



*"This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 603946".*



# HEALS

Health and Environment-wide Associations  
based on Large population Surveys

FP7-ENV-2013- 603946

<http://www.heals-eu.eu/>

## D3.1

# Workshop on conceptual framework of HEALS

## WP 3 Definition of methodological framework


### Version 1

Lead beneficiary: AUTH

Date: 17<sup>th</sup> of March 2014

Nature: O

Dissemination level: PU

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework		<b>Security:</b>
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	2/18

## Document Information

<b>Grant Agreement Number</b>	ENV-603946	<b>Acronym</b>	HEALS
<b>Full title</b>	Health and Environment-wide Associations based on Large population Surveys		
<b>Project URL</b>	<a href="http://www.heals-eu.eu/">http://www.heals-eu.eu/</a>		
<b>EU Project Officer</b>	Tuomo Karjalainen,- <a href="mailto:Tuomo.KARJALAINEN@ec.europa.eu">Tuomo.KARJALAINEN@ec.europa.eu</a>		

<b>Deliverable</b>	<b>Number</b>	3.1	<b>Title</b>	Workshop on conceptual framework of HEALS
<b>Work Package</b>	<b>Number</b>	3	<b>Title</b>	Definition of methodological framework

Delivery date	Contractual	M6	Actual	17-19/03/2014
Status	Draft <input type="checkbox"/>		Final <input checked="" type="checkbox"/>	
Nature	Demonstrator <input type="checkbox"/>	Report <input type="checkbox"/>	Prototype <input type="checkbox"/>	Other <input checked="" type="checkbox"/>
Dissemination level	Confidential <input type="checkbox"/>		Public <input checked="" type="checkbox"/>	


<b>Author (Partners)</b>	Name (Organization) AUTH			
<b>Responsible Author</b>	Name Denis Sarigiannis		<b>Email</b>	d.a.sarigiannis@gmail.com
	<b>Partner AUTH</b>	Name	<b>Phone</b>	

## Document History

Name	Date	Version	Description
AUTH	26/05/2014	1	First version of the minutes
UPMC - AUTH	29/07/2014	2	Restructuration of the minutes according to the Project Officer comments

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	3/18

## HEALS Workshop- HEALS concepts and methodology

**Organization and hosting of the meeting:** Workshop, Environmental Engineering Laboratory – Department of Chemical Engineering Aristotle University of Thessaloniki, Greece

**Localization:** Research Dissemination Center of the Aristotle University of Thessaloniki, Aristotle University Campus, 3rd Septemvriou street, 54636 Thessaloniki


**Start:** March 17, 2014, **End:** March 20, 2014

### Participants

1- UNIVERSITE PIERRE ET MARIE CURIE	UPMC	Isabella Annesi-Maesano Annabelle Ostyn Soutrik Banerjee
2- ARISTOTELIO PANEPISTIMIO THESSALONIKIS	AUTH	Dimosthenis Sarigiannis Alberto Gotti Spyros Karakitsios Georgios Theodoridis Georgios Tzimagiorgis Roxani Tzimou-Tsitouridou Maria Papaioannou Krystalia Papadaki Manara Panagiota Roula Nikolaki Maria Liakopoulou Kyriakidou Stavroula Kyriakou Sofia Koudou Periklis Kontoroupis Marianthi Kermenidou Gika Helen Evangelos Handakas Ioannis Diamantopoulos Manolis Ballis
3- INSTITUTE OF OCCUPATIONAL MEDICINE	IOM	John Cherrie
4- UNIVERSITAET STUTTGART	USTUTT	Rainer Friedrich Joachim Roos Naixin Li
5- INSTITUT JOZEF STEFAN	JSI	Milena Horvat Darja Mazej Ingrid Falnoga
6- UNIVERSITE PARIS DESCARTES	UPD	Robert Barouki Martine Aggerbeck
7- UNIVERSITY OF BRISTOL	UNIVBRIS	Clive Sabel
8- ISTITUTO SUPERIORE DI SANITA	ISS	Gemma Calamandrei
9- LUDWIG-MAXIMILIANS- UNIVERSITAET MUENCHEN	LMU	Stephan Boeseoreilly
10- INSTYTUT MEDYCYN Y PRACY NOFERA	NIOM	Kinga Polanska Joanna Jurewicz
11- TEKNOLOGIAN TUTKIMUSKESKUS VTT	VTT	Sami Nousiainen Juha Pärkkä

<sup>1</sup> I: information; D: decision; A: action


<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	4/18

12- THE UNIVERSITY OF MANCHESTER	UM	
13- NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK - TNO	TNO	Rob Stierum Anjoeka Pronk
14- THE SECRETARY OF STATE FOR ENVIRONMENT, FOOD AND RURAL AFFAIRS	FERA	Mike Dickinson
15- AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	CSIC	Joan Grimalt Mercè Garí Esther Marco
16- PANEPISTIMIO DYTIKIS MAKEDONIAS (UNIVERSITY OF WESTERNMACEDONIA)	UOWM	Ioannis Bartzis Evangelos Tolis Panagiotis Karagiannis
17- FUNDACIO PRIVADA PARC CIENTIFIC DE BARCELONA	CERETOX	Miquel Borràs Eliandre de Oliveira
18- Institute of Mechanical Engineering	IDMEC-FEUP	Eduardo de Oliveira Fernandes Joana Madureira
19- OIKON DOO INSTITUT ZA PRIMIJENJENU EKOLOGIJU	OIKON	Zdravko Spiric
20- CONSIGLIO NAZIONALE DELLE RICERCHE	CNR	Sonia Cerrai
21- UNIVERSIDADE DO PORTO	FMUP	
22- NATIONAL CENTER FOR SCIENTIFIC RESEARCH "DEMOKRITOS"	NCSR	Leondios Leondiadis Asimina Stamatelopoulou Thomas Maggos Kleopatra Kedikoglou
23- UNIVERSITAT ROVIRA I VIRGILI	URV	Marta Schuhmacher Joaquim Rovira
24- KLINIKUM DER UNIVERSITAET REGENSBURG	UKR	
25- ServiceXS BV	SXS	
26- KING'S COLLEGE LONDON	KCL	
27- NASJONALT FOLKEHELSEINSTITUTT	NIPH	
28- SYDDANSK UNIVERSITET	SDU	
29- THE REGENTS OF THE UNIVERSITY OF CALIFORNIA	UC	Michael Jerrett
30- Agilent Technologies		Nigel Skinner (UK) Anthony Macherone (USA)
31- VARELAS (Greece)		Chrisafis Meskos Haris Tzouvalis
32- Advisory Board		David Balshaw

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	5/18

## Agenda:

### HEALS Workshop- HEALS concepts and methodology

**Thessaloniki /Greece**  
**March 17 – 20, 2014**

**Hosted by**  
**Environmental Engineering Laboratory – Department of Chemical Engineering Aristotle**  
**University of Thessaloniki**

*To take place at the*  
*Research Dissemination Center of the Aristotle University of Thessaloniki*  
*Aristotle University Campus, 3rd Septemvriou street, 54636 Thessaloniki*

## AGENDA

### Workshop on HEALS concept and methodology

#### Monday March 17, 2014

9:15 – 09:30 Welcome address and Opening of the meeting (S. Kouidou-Andreou, AUTH Vice-Rector)  
9:30 – 9:45 Introduction – Aim of the meeting (D. Sarigiannis and I. Annesi-Maesano)

#### **Session 1: Progress reports of active Work Packages**

Each WP leader to report on progress, next steps, status and timeplan

09:45 – 10:45 **Stream 1 (led by J. Cherrie)**

09:45 – 10:05 WP1 (J. Cherrie)

10:05 – 10:25 WP2 (M. Horvat)

10:25 – 10:45 WP3 (D. Sarigiannis)

10.45 – 11.00 Break

11:00 – 12:30 **Stream 2 (led by D. Sarigiannis)**

11:00 – 11:20 WP4 (M. Horvat)

11:20 – 11:55 WP5 (R. Stierum)

11:55 – 12:15 WP6 (S. Karakitsios)

12:15 – 12:30 WP7 (D. Sarigiannis)

12:30 – 13:30 Lunch

13.30 – 14:15 **Stream 3: (led by J. Bartzis)**

13:30 – 13:50 WP8 (J. Bartzis)

13:50 – 14:15 WP9 (J. Cherrie)

14.15 – 14:45 **Stream 4: (led by D. Sarigiannis)**

14.15 – 14:45 WP12 (S. Nousiainen)


14.45 – 15:45 **Stream 5: (led by I. Annesi-Maesano)**

14:45 – 15:05 WP14 (G. Viegi)

15:05 – 15:25 WP15 (G. Calamandrei)

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	6/18

15:25 – 15:45 WP16 (I. Annesi-Maesano)

15.45 – 16.00 Break

16:00 – 16:45 WP17 - EXHES protocol (I. Annesi-Maesano)

16:45 – 17:30 Stream 6 (led by M. Schuhmacher)

16:45 – 17:10 WP18 (S. Bose-O'Reilly)

17:10 – 17:30 WP19 (J. Grimalt)

17:30 – 18:30 Start of the e-learning platform - live demonstration (J. Schoierer)

21:00 Informal Concert of the European Union Youth Orchestra – Thessaloniki Concert Hall

## **Tuesday March 18, 2014**

### **Session 2: HEALS concept and methodology workshop**

#### *Methodology workshop part A: external exposome*

9:00 – 9:45 Measuring external exposome in the context of HEALS (J. Bartzis)

9:45 – 10:30 How personal sensors can support external exposome at individual level (J. Cherrie)

10:30 – 11:00 Coffee break

11:00 – 11:45 The role of agent-based modeling in constructing the exposome (C. Sabel)

11:45 – 12:30 Data integration - exposure monitoring throughout lifetime (R. Friedrich)

12:30 – 13:30 Lunch

#### *Methodology workshop part B: internal exposome*

13:30 – 14:15 Human Biomonitoring in the context of HEALS: links with -omics (M. Horvat)

14:15 – 15:00 Functional integration of -omics technologies in the HEALS exposome concept (R. Stierum)

15:00 – 15:30 Coffee break

15:30 – 16:15 Internal dose modeling a bridge between external and internal exposure (D. Sarigiannis)

21:00 Social dinner

## **Wednesday March 19, 2014**

#### *Methodology workshop part C: data management and modeling for EWAS*


9:00 – 9:40 Building the HEALS Geodatabase platform (S. Nousiainen)

9:40 – 10:10 Environmental data mining and management (K. Karagiannis)

10:10 – 10:45 Novel bioinformatics strategies for biomarker prediction (C. Papaloukas)

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	7/18

10:45 – 11:15 Coffee break

11:15 – 11:50 Biostatistical methods for EWAS (S. Banerjee)

11:50 – 12:30 The HEALS trademark: Environment-wide associations linking environmental exposures to health outcomes (D. Sarigiannis)

12:30 – 13:00 HEALS methodology workshop closure (D. Sarigiannis, I. Annesi-Maesano)

13:00 – 14:00 Lunch

### **Workshop on Agilent exposomic workflows**

*Use of advanced analytical and -omics technologies for exposome research both in the EU and the USA. Implications for HEALS*

(co-hosted by Agilent)

### **AGENDA**

#### **Wednesday March 19, 2014**

14:00 – 14:45 Overview of Exposomics FP7 and NIEHS-funded projects (T. Karjalainen, D. Balshaw)

14:45 – 15:15 Agilent Overview (A. Macherone, M. Kontogiannis)

15:15 – 15:45 Coffee Break

15:45 – 16:30 Using the Blood Exposome to Discover Causes of Disease (A. Macherone)

16:30 – 17:30 Discussion and wrap-up

21:00 Workshop Dinner

#### **Thursday March 20, 2014**

9:30 – 10:00 Data integration needs in exposomics research (D. Sarigiannis)

10:00 – 10:30 Example of omics work ongoing in FP exposomics consortium (G. Theodoridis)

10:30 – 11:00 Coffee break


11:00 – 11:45 Multi-omics data integration with GeneSpring including case studies (N. Skinner)

11:45 – 12:30 Live demonstration of Agilent technology and data analysis tools.

12:30 – 13:30 Lunch

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	8/18


### Minutes: Record of decisions

Type <sup>1</sup>		Who	Estimated date	Status <sup>2</sup>
	<b>Introduction of the workshop</b>			
<b>D</b>	Aim of the meeting: Bring all disciplines together/ organize work / e-learn/ harmonization /same information for every study. The following actions were suggested: 1) To have an Holistic study Protocol 2) To extract important data out of the existing studies 3) To understand jointly the use of a solution via the use of the available technologies, linkages and the practical ways of solving them via joint discussions	D. Sarigiannis and I. Annesi-Maesano		
<b>Type 1</b>	<b>Session 1: Progress reports of active Work Packages</b>	<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>A</b>	Each WP leader to report on progress, next steps, status and time plan.	ALL WPLS PRESENT PARTNERS	Every three months	Ongoing
	<b>Stream 1</b>	<b>J. Cherrie</b>		
<b>I</b>	Gave overview of the current state of development of all WPs within Stream 1.			
<b>I</b>	<b>WP1</b> Assess critical life events not only for the exposome, but also for health outcome phenotypes. Parallel development of critical parts of life for both the exposome and health outcomes. Bring together developmental stage and disease. There are specific times when exposure patterns change significantly.	J. Cherrie		
<b>A</b>	Task 1.1	WP1 members	Month 12	Ongoing
<b>A</b>	Task 1.2	WP1 members	Month 6	Delay
<b>A</b>	Task 1.3	WP1 members	Month 18	Ongoing
<b>D</b>	The audience asked for the necessary steps to do the assessment and from where to start. It was agreed to focus on the exposome and to identify the key exposure patterns, the critical periods of life and heterogeneity in exposure		Up to month 18	Ongoing
<b>A</b>	<b>WP2</b> Scientific networking already active. Links with scientists on the other projects of relevance to HEALS. On-going work on linkages with stakeholders and NGOs.	M. Horvat and WP2 members		Ongoing
<b>A</b>	Organization of scientific workshop on recent advances in the links between environmental pressure and health in Edinburgh	J. Cherrie and WP2 members	Month 12	Ongoing
<b>A</b>	Overview of existing exposome relevant networks/programs in the EU and the USA (world)	WP2 members		Closed
<b>D</b>	Discussion about networking with the other projects in the EU and the USA - opportunity to discuss about biomarkers in the Slovenia workshop		Month 7 (26-29 May, 2014)	
<b>A</b>	Deliverable D2.1	WP2 members	Month 12	Ongoing
<b>A</b>	Deliverable D2.2	WP2 members	Month 15	Ongoing
<b>A</b>	Deliverable D2.3	WP2 members	Month 18	Ongoing
<b>A</b>	Dissemination of exposome technology, in the University of Berkley, the Imperial College, the University of Amsterdam and the	WP2 members		Closed

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay




 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	9/18

	Industrial commission for safety			
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>D</b>	Future dissemination: ISEE Seattle conference on epidemiology and NHS workshop in North Carolina (exposome)			
<b>D</b>	Suggestion to maintain a network: justify collaboration with a memorandum of understanding; share PhD/Post-Doc so that money will be allocated to.			
<b>D</b>	Management session, credible results are needed (e.g. on HEALS approach), HELIX and EXPOSOMICS work jointly for biostatistics assessment.			
<b>D</b>	Proposed joint workshops on biomarkers in view of networking and organize methodological workshop in absence of results.			
<b>A</b>	<b>WP3</b> Deliverable D.3.1, this workshop	D.Sarigiannis and WP3 members	Month 6	The minutes will be written after the workshop
<b>A</b>	Deliverable D.3.2, Report on conceptual framework on HEALS	WP3 members	Month 12	Ongoing
<b>A</b>	Review on Exposome EWAS.	WP3 members	Month 9	Ongoing
	<b>Stream 2</b>	<b>D. Sarigiannis</b>		
<b>I</b>	<b>WP4</b> Overview of the current definitions of biomarkers and human biomonitoring given. Collation and review of information from relevant projects is on-going.	M. Horvat		
<b>D</b>	Next major milestone is the workshop in Ljubljana (Slovenia). We need to start working with the data that already exist. We need to put them in the HEALS database so that they can be used in the EWAS approach (appropriate format) - in contact with WP12 - it would have to finish at the workshop in Ljubljana. Opportunity for HEALS networking at the Ljubljana workshop - participation of people outside HEALS (from HELIX and EXPOSOMICS). They work on biomarkers of exposure. The main output will be presented at the Ljubljana workshop.		Month 7	
<b>A</b>	The main outcome should be the selection of biomarkers to be used for EWAS studies. This has to be done in conjunction with WP5.	WP4 members		Ongoing
<b>A</b>	A lot of work has been done to complete the table on health outcomes and biomarkers and bio samples.	WP4 members		Ongoing
<b>D</b>	Re-analysis of samples in biobanks will need to be discussed at the Thessaloniki workshop to decide what is feasible and needed to be done Biomarkers of exposure to chemicals - core program: PCBs, PFC, Metals and metalloids. The exact list of organics that need to be analyzed has to be still discussed.		17-20 September	
<b>D</b>	Discuss on laboratories for analysis and cost of analysis.		17-20 September	
<b>A</b>	In Rome we had outlined a much longer list of chemicals - the final list has to be discussed.	WP4 members		Ongoing
<b>D</b>	Topics to be discussed at the Ljubljana workshop should include Biomarkers in HEALS, EWAS Integration of existing HBM data, biobanks and their usefulness in HEALS, guidelines and workflow		Month 7: 26-29 May, 2014	

<sup>1</sup> I: information; D: decision; A: action


<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS			
	<b>WP3:</b> Definition of methodological framework		<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis		<b>Version:</b> 2	10/18

	in HEALS, IPR issues, Dissemination (special issue of Environmental Research).			
<b>D</b>	We need to dust off the EUREKA document on pre-existing cohorts to be used by WP 14/15/16 leaders.		17-20 September	
<b>D</b>	Set a good set of criteria for targeting the contaminants that we would focus on (part of it would be health outcomes and part of it would be analytical and feasibility constraints).		17-20 September	
<b>D</b>	Questions from the secondary use of data and samples: to be addressed in Ljubljana in May 2014.		26-29 May, 2014	
<b>D</b>	D.4.2 Guidelines for appropriate biomarkers of exposure selection EWAS.	WP4 members	Month 12	Ongoing
<b>A</b>	Deliverable D.4.1 Workshop on feasibility and extent of sharing biomarkers data in Europe	WP4 members	Month 8	Ongoing
<b>I</b>	Questions raised: 1) Should study focus on health end points e.g. obesity, respiratory problems etc.? 2) Which chemicals to focus ? 3) Which bio monitoring to consider? Answer in WP 14/15/16 (Data available all positive stressors) focus on bio-banks cohorts and in association to the WP 17			
<b>A</b>	<b>WP5</b> Collected technologies/protocols from all WP5 partners Protocols on-going Provided advice to metals and VOC task forces Excel file with all the omics and the analytical requirements (sample type, etc.)	R. Stierum and WP5 members		Ongoing
<b>D</b>	Genotyping to both children and parents or not? smaller # of samples, larger # of SNPs or larger # of samples, smaller # of SNPs? We need to discuss and decide.			
<b>D</b>	We need to have satellite meetings to discuss the technical details. Suggestion to use microbiomics (by S. Banerjee - UPMC). There are recent publications showing higher associations and capturing variability in EWAS studies. Microbiomics, however, was not foreseen in the HEALS DoW - we would need to consider this in the light of adaptation to scientific/technical progress (within the limits of resources of the project).			
<b>A</b>	Framework and best practices for applicability to omics, D 5.1	WP5 members	Month 8	Ongoing
<b>A</b>	Framework and best practices for applicability to omics, D 5.2	WP5 members	Month 12	Ongoing
<b>A</b>	Framework and best practices for applicability to omics, D 5.3	WP5 members	Month 42	Ongoing
<b>A</b>	Framework and best practices for applicability to omics, D 5.4 database of candidate	WP5 members	Month 42	Ongoing
<b>D</b>	Discussion on - satellite discussion between omics experts, - prioritization of samples, - omics to EXHES. For children a sample of 1500 is needed; for other cases it needs to be defined			
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>A</b>	<b>WP6</b> Provided an overview of the objectives of this WP.	S. Karakitsios and WP6		Ongoing

<sup>1</sup> I: information; D: decision; A: action


<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	11/18

	He also gave a detailed technical description of the current state of development of PBPKs in the frame of HEALS. Use of Abraham solvation equation coupled to ANNs allowed much better description of biochemical and metabolic kinetics. He also showed how we will approach chemical interactions during mixture exposure. Next steps would be to link the different classes of enzymes related to their phase I and II metabolism; and to identify interactions among these chemicals (e.g. BTEX). Linkage between PBBK models and gene regulatory networks using dynamic flux balance analysis.	members		
<b>A</b>	Deliverable D 6.1, Modelling module for biomonitoring data assimilation.	WP6 members	Month 30	Ongoing
<b>A</b>	Deliverable D 6.2, Modelling module for assessing population and individual risk from monitoring data. To include the incorporation of a gastrointestinal tract module and a detailed skin absorption model.	WP6 members	Month 42	Ongoing
<b>D</b>	Identify interaction among chemicals.	WP6 members		
<b>A</b>	Generic PBTK	WP6 members	Month 9	Ongoing
<b>A</b>	Lifetime PBTK	WP6 members	Month 11	Ongoing
<b>A</b>	QSAR model	WP6 members	2015	Not yet started
<b>A</b>	Mixtures interaction	WP6 members	2016	Ongoing
<b>A</b>	Bio-monitoring data assimilation	WP6 members	End of 2015	Ongoing
<b>A</b>	Flux balance analysis	WP6 members	by 2016	not yet started
<b>I</b>	The audience asked how this methodology fits to the epidemiological studies and what needs to be addressed; t Internal dose modeling is a bridge between external and internal exposure; it helps translate external exposure to internal dose at the target tissue(s) for specific health outcomes and thus link the external to the internal exposome following a mechanistic approach and not only biostatistical associations. This will help refine the exposure space to which EWAS studies will be performed.			
<b>I</b>	<b>WP7</b> Gave a presentation on the novel methods developed by his team.	D. Sarigiannis		
	<b>Stream 3</b>	<b>J. Bartzis</b>		
<b>I</b>	<b>WP8</b> Presented the list of pollutants considered for the environmental data monitoring analyses.	E. Tolis		
<b>A</b>	Collected a number of analytical procedures QA/QC from the substances collected up to now.	WP8 members		Closed
<b>A</b>	Need to finalize the deliverable.	WP8 members		Ongoing
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>A</b>	They have asked for access to IPChem and ToxHub to gain access to their DB structure. Letter for the coordinators. Need input on the DB format from the modellers. Need to finalize the data protocol of the EDMS. Need to design the IT architecture and prepare the overall deliverable, i.e. the EDMS.	WP8 members		Ongoing

<sup>1</sup> I: information; D: decision; A: action


<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS			
	<b>WP3:</b> Definition of methodological framework		<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis		<b>Version:</b> 2	12/18

<b>I</b>	<p>Identified data sources / databases:</p> <p>Air pollution: Gave an example from Airbase on the structure of the dataset and how we can tap on it for use in HEALS. He gave the example of the BUMA and BUMAC databases (BUMA + consumer products, from the EPHECT project).</p> <p>Water contamination: Another example is the GEMStat.org database from the UN - chemical contamination in water across the world.</p> <p>Food consumption: DAFNE (Food consumption in Greece) - FAOSTAT (food consumption in the world from FAO). EFSA database on food consumption - but not data on food contaminants (they have all the relevant information in the form of .pdf files).</p> <p>Food contamination: Pesticides DB of FAO (Codex Alimentarius) EPIC-Spain</p> <p>Human activity data: EXPOLIS (in Access) CHAD (from the USA).</p>			
<b>A</b>	Task 8.1 (Identify chemical substances done & data classification Data identification and review)	WP8 members	Month 12	Closed
<b>A</b>	Task 8.2 (Quality assessment and control)	WP8 members	Month 24	Ongoing
<b>I</b>	Task 8.3 (First approach on EDMS structure) access to IPCHeM database and the ToxHub platform			
<b>I</b>	<b>WP9</b> Sensors: Technology reasonably reliable and "mature"/ Miniature low-cost sensors not yet ready for use in epi studies / Larger fixed location systems available for some pollutants. We should perhaps focus on a small number of reliable sensors.	J. Cherrie		
<b>D</b>	We envisage doing a pilot study on sensors at TNO, IOM, USTUTT. Other partners could join the pilot if they want.			
<b>A</b>	Deliverable D 9.1, Practical sensor-based exposure monitoring protocol	WP9 members	Month 18	Ongoing
<b>A</b>	Discussions this week & organize tele-conference	WP9 members	Month 6	ASAP
<b>A</b>	<ul style="list-style-type: none"> <li>Select exposure to measure and which sensors</li> <li>Preliminary verification</li> <li>Questionnaires for diet and other measures</li> <li>Start recruitment of 'panels' involving mothers and children at 3 or more centers</li> <li>Start modelling work include agent based models</li> <li>Start panel study in 3 centers</li> <li>Sensors and questionnaires methods</li> </ul>	WP9 members	ASAP	Ongoing
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>D</b>	It was suggested to include the bio-omics in WP 17, in view of the constrained budget. Proposal to use the geo-location and in parallel measuring chemicals to verify the modelling results in the pilot study. It was considered too expensive since the proposed sensors only measure activity.			

<sup>1</sup> I: information; D: decision; A: action


<sup>2</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS			
	<b>WP3:</b> Definition of methodological framework		<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis		<b>Version:</b> 2	13/18

	<b>Stream 4</b>	<b>D. Sarigiannis</b>		
<b>I</b>	<b>WP12</b> Presentation of the WP	S.Nousiainen		
<b>A</b>	Task 12.1, definition of functional specification	WP12 members	Month 10	Ongoing
<b>A</b>	Task 12.2, definition of technical framework and system architecture	WP12 members	Month 18	Ongoing
<b>A</b>	Task 12.3, Development and implementation of the HEALS platform. Methods for generating new data, activity data and indoor quality data Data management systems: Methods for linking exposure to health end points Coarse level sketching of functionality	WP12 members	Month 36	Ongoing
<b>A</b>	<ol style="list-style-type: none"> <li>1. Cataloguing of environmental data</li> <li>2. Details are missing</li> <li>3. Gaps of finished cohorts -- &gt; cataloguing representative but in-depth info is lacking</li> <li>4. Gaps in data (indoor spaces), more detailed requirement on interfaces</li> <li>5. Database design</li> </ol> Suggestions: To end up with: linking exposure dataset with the exposure profile Exposure estimation to a more advanced level to see which data are really needed <ol style="list-style-type: none"> <li>a) LUKAS database could be integrated (on allergy)</li> <li>b) Use old cohorts datasets if a normalization is needed or what type of data are needed; Relevance decrease as time passes, there is no prioritization of how useful they are.</li> </ol> Data management to put the cohort data in datasets in need to select what it is needed	WP12 members	ASAP	Ongoing
<b>D</b>	Close link with WP8 to avoid overlap on the work packages: a) find a common format, b) Step to link external database to be compatible with other existing databases.	WP12 and WP8 members		
	<b>Stream 5</b>	<b>IAM</b>		
<b>I</b>	<b>WP14</b> Presentation of the WP	S. Cerrai		
<b>A</b>	Milestone MS1: review literature and identify gaps	WP14 members	Month 6	Ongoing
<b>A</b>	Milestone MS2: collect data and harmonize them	WP14 members	Month 12	Ongoing
<b>A</b>	Complete the report on the implementation of the HEALS methodology for country-based assessment of all health and exposure outcomes of interest (D14.1)	WP14 members	Month 18	Ongoing
<b>D</b>	We can have a special session on biomarkers for asthma/allergies at the Ljubljana workshop.			
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>A</b>	It is important to highlight the importance of the work on Wp14-16;	WP14	ASAP	Ongoing

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay


 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	14/18

	this is where the main bulk of the project outcomes will come from. More active participation has to come	members		
<b>I</b>	<b>WP15</b> Presentation of the WP	K.Polanska		
<b>A</b>	Have already done some reviews on already published studies - look at stress during pregnancy	WP15 members		Closed
<b>A</b>	G. Calamandrei has already collected information on how many samples and in which matrices additional work has to be done.	WP15 members		Closed
<b>I</b>	<b>WP16</b> Presentation of the WP	I. Annesi-Maesano		
<b>A</b>	Have worked together with G. Viegi in the data collection and the study review - similar mechanistic pathways induced	WP15 members		Closed
<b>A</b>	Deliverable D.16.1: Report on the implementation of HEALS	WP16 members	Month 12	Ongoing
<b>A</b>	Milestone MS 24: completion of literature and identification of gaps	WP16 members	Month 6	Ongoing
<b>A</b>	Milestone MS 25: completion of data harmonization	WP16 members	Month 12	Ongoing
<b>I</b>	Suggestions: <ul style="list-style-type: none"> <li>Type of biomarkers are needed, allergy related, special subsection could be dedicated to this</li> <li>On data needed for external exposure; can exposure cover an entire life: this depends on the study, i.e. population related to the available monitoring data</li> <li>Collect existing data, allergies studies</li> </ul>			
<b>I</b>	WP15/16/17: exposure harmonization			
<b>I</b>	WP 14 is a good cohort, very suitable case study for WP 13 to test the philosophy using the Stream 3 data			
<b>I</b>	It was noted that HEALS has been built to also use the available data of the exposure analysis and the linkages between steps			
<b>D</b>	No need to do assessment EU wide: do in small areas instead			
<b>I</b>	<b>WP17</b> Presentation of EXHES protocol	I. Annesi-Maesano		
<b>I</b>	Showed specific objectives of the study.			
<b>A</b>	Phase I protocol almost completed. Need to work still on HBM Major environmental stressors identified Major single phenotypes targeted Major organ/tissues specimens collected Possibility to include New Caledonia (??) I. Annesi Maesano suggested to study the microbiome (satellite case study) Identified the contents of the questionnaire: Indoor air quality and building characteristics, noise, radiation, same toxicants POPs, physical activities, social/environmental census data, green-spaces and other wellbeing characteristics We need to think of freezers and ethical aspects.	WP17 members	ASAP	Ongoing
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>I</b>	Recommendation by the audience: personal exposure residential mobility and time-activity patterns to be developed. It was suggested by the audience, that protocol should include the timing to begin the data collection, sampling twice and the re-use of the			

<sup>1</sup> I: information; D: decision; A: action

<sup>2</sup> For actions: Ongoing, Closed or delay




 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS			
	<b>WP3:</b> Definition of methodological framework		<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis		<b>Version:</b> 2	15/18

	samplers.			
<b>D</b>	It was decided that the protocol should be sent by the HEALS PI to 10 countries.			
	<b>Stream 6</b>	<b>M.Schuhmacher</b>		
<b>I</b>	<b>WP18</b> Presentation of the WP	S.Bose-O'Reilly		
<b>I</b>	Information is exchanged with stakeholders for the WP19			
<b>A</b>	Milestone MS34: HEALS website is operational.	WP18 members	Closed	
<b>A</b>	Deliverable D19.1: web-based training and dissemination. The Moodle platform will be used and it will be linked directly to the HEALS web portal.	WP18 members	Month 6	Ongoing
<b>A</b>	WP 18 Training questionnaire and e-learning platform is completed	WP18 members		Closed
<b>A</b>	Deliverable D18.1: Internet training plan and material.	WP18 members	Month 12	Ongoing
<b>A</b>	WP 19: who-is-who, conference and stakeholder list, newsletter list are all completed, publications to be placed in zend.org	WP18 members		Closed
<b>A</b>	Milestone MS31: prepared from the Munich meeting	WP18 members	Month 12	Ongoing
<b>I</b>	<b>WP19</b>	J.Grimalt		
<b>A</b>	Milestone MS 35: dissemination strategy development		Month 12	Ongoing
<b>A</b>	Conference abstract submission dates: EAAC? congress		Month 6	Ongoing
<b>A</b>	50 <sup>th</sup> Eurotox congress Suggested by the audience the use of Mendeley and Moodle for sharing papers		Month 7	Ongoing
<b>A</b>	Start of the e-learning platform- live demonstration	S. Bose-O'Reilly	September 17, 2014	Ongoing
<b>Type</b>	<b>Session 2: HEALS concept and methodology workshop</b>	<b>Who</b>	<b>Estimated date</b>	<b>Status</b>
<b>I</b>	<b>Part A: external exposome</b>	A. Gotti, E. Oliveira-Fernandes		
<b>I</b>	Measuring external exposome in the context of HEALS Made a first suggestion how to proceed with the exposome	J. Bartzis		
<b>I</b>	How personal sensors can support external exposome at individual level. Examples of personal sensors which can be used for babies include My sensible baby (mysensiblebaby.com) Mimo Baby (mimobaby.com) Post processing data is the critical part in getting the information. Dylos need a laser system. New monitors coming from China are much cheaper - with very good correlation with the Dylos - the problem is with the data visualization. Oregon State University has just produced a wrist band (made of silicon) that can measure many pollutants incl. POPs, etc. Focus on some concrete data requirements and, on that basis, choose the sensors to use..	J. Cherrie		
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>D</b>	NEED TO SET UP A WORKING GROUP ON THE SENSORS.			

<sup>1</sup> I: information; D: decision; A: action

<sup>2</sup> For actions: Ongoing, Closed or delay


 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	16/18

	<ul style="list-style-type: none"> <li>• Discussion on the type of sensors that measure pollution both indoor and outdoor</li> <li>• Idea of silica bands that measure nicotine, discussed the use of passive samplers</li> <li>• It was discussed on the connection between the substrate and the concentrations in some critical spaces (area distributed) and the problem of doses.</li> <li>• It was also discussed which pollutant to choose and what the aim should be: to measure as much as you can and integrate these data to the exposome (from the different sources)</li> </ul>			
<b>I</b>	<p>The role of agent-based modeling in constructing the exposome (C Sabel)</p> <p>Good overview of agent-based modeling and of the exposome - some slide on social aspects.</p>			
<b>D</b>	<p>Agnostic individual exposome has to be the main thrust of the project - explore what this concept will bring downstream.</p> <p>It was pointed out that there is no typical person in exposome, all exposure parts should be brought together; the information should be synchronized and fused (i.e. firstly focus on the outcomes and then build the exposure).</p> <p>Exposome in relation to the agent: an agnostic – untargeted individual whom we measure his exposure.</p> <p>A meeting from Stream 3 needs to be scheduled</p>			
<b>I</b>	<p>Data integration - exposure monitoring throughout lifetime (R. Friedrich)</p> <p>Minimum pollutants suggested: PM2.5, NO2 in ambient and indoor air and NOISE, since all these have a very small uncertainty an order of magnitude, as compared to pesticides which have 3 orders of magnitude.</p>			
<b>D</b>	It was suggested to divide pollutants with regard to the exposure routes.			
<b>I</b>	<b>Part B: internal exposome</b>	<b>G. Calamandrei, L. Leondiadis</b>		
<b>D</b>	<p>Human Biomonitoring in the context of HEALS: links with -omics (M. Horvat)</p> <ul style="list-style-type: none"> <li>• Harmonization is needed</li> <li>• Associate biomarkers to what we have to do: EWAS: samplers available in bio-bank WP 14/15/16 and other studies</li> <li>• Biomarker available data (exposure and omics)</li> <li>• Exposure markers and omics analysis, suitability of existing samples in bio-banks, new sampling is suggested (e.g. in saliva)</li> <li>• Discussions on the number of samples needed, metals and organics require a small number of samples, keep samples at very low temperature -80°C</li> </ul>			
<b>Type<sup>1</sup></b>		<b>Who</b>	<b>Estimated date</b>	<b>Status<sup>2</sup></b>
<b>D</b>	Functional integration of -omics technologies in the HEALS			

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay




 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	17/18

	exposome concept (R. Stierum) Metabolomics: saliva samples are usual in the USA, suggested to be also used in HEALS, list what is already collected from the cohort studies from the –omics.			
<b>I</b>	Internal dose modeling a bridge between external and internal exposure.	D. Sarigiannis		
<b>A</b>	Administrative and financial issues update <ul style="list-style-type: none"> <li>There are two deliverables due in May 2014 and there is a general assembly in Edinburgh in September 2014. There is a interim report and review in March 2015</li> </ul>	A. Ostyn	Month 8, Month 12, Month 17	Ongoing
<b>D</b>	<ul style="list-style-type: none"> <li>Suggested the differentiation between two groups the Administrators, Pls and the Scientists. Communication via email was suggested to have as subject the HEALS acronym. Suggested to archive information to the intranet as well.</li> </ul>			
<b>I</b>	<b>Wednesday March 19, 2014 Part C: data management and modeling for EWAS</b>	<b>S. Boese-O'Reilly, K. Polanska</b>		
<b>I</b>	Building the HEALS Geodatabase platform Discussed on the period that data would be available on the server and in relation to the ethics that these data may have <ul style="list-style-type: none"> <li>Discussed on a differentiation between the availability of data for public use and the data for the HEALS members.</li> </ul>	S. Nousiainen		
<b>I</b>	Environmental data mining and management. Discussed in general on data mining and data management.	K. Karagiannis		
<b>I</b>	Novel bioinformatics strategies for biomarker prediction Discussed I on bioinformatics strategies that could be used in HEALS.	C. Papaloukas		
<b>I</b>	Biostatistical methods for EWAS Discussed biostatistical methods that could be used in HEALS.	S. Banerjee	Month 8	
<b>D</b>	Discussed the training needs for participants and this should follow in Ljubljana, suggested the idea of lectures to be uploaded.	S. Banerjee	Month 8	
<b>I</b>	The HEALS trademark: Environment-wide associations linking environmental exposures to health outcomes. Gave a methodological overview of the EWAS paradigm of HEALS supported by concrete examples from pre-existing datasets.	D. Sarigiannis		
<b>D</b>	<b>HEALS methodology workshop closure Workshop conclusions drawn:</b> <ol style="list-style-type: none"> <li>1. We need data from the existing cohort studies</li> <li>2. To provide several tools in different ways. There is a need for a utility for the project to be useful to the general population to prevent disease in the long term, the idea of easy tools (harmonized) for comparable results was suggested..</li> <li>3. Focus on technology and how to engage and bring together the different groups and encourage groups to have separate meeting.</li> <li>4. Important to bring streams 2 and 3 together, arrange a web conference. To talk on exposome and how to bring the information together and to prioritize the methods available.</li> </ol>	D. Sarigiannis, I. Annesi-Maesano		

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay

 <b>HEALS</b> FP7-ENV-2013-603946	D3.1 - Workshop on conceptual framework of HEALS		
	<b>WP3:</b> Definition of methodological framework	<b>Security:</b>	
	<b>Author(s):</b> Prof Denis Sarigiannis	<b>Version:</b> 2	18/18

	<p>5. A milestone for Ljubljana is the combination of external exposure and omics and to encourage people to do real world work in the lab, in order to be ready for evaluation in Edinburgh.</p> <p>6. Training on biostatistics would be useful, on the biomarkers of effect and of exposure</p> <p>7. Future presentations should be shorter in length and more concise, to provide extra time for the discussions.</p> <p>8. Internal meetings within the streams are needed. The project PIs encourage the set-up of ad-hoc meetings among the WP leaders</p> <p>9. This workshop provided the opportunity for project members to see where they fit in.</p> <p>10. It was decided that in the next project meeting a template could be used for presentations, to provide the most to the point information possible..</p> <p>11. It was suggested that for future meetings, input from people participating is needed and the audience should clarify what they expect to hear and see (perhaps via questioners). The workshop program should not be prepared the last week prior to the scheduled meeting.</p> <p>12. It was realized that the EWAS is the heart of the HEALS project</p> <p>13. Lastly, it was suggested that there are four critical stages during a project's life, a) the process of forming (where people try to see where they fit in), b) the storming (where people try to see what the personal benefit is), c) the norming (the harmonization) and d) the performing (where the project gets accomplished). In the current phase most people in HEALS fit in the first stage and the remaining in the second.</p>			
<b>A</b>	Workshop on Agilent exposomic workflows Use of advanced analytical and -omics technologies for exposome research both in the EU and the USA. Implications for HEALS (co-hosted by Agilent)	Agilent	March 19, 2014	Closed

<sup>1</sup> I: information; D: decision; A: action

<sup>1</sup> For actions: Ongoing, Closed or delay