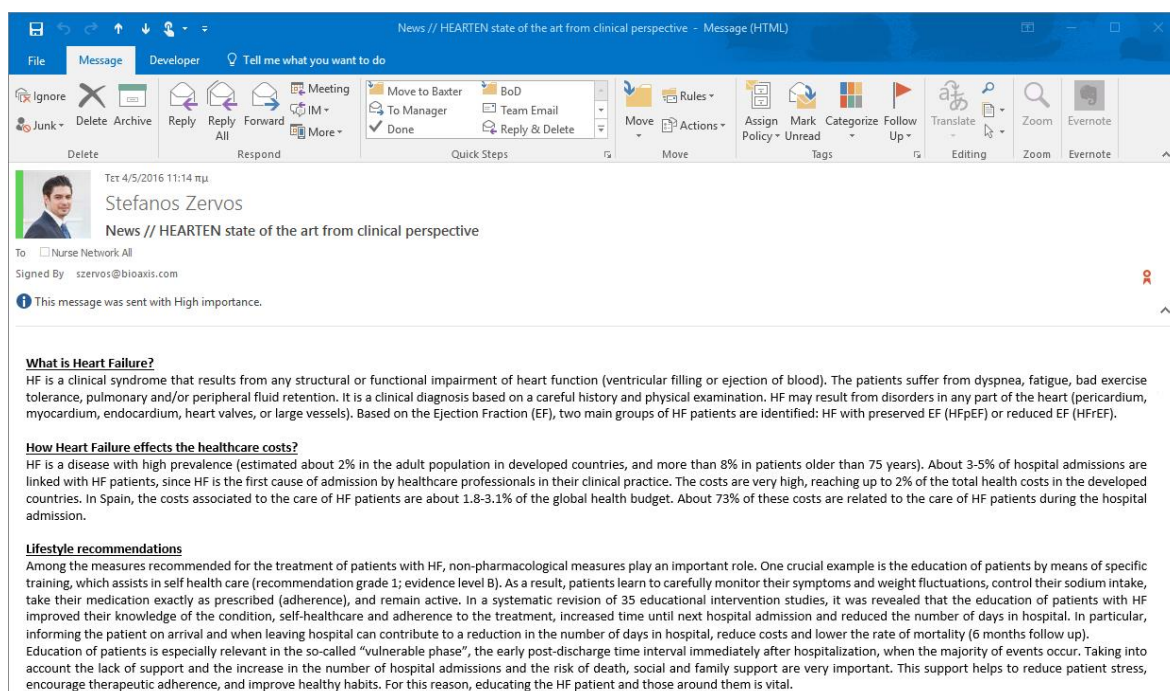


Figure 45: Newsletter provided to BIOAXIS-CAREDOME caregiver Network..

2.2.8 What we achieved vs what we originally targeted in terms of dissemination activities

In the following table a list of the dissemination activities that we have targeted and their achievement is presented. Most of them have been accomplished as planned, while some other have been replaced by other dissemination activities, as already presented in previous sections.

Table 32: Overview of the targeted dissemination activities and the actual achievements.

Partner	Means of dissemination	Event/Media	Status (achieved/not achieved)
BIOAXIS-CAREDOME	Pharmaceutical Event/ (Presentation, Leaflet)	10 th Pharmaceutical Marketing Conference (Greece)	This has been rescheduled for the next period
	Healthcare Professionals Event/ (Presentation, Leaflet)	42 nd Panhellenic Medical Conference (Greece)	This has been rescheduled for the next period
	HEARTEN state of the art from clinical perspective	42 nurses cooperating with BIOAXIS-CAREDOME	Achieved

Partner	Means of dissemination	Event/Media	Status (achieved/not achieved)
	(Newsletter)		
	Cardiologists presentations (Meetings in Portugal and Greece)	Medical Office / Clinic visits	Achieved
	Abbvie Pharmaceuticals (Meeting - Greece)	Company Visit	Achieved
	Roche (Meetings in Portugal and Greece)	Company Visit	Achieved
	Novartis (Meetings in Portugal and Greece)	Company Visit	Achieved
	Bayer (Meetings in Portugal and Greece)	Company Visit	Achieved
	Amgen (Meeting in Greece)	Company Visit	Achieved
	Takeda (Meetings in Greece and Rest of Balkans)	Company Visit	Achieved
	MSD (Meetings in Portugal and Greece)	Company Visit	Achieved
	Boehringer Ingelheim (Meetings in Portugal and Greece)	Company Visit	Achieved
	UCB (Meetings in Portugal and Greece)	Company Visit	Achieved
	Pfizer (Meetings in Portugal and Greece)	Company Visit	Achieved
SITAL	Presentation of Funded Project, Research and HEARTEN Project	Corporate Site	Achieved
	IEO – European Institute of Oncology [30]	Meetings with our Italian customers	Achieved
	Centro Cardiologico Monzino [31]		Achieved
	Lombardia Informatica [32]		Achieved
YOURDATA	Presentations, newsletters, brochures, announcements, papers etc.	Website	Achieved
		Facebook and LinkedIn accounts	Achieved
		Conferences	Will be performed the following months
		Local and national press and television	Achieved

Partner	Means of dissemination	Event/Media	Status (achieved/not achieved)
		Sardinian local health care system	Achieved
SAS	Clinical sessions in Virgen del Rocío University Hospital	Internal diffusion	Achieved
	Conferences about HF or Medical Informatics	Flyers /brochures	Achieved
		Newsletters	Achieved
	Poster and/or oral communications in national (Spanish) and international conferences	Conferences	Achieved
	Scientific papers in relevant journals like: <ul style="list-style-type: none"> Journal of the American Medical Informatics Association. Journal of Medical Systems. Journal of Biomedical Informatics. IEEE Journal of Biomedical and Health Informatics. 	Scientific publications	Will be performed the following months.
UNIFI	Presentation of the outcomes of its research related to the analysis and identification of breath and saliva biomarkers.	Conferences	Achieved
		Scientific publications	Achieved
UMOR	Transport and disseminate new knowledge into a broad international research community	International association for breath research (IABR)	Achieved (4 presentations/ abstracts in International conferences IABR 2016; Pittcon 2016, NCCS 2016)
		Task force for standardisation	Achieved (Publications in Q1 journals Implication of basic HEARTEN results as typical example for sensor QC and validation into the IABR standardization task force)

Partner	Means of dissemination	Event/Media	Status (achieved/not achieved)
CSIC	Poster and/or oral communications in national and international conferences, as well as, journals related to the development of saliva and breath biosensors	Conferences	Achieved
		Scientific journals	Achieved
	Dissemination of both CSIC-specific results and general overviews of the project development to Spanish media (press releases, press conferences, interviews, web pages and social networks)	Press and outreach offices/CSIC communication department	Not done in 2016. Done in 2015 (announcement of the start and objectives of the project). It is expected to be done again in 2017, with the final results achieved.
FORTH	Scientific papers in relevant journals like: <ul style="list-style-type: none"> 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'16) 	Scientific publications	Achieved
	Federated conference on computer science and information systems (FedCSIS)		This dissemination activity was not performed and was replaced by the participation of FORTH in Fabulous Conference.
AppART	Dissemination in several online and on-paper magazines, webspots and congresses	Greek Media Agency	Partially achieved and alternative actions arranged: Dissemination in, corporate meetings with possible future shareholders and Academic Conferences: (i) Presentation of HEARTEN project in large Greek Telecommunications Company: telecommunications professionals formed the audience considered a potential shareholder for the future (ii) Participation in 9 th International Conference Energy and Climate Change: many innovative Greek companies presented in an a

Partner	Means of dissemination	Event/Media	Status (achieved/not achieved)
			broad academic audience innovative solutions of several scientific fields
EVERIS	Presentations, newsletters, brochures, announcements, papers etc.	Company website, Social media, Company presentations, Media	Achieved
UCBL	Scientific papers in relevant journals like: <ul style="list-style-type: none"> Journal "Materials Science and Engineering: C" [15] Journal "Trends in Analytical Chemistry" [9] 	Scientific publications	Achieved

3. Dissemination planned for M25-36

3.1 Planned activities per partner

UCBL

The dissemination strategy that UCBL will follow is related to development of breath/saliva biosensors for HF and will be presented in International conferences with large audience and experts in the field. These will mainly focus on demonstrating the impact of such sensor tools in health application. In addition, the participation in National and International workshops will be achieved as well as publication in Journals related to biosensors technology.

EVERIS

EVERIS plans the following actions for the upcoming months:

- Preparation a video concerning the works on the HEARTEN – SAS EHR integration to be published in the social networks of the project.
- Distribution of leaflets to Health events were EVERIS is invited
- Preparation of a leaflet concerning the HEARTEN – SAS EHR integration
- Publication under the HEARTEN Website of monthly consolidated news appeared in the social networks of the project as digest newsletters.
- Contribution to social networks of the HEARTEN project concerning the integration works as well as dissemination events were EVERIS participate.

AppArt

In the following months AppArt has arranged the following dissemination activities:

- Presentation in a second large Telecommunications Company for potential future shareholder interest
- Article in the Sunday Edition of the newspaper “TO VIMA”, in the pages regarding scientific innovation. AppArt has talked with the journalist of the column and the issue is in progress
- Article in the online magazine for the Telco Industry, Netfax.

FORTH

FORTH plans to participate during the next reporting period in two-three conferences and submit a journal publication. Specifically, results of the Knowledge Management System will be submitted for possible consideration in the 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC’17) that will take place in Korea, in the period July 11-15, 2017. FORTH, in collaboration with the other clinical and technical participating partners plans to submit the design and results of KMS in a journal. Additional journal papers are planned depending on the available patient data and the results obtained by the data mining analysis and the KMS application. In addition, a flyer will be designed targeting the HF patients and the HF community in order to make them aware of HEARTEN platform and the expected benefits from its utilization.

CSIC

The planned dissemination activities for CSIC for the last 12 months of the project are to continue the publication of the results on the development of biosensors in scientific and technical journals, and to continue to present the results in international conferences of the field. It is also planned to send a press release in Spain at the end of the project summarizing the main results.

UMOR

The dissemination activities that are foreseen from UMOR in the following months are:

- Publications: 2 peer reviewed publications from D4

- 3 presentations at international/ European scientific meetings: PittCon, IABR, ERS
- Organization of courses on real time monitoring of breath VOCs in patients with hemodynamic instabilities during the InnoIndigo Meeting, Rostock May 2018
- Link of HEARTEN with other EU projects (PIMMS, IMPACT, NCD-CAPomics) regarding the measurement techniques and effects of hemodynamics on breath profiles

UNIPi

In the following months UNIPi has planned the following dissemination activities:

- Publications: 3 peer reviewed publications
- Participation to national and international congresses

SAS

SAS will perform the following dissemination activities:

- To perform a publication to the Health Technology Assessment journal to share with the scientific community the clinical protocol that is going to be used in the pilot study.
- To present a poster communication to the 27th Medical Informatics Europe Conference related to the integration between HEARTEN and SAS systems.
- Distribution of leaflets to all the conferences related to Internal Medicine, Cardiology or Medical Informatics, in which SAS team participate.
- To prepare a video to share the opinion of doctors, nutritionists and psychologists related to HEARTEN ecosystem.
- Prepare a new leaflet of clinical content.

YOURDATA

YourDATA will:

- Participate to SINNOVA 2018, Sardinian Innovation Fair, presenting HEARTEN progress;
- Organize a public event in Cagliari, to communicate to general public, scientific community and healthcare system functionaries HEARTEN features;
- Make a survey among EU HF patients to collect useful data for exploitation purposes that, at the same time, will help to spread HEARTEN information among patients and patients' associations around Europe.

BIOAXIS-CAREDOME

BIOAXIS- CAREDOME will proceed with the following dissemination activities for the next months:

- Dissemination of project through company's and HEARTEN's social media account.
- Face to Face presentation to Pharmaceutical Companies' Executives in Portugal, Greece and UK.
- Face to Face presentation to healthcare professionals in Portugal and Greece.
- Presentation to Cardiological Associations and related Patient Associations in Greece.
- Newsletter to BIOAXIS-CAREDOME nurse agents and cooperating healthcare professionals in Portugal, and Greece.
- Participation and leaflet distribution in 8th Conference for Entrepreneurship and Communication in Healthcare, Athens Greece on 18th and 19th of February 2017.

SITAL

SITAL will perform the following dissemination activities the following months:

- Presentation of the project on the corporate site
- Participation to Facebook POSTs with technical arguments as database and security
- Presentation of HEARTEN in clinical institutes in Italy.

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