



Deliverable – D4.3

Summary report on use of the platform for 9 months
at all the pilot sites

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SUMMARY	Exploitation of the Platform during the Large Scale Pilot Execution and thr change management tasks in the three organisations.

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Glossary - general

3G connexion : Internet connexion using third generation of mobile phone net

ADSL : Asymmetric Digital Subscriber Line

BMI : Body Mass Index

BPd : Diastolic blood pressure

BPs : Systolic blood pressure

Ethernet connexion: Internet connexion using Ethernet link

GP : General Practitioner

HDIM : Home Dietary Intake Monitoring

HDMI : High definition Multimedia Interface

HHR : Home Health Record

HHR- Pro : the part of HHR displayed on PC/Tablets

HHR-Home : the part of HHR displayed on TV

MNA – SF: Mini Nutritional Assessment - Short Form

MUST : Malnutrition Universal Screening Tool

NYHA : New York Heart Association

SF-36 : 36 Items - Short Form Health Survey

SNAQ : Simplified Nutritional Appetite Questionnaire

Glossary – specific diagnosis

ANX: Anxiety-/ Panic disorders

ARTHRIT: Osteoarthritis of the hips or knees

ASTHMA/BRONCH: Asthma, chronic bronchitis, emphysema

CARDINS: Heart incapacity

CHEMOTH: Cancer (not under chemotherapy)

CNSLD: Chronic non specific lung disease

COGNIMP: Mild cognitive impairment

COPD / CATLUNG: Chronic Obstructive Pulmonary diseases

DEPRESS: Depression

DIAB: Diabetes

HEARING: Hearing problems

HIPREP/HIPFRACT: Broken hip

HYPERC/: Hypercholesterolemia

HYPERT: Hypertension

INCONTINENT: Urinary Incontinence

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KNEEREP: Other bone fractures (other than broken hip)

LUPUS: Lupus

OSTEOP: Osteoporosis

OVERW: Obesity (with sarcopenia)

PARKIN: Parkinson

PROSTAT: Prostate problems due to benign prostatic hyperplasia

RENALINS: Renal failure

SPINEPROB: Spine problem

STROKE/CEREBINFR/CATBRAIN: brain stroke

TIA, BRAINHAEM: Cerebral vascular incident, cerebral infarct

VISION: Visual problems

PHYSIODOM-WP4 – LARGE SCALE PILOT EXECUTION – LSPE

DELIVERABLE D4.3 - SUMMARY REPORT ON THE USE OF THE PLATFORM FOR 9 MONTHS AT ALL THE PILOT SITES

PREAMBLE

The purpose of this deliverable is to describe the use of the PhysioDom platform deployed across a broad area at each of the three pilot sites, meeting the description written in the deliverable D4.1 -

See - [Annex 5 – Deliverable D4.1](#).

As we have already described the territory, the platform’s general schema and the home equipment, we will not dwell on these points in this document.

IN SUMMARY

We will present: recruitment and drop-out, services provided at each site, dynamics of the platform’s operation with general usage data, training, maintenance and HDIM, core of the project, with its four levels of services.

Work on Change Management in the Organizations is described here with a study specific to each pilot and a summary.

The outcomes of the studies will be presented here briefly. More details can be found in the ad hoc deliverables :

- The Acceptability - See – [Annex 10 – Acceptability study](#)
- Metrics of Success based on tables presented – See - [Annex 5 – Deliverable D4.1](#) – page 60 to
- Usefulness, Efficacy and Efficiency, the core of the WP5, presented in detail in deliverable D5.1
- In light of comments made in previous review each Pilot site responds the current situation at the end of the large Scale Pilots Execution – LSPE.

Pilot location	What is the impression of the Pilot sites at the end of the Large Scale Pilot Execution LSPE phase
Terrassa (SP)	During the project the beneficiaries who have finished the project have shown a high level of commitment with Physiodom system. A large number of them want to continue with the telemonitoring. In the other hand, the professionals had been enrolled with the project as it advanced,

	<p>A large number of participants have been successful with the aim of Physiodom, improve their life. Most of them have lost weight and increased the level of physical exercise, two of the fundamental and most important pillars of healthy aging.</p>
<p>Cybermoor (UK)</p>	<p>The project has been a great success at engaging participants to exercise more and better manage their weight. The simplicity of the TV set top box interface has been welcomed by participants who find it difficult to use computer and smartphone based ICT. Healthcare organisations have welcomed the intervention and the project is now being developed further with Sport England to encourage over 55s to become more active.</p> <p>One participant lost 29kg from a starting weight of 103kg through increased exercise and improved diet. He was in his late 60s, obese and unwilling to exercise in public. He used the pedometer to walk around his home, tracking his daily activity. This built his confidence and PhysioDom provided the incentive for him to change his lifestyle. In rural areas, with difficult access to leisure facilities, there is enormous scope for personalised home based interventions like PhysioDom. Another success was video consultations with a dietitian – this had not been done before in Cumbria and was a rich experience for the participant and the dietitian, reducing costs.</p>
<p>Nunspeet (NL)</p>	<p>The PhysioDom project has been successfully implemented within two health care organizations in two different regions in the Netherlands. A team of nurses and dieticians have enthusiastically adopted and implemented PhysioDom as a way to enhance health care by focusing on prevention and a healthy lifestyle. Also participants showed a positive attitude towards the project, with a satisfaction rate of 4 out of 5. Many participants mentioned that PhysioDom was a ‘stimulus’ to be physically active and to improve diet. Compared to the pre-pilot, usability of HHR Home has drastically improved, providing the elderly participants an easy and convenient user experience.</p>

Table 1: Pilot sites assessment

PO Recommendations

Three of the PO’s twelve recommendations will be addressed directly in this deliverable :

R1 : It must be demonstrated how the nutritional service will be structured, and how the set top box technology will benefit this service. This includes monitoring of nutritional choice and validating od dietary coaching services – See - page 12

R7 : It must be demonstrated how external motivation issues are addressed with PhysioDom-HDIM – See - page 13

R9 – The consortium must reinforce its commitment to engage with healthcare providers for a realistic chance for successful integration of care – See - [Annex 8 – Responses to the R9 - PO Recommendation](#)

1 - INTRODUCTION

1.1 - OBJECTIVES

1.1.1 - FROM THE DOW

The DOW gives the key features of the use of the PhysioDom platform

- To operate the PhysioDom-HDIM platform under good technical conditions, on a large scale over a given area, involving a target population of seniors with variable physiological conditions, suffering from chronic diseases or not, and cared for by the local assistance services providers.

With some changes since the last publication of the DOW in July 2013, mainly -

- The number of beneficiaries recruited – 175 before drop out, and consequently, the number of Professionals involved in the ad hoc services which is reduced.
- The time of the study, shortened to nine months.

From the time of deployment of the platform, the use of the platform is comprised of two main groups of tasks - See – [Annex 5 – Deliverable D4.1](#) pages 8/9

- For each Pilot site
 - Operation of the Coordination, and Dietary and Physical Activity Monitoring and Coaching service
 - Training activity to complete the last one given during the first phase of WP4
 - Study on use (Acceptability) of the tools made available: TV set and HHR, as a supplement of the work done in WP3
 - Involvement of the Dietary Coaching Service in the research aspects with UREN
 - Propose suitable elements of business cases according to the commercial regulations of the country in question, under the supervision of Viveris in charge of WP7
- To be shared among the Pilots
 - Technical administration and operation of the central data warehouse
 - 3rd level maintenance
 - Publication of the outline for the summary report given to each Pilot site

1.1.2 - FROM THE FIRST PHASE OF THE PRE-PILOT STUDY (WP3)

The Study Phase (April/December 2016) has followed the main recommendations in conclusion of the Pre-Pilot study, well established in the deliverable D3.3 – See – [Annex 5 – Deliverable D4.1](#) pages 13 to 19

The main chapters concern:

- Use of the platform
- Clinical data trading report – Physiological data, Messages, Symptoms, Questionnaires
- Maintenance Activity – Interventions
- HHR modifications tasks on HHR-Pro / HHR-Home
- The features specified during the study phase

- Training activity – Sessions – Tools
- Drop out and Maintenance activity assessment
- Recommendations from the Acceptability study (WP4)
-

1.1.3 - FROM THREE OF THE PO RECOMMENDATIONS FOLLOWING THE RP2 MEETING IN ALSTON

R1 : “it must be demonstrated how the nutritional service will be structured, and how the set top box technology will benefit this service. This includes monitoring of nutritional choice and validating of dietary coaching services”.

Answer

How the nutritional service is structured?

The nutritional service was presented several times in two deliverables:

- General organization of the three Pilot sites – set up of the Coordination, set up of the Physiodom Services – See : [Annex 3 – Deliverable D3.2](#) pages 8/9
- Nutritional and Physical Activity Coaching during the Study phase – See: [Annex 5 – Deliverable D4.1](#) pages 27 to 46

This service is described through five phases, for a beneficiary living in a PhysioDom territory:

- Phase 1 – Diagnosis of the Dietary Coaching needs
- Phase 2 - Communication and Prescription of the PhysioDom-HDIM service
- Phase 3 – Home equipment and training of the beneficiary
- Phase 4 – Nutritional and Physical Activity coaching:
 - Level 1 – Automatic monitoring from the system
 - Level 2 – Alert monitoring from Professionals
 - Level 3 – Dietary Coaching services - at home or remotely
 - Level 4 – Medical intervention
- Phase 5 - Cancelling PhysioDom subscription

How the set top box technology will benefit to the dietary coaching service

The set top box is used in all phases. Different arguments can be advanced for each of these phases, for both Beneficiaries and Professionals.

Arguments	Hub for Sensors IOT	Large public item (TV)	Security (data) Truthfulness	Acceptability*	Usefulness*	Price (cheap)	Maintenance
Phase 1		*					
Phase 2		**	**	**	**	**	
Phase 3		**		**	**		
Phase 4 – L1	**		**				**
Phase 4 – L2			**				
Phase 5							**

Table 2: Set top box benefices

R7 :“It must be demonstrated how external motivation issues are addressed with PhysioDom-HDIM “

CST - Response

The external motivation has been addressed in different ways:

The professionals have sent **2297 messages**, inside these messages there were two kind of information with the aim of motivate the beneficiaries, one of them were to motivate if the beneficiary was doing well the diet en the exercise plan, other were to inform the beneficiary about community activities like hikes or social activities in the community house and encourage them to participate.

Another strong point of motivation was the professionals for themselves; the beneficiaries knew that the community nurse was behind the system and taking care of them. This make them feel safer because of the therapeutic relationship between the beneficiary and the Healthcare professional. These professionals made **regular phone calls** to the beneficiary in order to motivate them to continue in the cases of good compliance and to try to help in the cases of bad compliance - Libro I pododmetro call center

R9 –“The consortium must reinforce its commitment to engage with healthcare providers for a realistic chance for successful integration of care”

- **CST / CYB - Responses** – See - [Annex 7 – Responses to the R9 - PO Recommendation](#)

- **WU - Response**

Wageningen University has fully engaged with two health care organizations (Zorggroep Noordwest-Veluwe and Opella (each over 1500 patients) for implementation of the project. Wageningen University was responsible for overall coordination, technical deployment and training of health care professionals and beneficiaries.

The care organizations were responsible for employing the telemonitoring system and providing adequate follow-up of telemonitoring alerts. In this way, PhysioDom was embedded within regular working routine and working procedures of the nurses and the care organization as a whole.

2 – CALENDAR

Place of LSPE in the global schedule of the Project

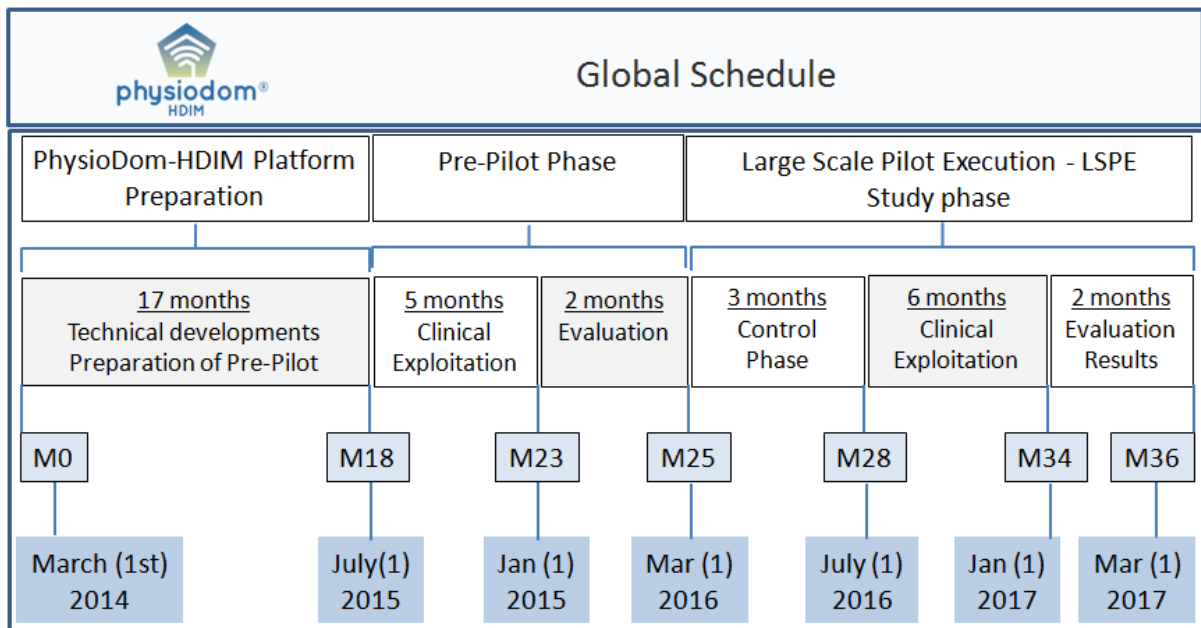


Table 3: Global schedule of the project

This table summarizes the work done from M25 to M34 through two phases – Control Phase and Clinical Exploitation - for CST and CYB.

A two-month Evaluation Phase followed from M34 to M36, ending on the 28th of February 2017 (end date of the project).

WU conducted its study following a different design: presence of a Control group.

For CST and CYB, the Clinical Exploitation phase ended on the 31st of December 2016.

For WU, the Clinical Exploitation phase ended on the 31st of January 2017.

For more information on study designs – See - [Annex 1 - Deliverable D1.1](#) pages 9 to 14

3 - THE LARGE SCALE PILOT EXECUTION PHASE ORGANIZATION (REMINDER OF D4.1)

On each Pilot site, the implementation plan of **the general organisation** has been well described in the deliverables - See - [Annex 5 – Deliverable D4.1](#) pages 13 to 20

The plan presented in the D4.1 were fully respected in the study through two chapters:

3.1 – THE PILOT SITES ORGANISATION

3.1.1 - THE SOURCE POPULATION FOR THE LSPE - SYNTHESIS

CST



Identified 14.000 suitable participants according with the inclusion criteria in the area of these four primary healthcare centres: **“Terrassa Nord”, “Sant Illatze”, “Matadepera” and “Anton de Borja”**

Figure 1: CST territory

CYB



The source population for the LSPE consisted of community dwelling older adults. Many have been referred by Age UK South Lakes, Age UK Carlisle and Eden and Age UK Northumberland. The Age UK South Lakes covers the South of Cumbria in North West, and have

over 10,000 Figure 2: CYB territory

clients who access their services.

- 4,000 clients have continuous contact/care
- 2,000 clients have Heavy duty/intensive contact/care.

The pilot area has extended to cover **Carlisle** and **Eden** and **West Northumberland** to increase the potential of recruiting sufficient participants in the LSPE. Other organisations such as **South Lakeland Housing and Eden Independent Living** have also referred participants to the project.

WU



The source population for LSPE consists of community dwelling older adults who receive home care from care organization **Zorggroep Noordwest-Veluwe (ZNWV)**.

The ZNWV provides a broad range of care in institutions and among community dwelling older adults in the region north west veluwe in the netherlands (total number of clients = 1500).

Figure 3: WU territory

3.1.2 – THE DEVICES MANAGEMENT

Through four groups of tasks on each Pilot site:

Goods ordering and reception: Scale, BP monitor, pedometer, TV Box, Components order, Dongle 3G HUAWEI, SIM Card

Inventory: corporate inventory, labelling, listing of all the equipments

Connexion of the TV Boxes to PhysioDom service: allocation of a TV box to each beneficiary, update of item data sheet, Monitoring balance of pay as you go HiOP SIM cards.

Setup of the TV Boxes and devices: TV box set up, Beneficiary profile creation, devices set up with clinical information.

All the devices were delivered (Viveris) to the three Pilots at the first of May 2016 allowing the beginning of deployment just after the recruitment phase.

Tasks	CST
- Goods ordering and reception	Albert Marquez
- Inventory	Albert Marquez
- Connexion of the TV Boxes to PhysioDom service	Albert Marquez +
- Set-up of the TV Boxes and devices	Albert Marquez

Tasks	CYB
- Goods ordering and reception	Kevin Wood + Yvonne Glendinning + Dave Thomson
- Inventory	Yvonne Glendinning
- Connection of the TV Boxes to PhysioDom service	Daniel Heery + Yvonne Glendinning+ Dave Thomson + Sue Gilbertson
- Set-up of the TV Boxes and devices	Yvonne Glendinning+ Dave Thomson + Sue Gilbertson

Tasks	WU
- Goods ordering and reception	Marije Van Doorn + Annemien Haveman
- Inventory	Marije Van Doorn
- Connexion of the TV Boxes to PhysioDom service	Marije Van Doorn + Mirthe Groothuis
- Setup of the TV Boxes and devices	Marije Van Doorn + Mirthe Groothuis

Table 4: Devices management on pilot sites

3.1.3 - OVERVIEW ON THE PRE-PILOT PLATFORM





- Professional section

	PhysioDom-HDIM – WP4 - LSPE phase Platform for the Professionals
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	Professionals				Platform for Professionals							
					PC - Internet link			Browsers		Office software		HHR Pro
	Coord	GP	Nurse Nutritionist	Social Worker	ADSL	3G (+ Tablets)	Other	Google Chrome	Other	Microsoft	Other	
CST	2	5	23+1	2	x			x		x		x
CYB	2	2	2	5	x			x		x	x	
WU	2	0	4 dieticians 8 nurses	0	x			x		x		x
Total	6	7	38	7	X			X		X		X
Total Prof.	58											

Table 5: Platform for the professionals

 – Home section

PhysioDom-HDIM - LSPE phase Home Equipment									
	Number of Beneficiaries involved in the LSPE phase At M0	TV-Box - STM + Dongle Bluetooth 4.0 USB-BT4LE + Dongle 3G Huawei E3131H-2 USB				Scale A&D + impedance meter UC-351PBT-CI	Tensiometer A&D UA-767PBT-Ci	Pedometer A&D tri-axial UW-101B	Others devices
									
		3G	ADSL	Other	Total				
CST	126	x			111	111	51	126	3 glucometers
CYB	156	10	146		110	110	35	156	10 glucometers
WU	92*	n.a	n.a		83	83	24	92	25 tablets
Total	374				304	304	110	374	38

*WU run the recruitment to the end of September 2016

Table 6: Home equipment

WP4 - LSPE - Equipment of the Professionals
58 Professionals / ADSL / Chrome / Microsoft
WP4 - LSPE – Home equipment
374 Beneficiaries / 304 Homes 304 TV box 304 Weight scales 110 Blood pressure monitors 374 Pedometers 13 Glucometers 25 Tablets

Table 7: PhysioDom - global equipment synthesis

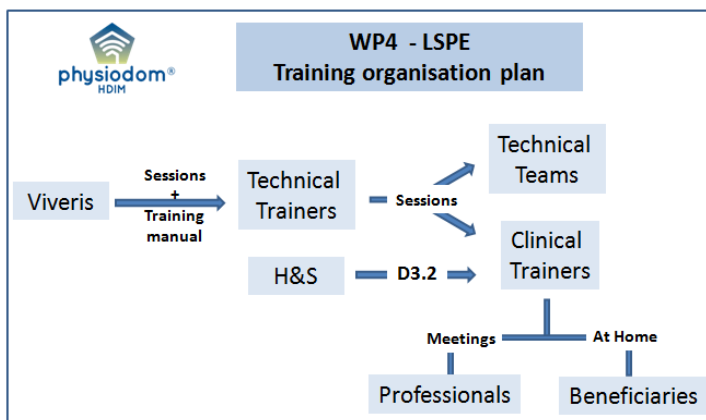
3.1.4 – THE DEPLOYMENT

Focused on the Home equipment through four groups of tasks:

- to prepare the kit including all items necessary for each beneficiary: TV box, Scale, pedometer, BP monitor (if necessary), Bluetooth dongle, SIM card dongle, SIM card, HDMI cable, plus additional electric cables and adapters;
- to deploy the TV box in each home according with the TV box manual installation – See – [Annex 8 – Home box installation manual](#)
- to complete the Home box installation form report for each beneficiary;
- to manage the connectivity: 3G, using an extended USB cable for the 3G dongle, using an Ethernet cable connected to the router, home plugs to connect router / HHR home in different rooms.

The deployment comes to the end at the first of July for the three Pilot sites, for a six months follow-up by the 31st of December 2016.

3.1.5 – THE TRAINING



The basics of the training in PhysioDom-HDIM were published in the document – WP3 – T3.5 Teaching and Training tasks – See – [Annex 3 – Deliverable D3.2](#) pages 29 to 37. During the study period the training tasks were significantly reduced in both groups, but always carried out following the schema. presented in - See [Annex 5 – Deliverable D4.1](#) pages 15 to 18.

The main data are summarized in

two tables on below.

Figure 4: Training organisation


	WP4 - LSPE phase Training of Professionals				
		CST	CYB	WU	Total
Appointments	Easy	X	X	X	X
	Difficult		1		
Trainer (Nb)	Technician from Pilot		1	1	2
	Prof. Medico-Social				
	Specialist in Training		1		1
	Others	2	3	2	7
Trained Persons (Nb)	GP	5	1	0	6
	Nurses	23	2	8	33
	Nutritionists	2	5	4	11
	Social workers	1		0	1
	Others	0	6	0	6
Sessions	Group learning (Nb)	7-13	4	2	
Where	Primary care centres	X	X	X	X
	Pilote sites offices				
	Professional venues		X		X
When	During PC Equipment		X		
	Special session	X	X	X	X
Nutritional Session	Yes	No		X	
Involvement	Very good		X	X	X
	Good	X	X		X
Encountered problems	Technical	X	X		
	Understanding	X	X		
Manual	Yes	Yes		X	
Good results	100%		X	Not measured	
	70%	X			
	50%				

Table 8: Training of the professionals – results

PhysioDom – WP4 – LSPE – Professionals training form	
Trained persons	57
Trainers	10
Sessions	20 - Primary care centres + Professionals venues
Involvement	Very good / Good
Problems	Technical / Understanding
Results	Good – 70%

Table 9: Training of professionals – synthesis


	WP4 – LSPE phase Training of Beneficiaries				
		CST	CYB	WU	Total
Trained persons	Beneficiary	126	156	92	374
	Family (with beneficiary)			1	1
Session	Face to face	X	X	X	X
Time	1h	X	X	X	
	2h		X	X	
	More	X			
Where	Primary health centre	X			
	home	X	X	X	X
Who	Prof. Home equipment	X	X	X	X
	Prof. Médico-social	X	X		X
When	During home Equip.	X	X		X
	Special session	X		X	
Involvement	Very good		X	X	X
	Good	X		X	X
Problems	Technical	X	X	Some	X
	Understanding	X	X	Some	X
	Involvement				
Good results	100%			We did not measure this	
	70%	X	X		X
	50%				
	Less				

Table 10: Training of the beneficiaries – results

PhysioDom – WP4 – LSPE – Beneficiaries training form	
Trained persons	374 + one family
Trainers	Professionals home equipment / medico social services
Sessions	>2h at home, during equipment + special sessions
Involvement	Very good / Good
Problems	Technical / Understanding
Results	Good – 70%

Table 11: Training of beneficiaries - synthesis

3.2 - INCIDENTS MANAGEMENT

This service has been organized following the rules presented in D4.1, through a call center set up on each Pilot site with a responsible well identified – See : [Annex 5 – Deliverable D4.1](#) pages 18/19

The technical incidents were managed by the technical teams of each Pilot site – maintenance level 1 with, if necessary the help of Viveris – maintenance level 2. The results are published in this document – See § 5.4 – General maintenance activity– page 39

The clinical Incidents encountered during the Study Phase (Alerts / Warnings) are presented in this document – See: § 6 – Dietary and Physical activity coaching – page 42

4 - RECRUITMENT

The selection of the beneficiaries had taken in consideration the DOW and the Design study as noticed in the D4.1: See – [Annex 5 – Deliverable D4.1](#) – page 20

- The core of the project – the Dietary and Physical Activity coaching.
- The five main categories of Beneficiaries: “Healthy and independent old people, Older people at risk of dependency, Independent patients + chronic diseases, Pre-frailty patients, Nursing home patients”.
- The design study which has limited the recruitment to 175 beneficiaries for a nine month study divided in two parts :
 - A Pre-Phase/Control phase, from M-3 (1st April - 2016) to M0 (1st July – 2016) with two sample of data at the beginning and at the end of the period.
 - A Post-Phase/Intervention phase M0 (1st July - 2016)to M6 (31 December - 2016) with continuous monitoring of the selected parameters + Dietary and Physical activity coaching
- The special WU design study with two groups - intervention and control groups studied from May 2016 to February 2017.

4.1 - THE SOURCE OF POPULATION AND RECRUITMENT PROCEDURES

For a complete description– See – [Annex 5 – Deliverable D4.1](#) – pages 20 to 22

4.2 - PARTICIPANTS WILL COMPLY WITH THE FOLLOWING CLINICAL INCLUSION AND EXCLUSION CRITERIA IN THE THREE PILOT SITES:

4.2.1 - INCLUSION STRATEGY

Inclusion criteria

Older than 65 years with clinical health records existing in databases or not

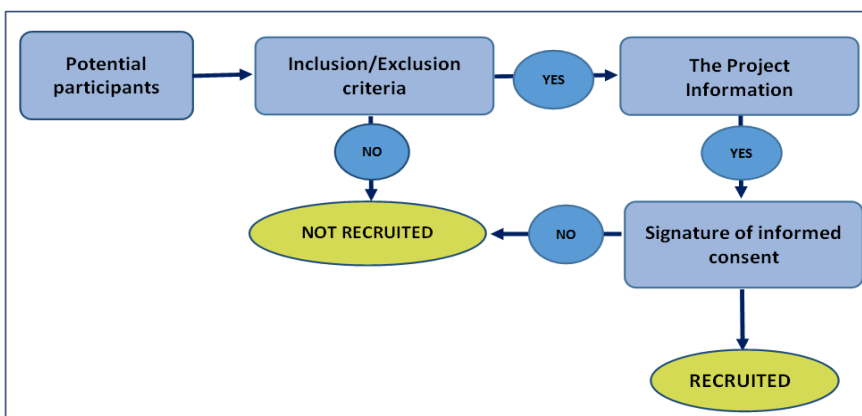
Profile: (Pre frailty, Undernutrition, Obese, Active + Chronic pathologies)

Main Indications:

- Cardiac Insufficiency, levels I and II
- Renal Insufficiency
- Hypertension (firsts phases)
- COPD (firsts phases)
- After chemotherapy (> 1 month)

Exclusion criteria

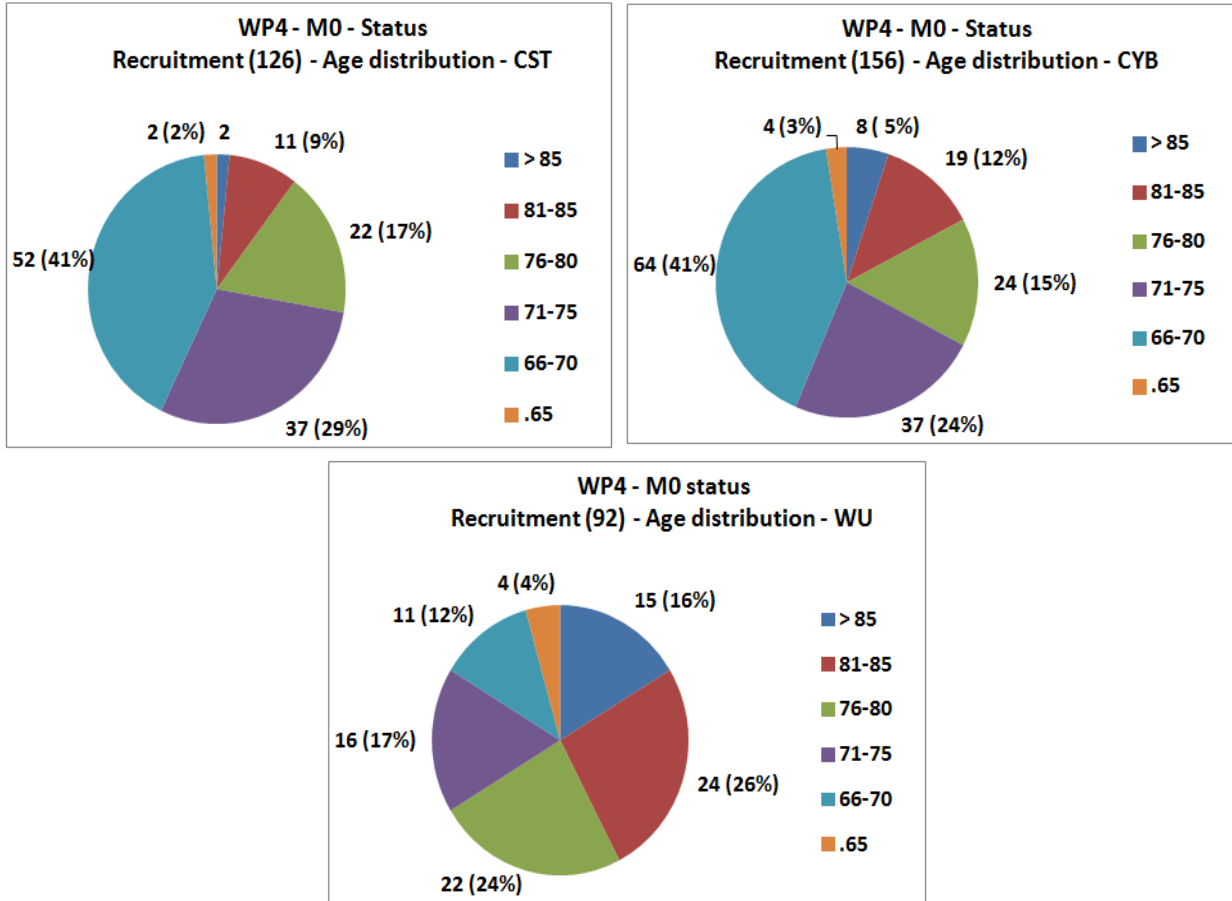
- < 65 years
- With life expectancy < 6 months
- Excluding people with:
 - Dependency;
 - severe cognitive impairments such as Alzheimer;
 - severe visual impairment;
 - physical impairment;
 - under chemotherapy.



Opposite, is the schema followed for recruitment at the three Pilot sites

Figure 5: Schema of the recruitment process for the study phase

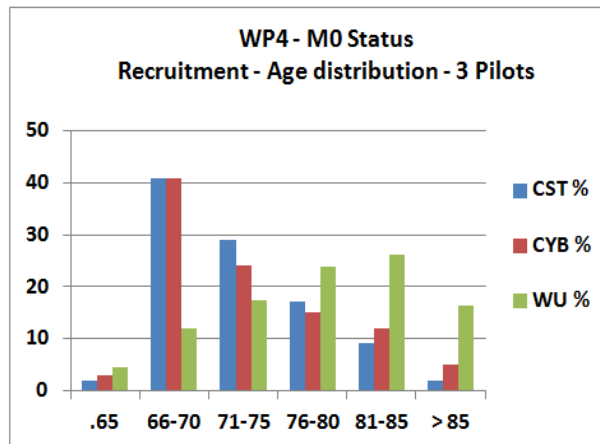
4.2.2 - AGE DISTRIBUTION



Age	CST - %	CYB - %	WU - %
85 - 95	2	5	16
81 - 85	9	12	26
76 - 80	22	15	24
71 - 75	37	24	17
66 - 70	41	41	12
.65	2	3	4

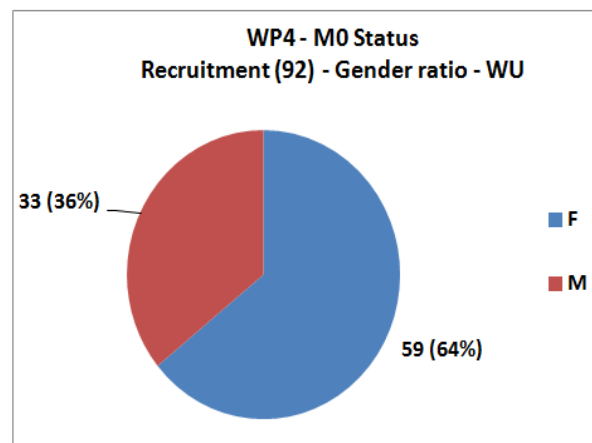
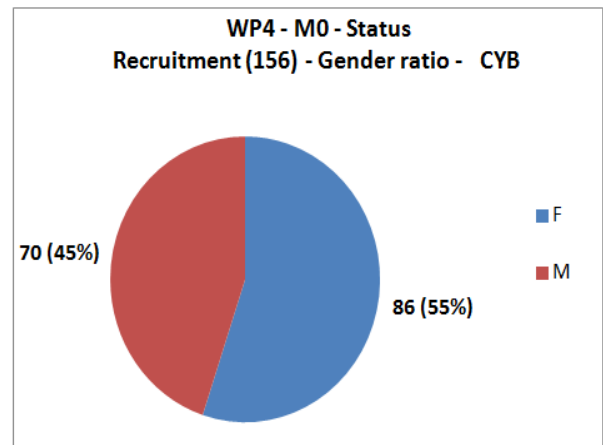
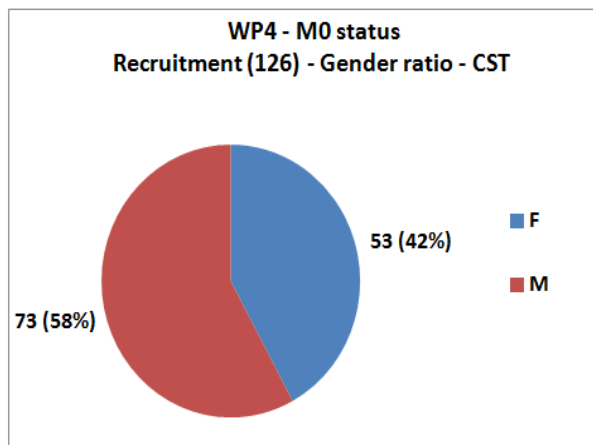
Table 12: Recruitment – age distribution

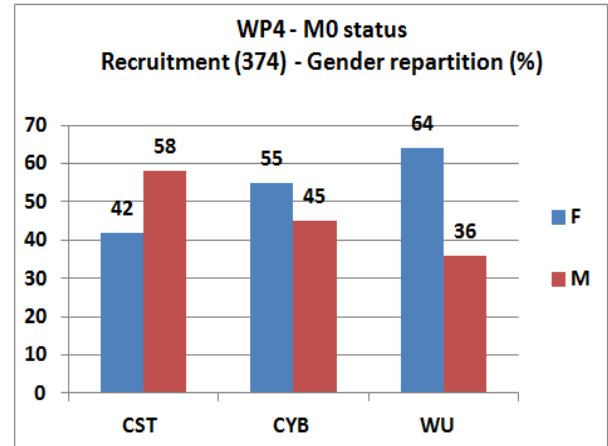
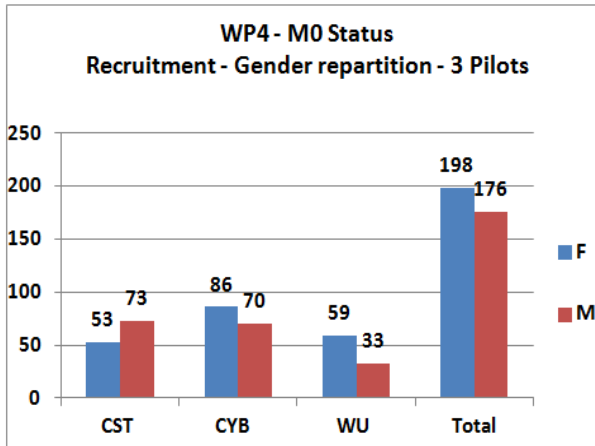
CST and CYB applied a similar recruitment process, with a maximum of beneficiaries aged between 65 and 75.



WU recruited much older beneficiaries: 46% are 80 years old or older.

4.2.3 - GENDER REPARTITION





There are more female in WU recruitment than in the others Pilot sites.

Gender	CST - %	CYB - %	WU - %
F	42	55	64
M	58	45	36

Table 13: Recruitment – gender repartition

4.2.4 - THE DIAGNOSIS

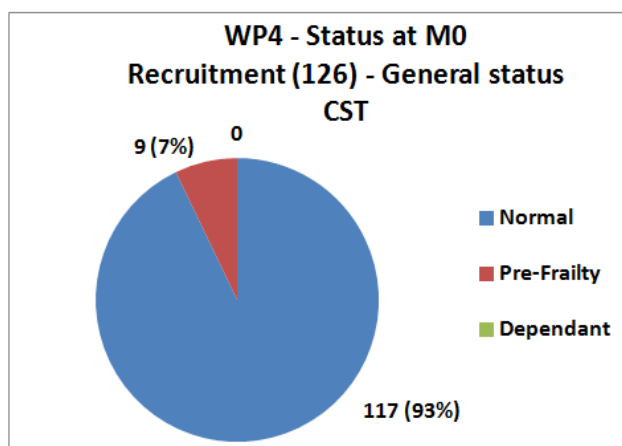
In PhysioDom-HDIM, the beneficiary's status is described thanks to three diagnosis types that aim to assess:

- the general conditions (overall status) targeting the couple – robustness /dependence;
- the nutritional status in order to identify the individuals with an increased risk of undernutrition;
- the medical condition by naming the main chronic disease.

4.2.4.1 - CST

Beneficiaries involved in the Study - CST

General condition

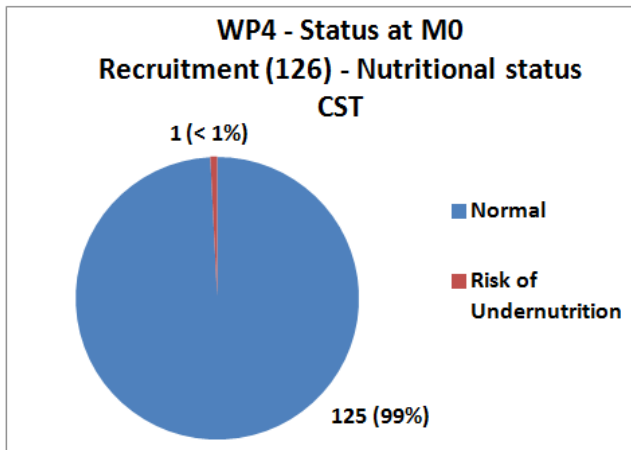


Fewer people are in a Pre-Frailty state - 7%

There is no dependant person

The great majority of persons involved in the study present a normal condition

Nutritional conditions



People are in a great majority in a normal nutritional status – 99%

Nobody is in the undernutrition status.

Chronic Pathologies + overweight

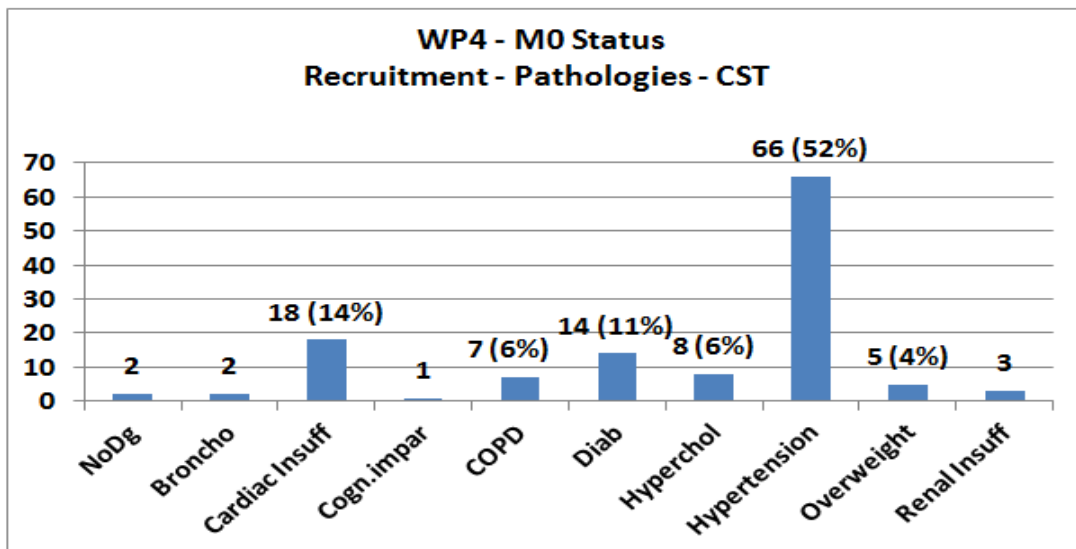


Figure 6: Recruitment - CST - pathologies

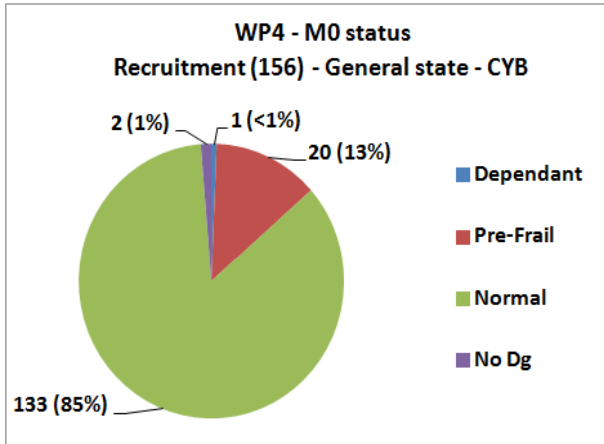
Hypertension + Diabetes + Cardiac Insufficiency represent more than 75% of the total of the pathologies

CST - Drop out evolution during the Study

See - § - Drop Out synthesis – page 32

4.2.4.2- CYB

General condition



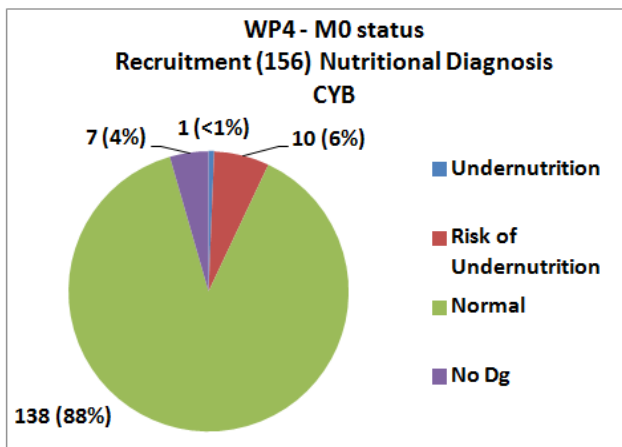
Only one dependant people;

13% are in a Pre-Frailty state.

In a great majority, the persons are in normal condition (85%).

Two records have no general diagnosis.

Nutritional condition



Only one person is in the state of undernutrition;

6% of persons are in a state of risk of undernutrition.

The major part of the beneficiaries of the CYB is in normal condition – 88%.

Seven persons have no nutrition diagnosis.

Chronic Pathologies

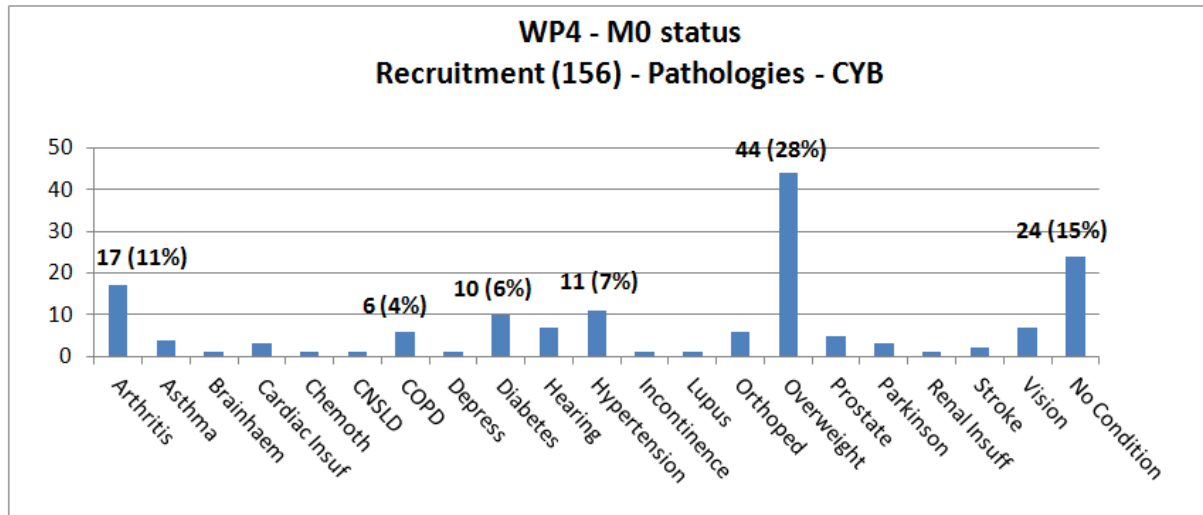


figure 7: Recruitment CYB - pathologies

There are 21 diagnosis in **CYB** cohort: five of them represent more than 70% - Arthritis, COPD, Diabetes, Hypertension, Overweight.

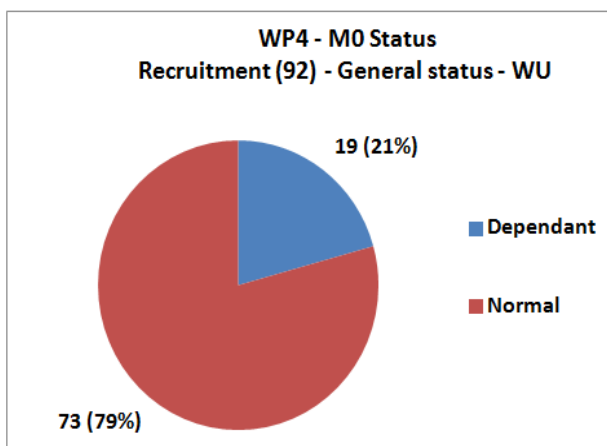
Three Diagnosis are noteworthy: Arthritis, Overweight , and No condition

CYB - Recruitment and Drop out evolution during the Study

See - § - Drop Out synthesis – page 32

4.2.4.3 - WU

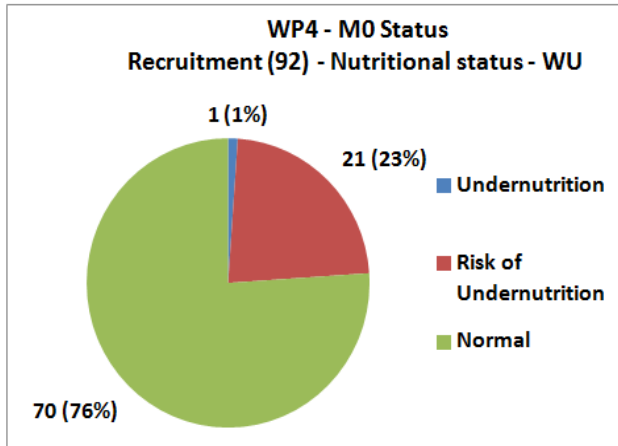
General condition



Comparing with the two other Pilots, we note a significant percentage of dependant beneficiaries (27%)

They didn't recruit anyone with a pre-frailty status.

Nutritional condition



WU's recruitment includes many more beneficiaries being diagnosed with a « Risk of Undernutrition » than both other Pilots' – 20%.

Only one case of Undernutrition

Chronic Pathologies

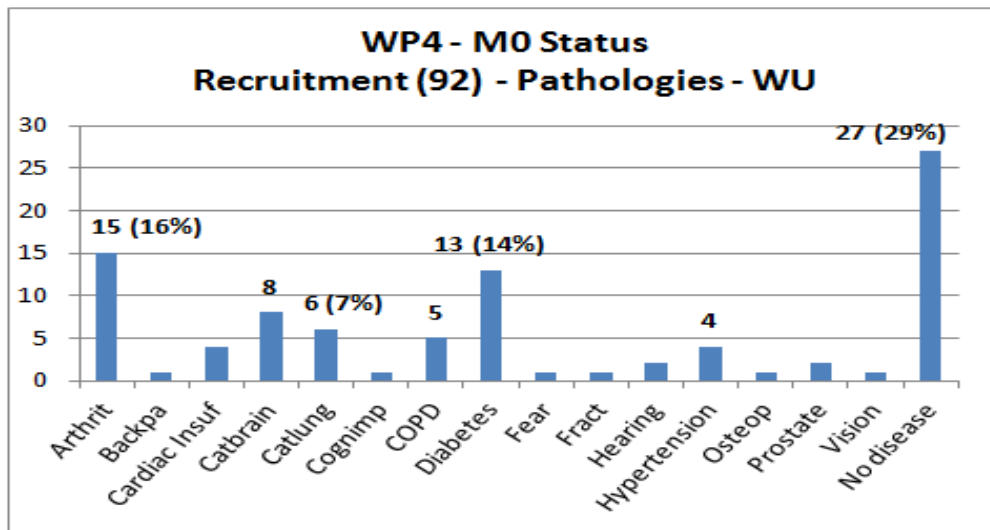


Figure8: Recruitment WU - pathologies

Arthritis, Diabetes, CatBrain, CatLung, COPD, Hypertension represent 55% of all diagnosis. "No disease" is an important group in WU recruitment as in CYB.

WU - Drop out evolution during the Study

See - § - Drop Out synthesis – page 32

4.2.5 – SYNTHESIS ON RECRUITMENT

Main causes of refusal from the contacted persons – study in CYB Pilot site

CYB – PhysioDom recruitment - Causes of refusal -	
Invoked causes	Number of persons
No time	5
Not for them	10
Not interested	1
Already followed	3
Health status	6
Total	25

Table 14: Recruitment – causes of refusal from CYB

General conditions

WP4 – Recruitment – General conditions on the three Pilots at M0									
	Recruitment Total	Dependant		Pre-frail		normal		No dg	
		Nb	%	Nb	%	Nb	%	Nb	%
CST	126	0	0	9	7	117	93		
CYB	156	1	< 1	20	13	133	85	2	1
WU	92	19	21	0	0	73	79		
Total	374	20	5,3%	29	7,7 %	275	73,5%	2	0,5%

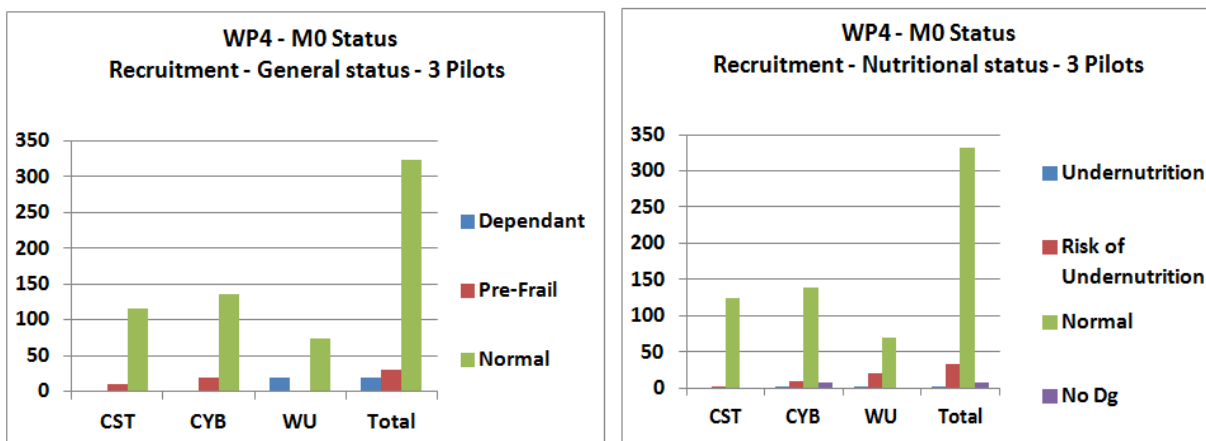
Table 15: Recruitment – synthesis – general conditions

Nutritional conditions

WP4 – Recruitment – Nutritional conditions on the three Pilots at M0							
	Recruitment Total	Undernutrition		Risk of Undernutrition		Normal Conditions	
		Nb	%	Nb	%	Nb	%
CST	126	0	0	1	< 1%	125	99%
CYB	156	1	< 1%	10	6%	138	88%
WU	92	1	1%	21	23%	70	76%
Total	374	2	0,5%	32	8,5%	333	89%

Table 16: Recruitment – synthesis – nutritional conditions

We note an overwhelming majority of “Normal conditions”



Another presentation of the General and Nutritional status repartition, in the three Pilots

Chronic Pathologies

WP4 – Recruitment – The seven main diagnosis on the three Pilots at M0					
Beneficiaries involved at M0	CST (126)	CYB (156)	WU (92)	Total (374)	%
Arthritis	0	17	15	32	8,5 %
Cardiac Insufficiency	18	3	4	25	6,6 %
COPD	7	6	5	18	4,8 %
Diabetes	14	10	13	37	9,8 %
Hypertension	66	11	4	81	21,6 %
Overweight	5	44	0	49	13 %
No disease	2	24	27	53	14 %
Total				295	78,8 %

Table 17: Recruitment – synthesis – pathologies

List of the seven main diagnosis and number of beneficiaries involved in the study with one of these diagnoses at M0, in each Pilot.

Total number and a percentage in comparison to the global cohort (374). Six pathologies represent 65% of the total.

53 beneficiaries are pathology free (14%), but with a nutritional problems to be solved or a deficient general status.

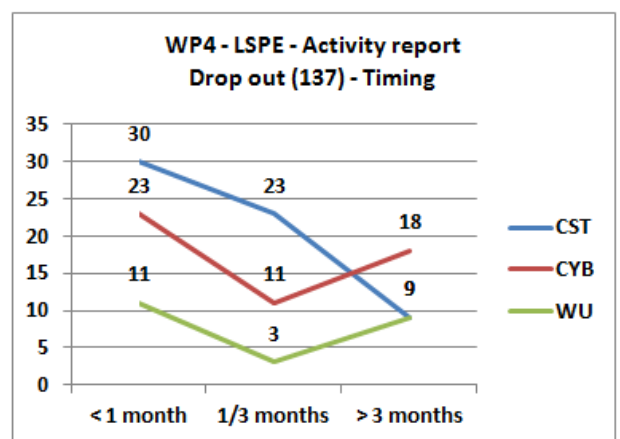
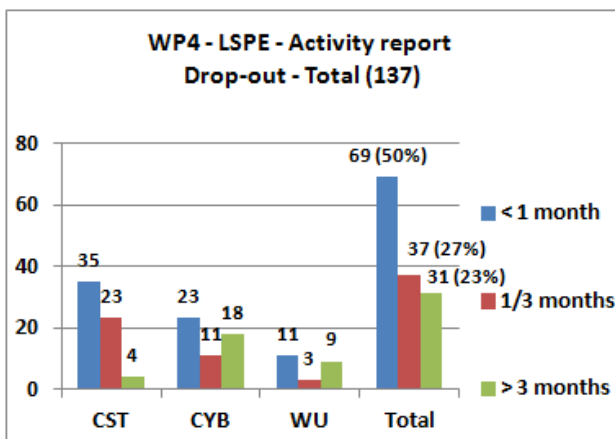
Drop out synthesis

LSPE = Large Scale Pilot Execution, the wording of WP4

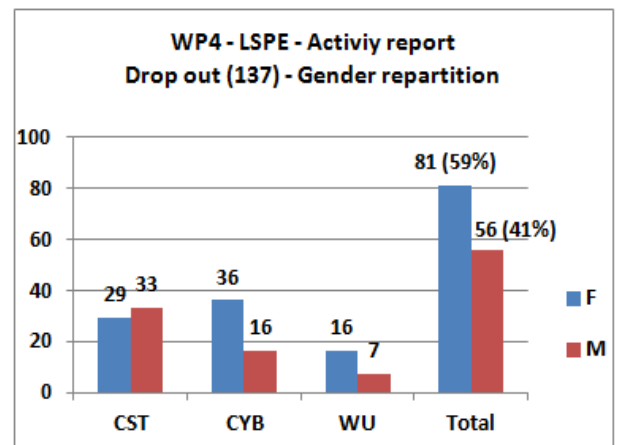
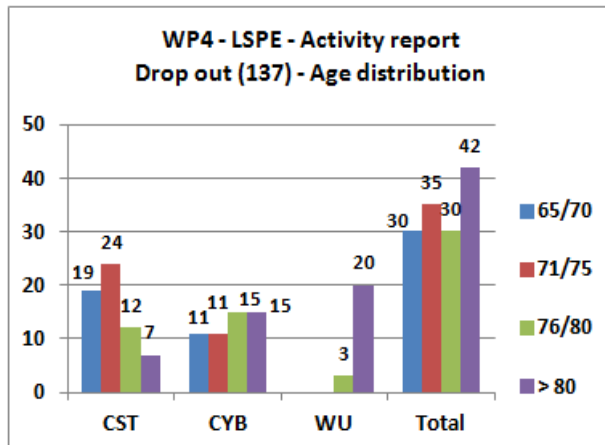
PhysioDom - WP4 - Recruitment Drop outs evolution during LSPE				
Drop outs	M-3 - M0 April / June 2016	M0 - M3 July / Sept 2016	M3 - M6 Oct / Dec 2016	Total
CST	30	23	9	62
CYB	16	18	18	52
WU	6	8	9	23
Total	52	49	36	137

Table 18: Recruitment – synthesis – drop-outs

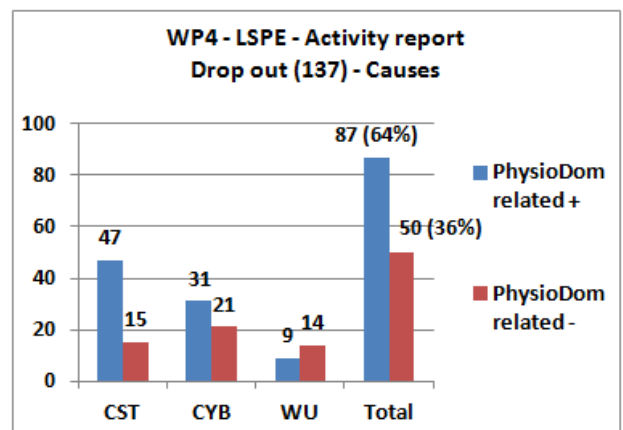
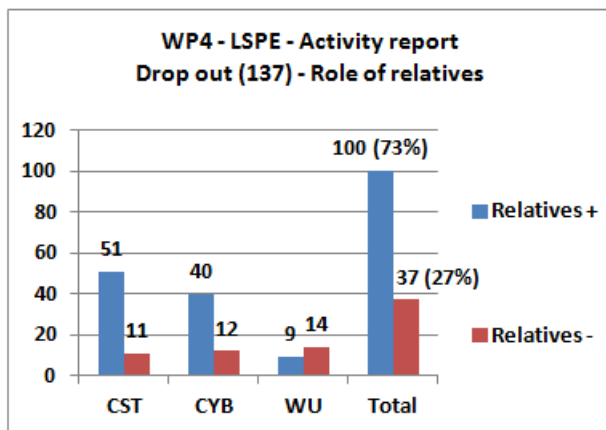
The global % of drop out during LSPE is between 30% and 35% of the number of Beneficiaries involved in the study.



- At M6 there is a total of **137 drop out**: **CST = 62, CYB = 52, WU = 23**,
- 50% took place in the first month after inclusion in the study
- 27% took place between 1st and 3rd month
- 23% took place after the 3rd month



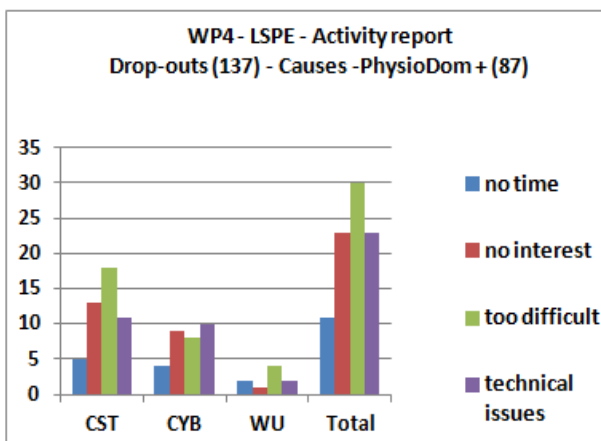
- All the age groups are represented excepted in WU where most drop outs are > 80 years.
- The global **gender ratio** in the Drop out group – F = 59% and M =41%, is similar to the mean gender ratio of the total recruitment.



The drop outs rate are no linked to loneliness – 73% of participants have a good social environment.

Nevertheless, in WU more than 60% of drop outs do not have relatives.

The causes of drop outs:



- **36%** - No relation to PhysioDom – holidays, moves, hospitalisations ...

- **64%** - Linked to PhysioDom with four main reasons to drop out:

- no time (13%);
- no interest (26%);
- difficulties in the management of the home devices (34%) e.g. Bluetooth scales reset;

- technical issues (internet connection...) (26%) e.g. database problems, requests for data.

Causes of drop out in two populations: **under 75 Years** and **older**.

We did not find any significant differences into the two groups : < 75 years and > 75 years

5– PLATFORM EXPLOITATION - RESULTS

Study data – methodology, parameters collection, results and analysis - are published in the Deliverable D5.1 and will not be presented in this document.

Here, we publish the data specific to the platform’s services. These data were the subject of a mid-term study at M3.

We compare the results between the following time periods:

- M0-M3 (1st of July - 30th of September 2016)
- M3-M6 (1st of October – 31th of December 2016)

5.1 – GLOBAL USE OF THE PLATFORM FROM M0 TO M6

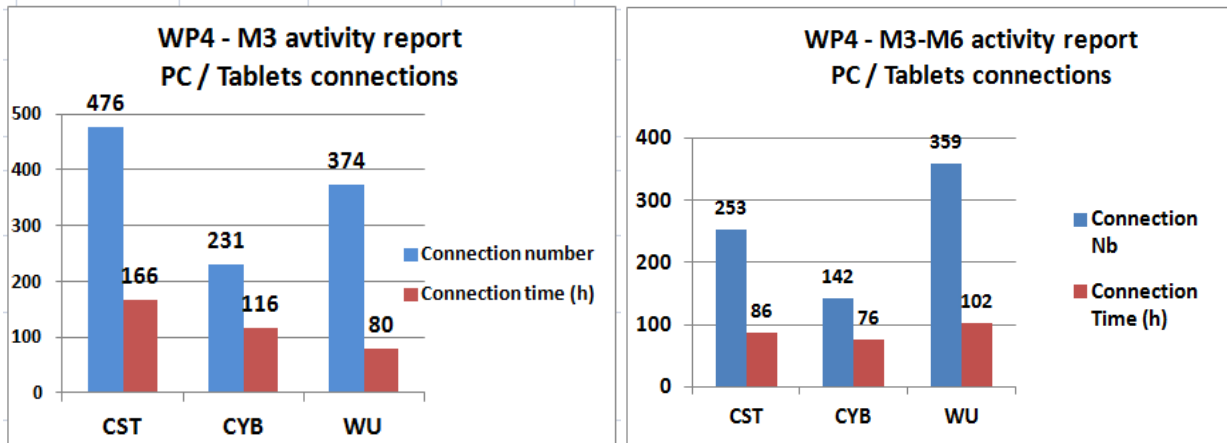
(M = Month, M0 = 1st July 2016, M3 = 30 September, M6 = 31 December 2016)

Here are the parameters we look at to quantify the PhysioDom platform use by the three Pilots during both time periods of the Clinical Exploitation phase : M0-M3 and M3-M6.

5.1.1 – THE CONNECTIONS

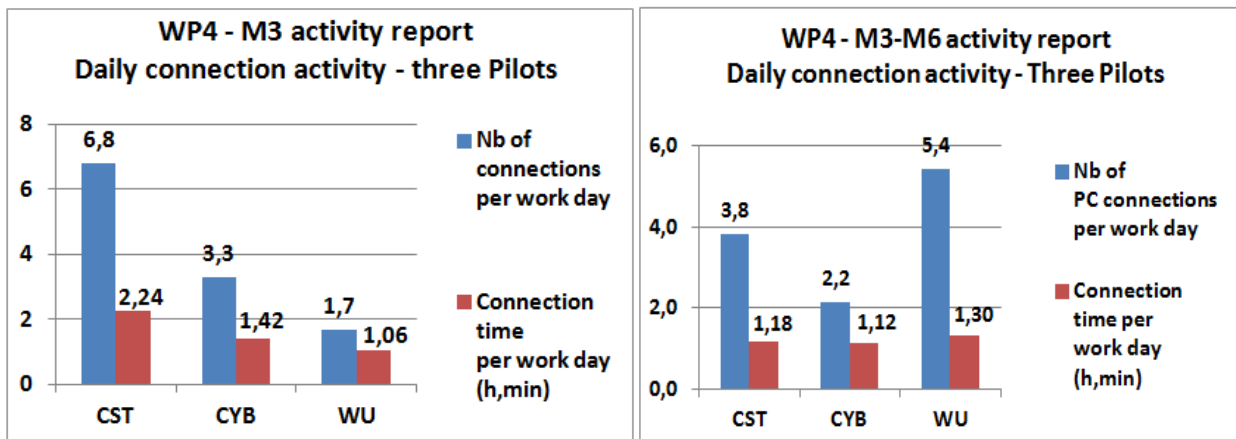
Total connections of the Pilot sites	Periods of the study	
	M0 / M3	M3 / M6
Number of connections	1081	754
Time of connection (h)	362	264

Table 19: Exploitation data - connections



For CST and CYB, we note a decrease in the number of connections, given that all the HHR were completed during the first time period.

As WU was still recruiting from M3 to M6, its number of connections stayed high.



CST and **CYB** : we note a significant drop in the number of connections between M0-M3 and M3-M6. This is due to the following facts:

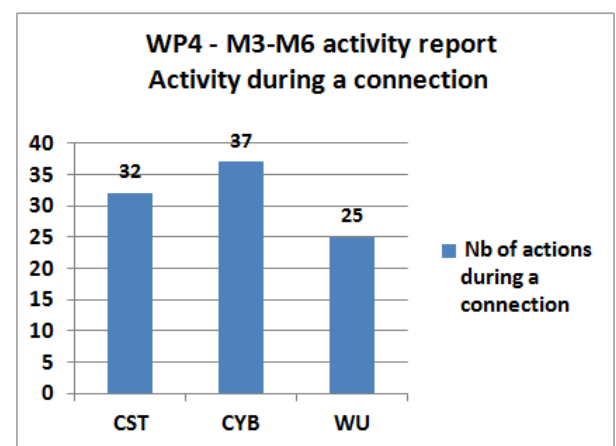
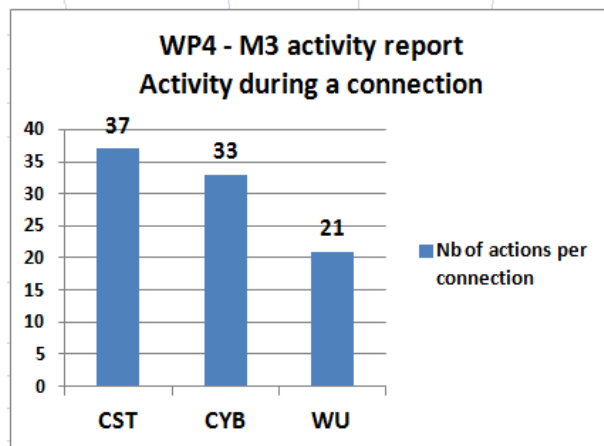
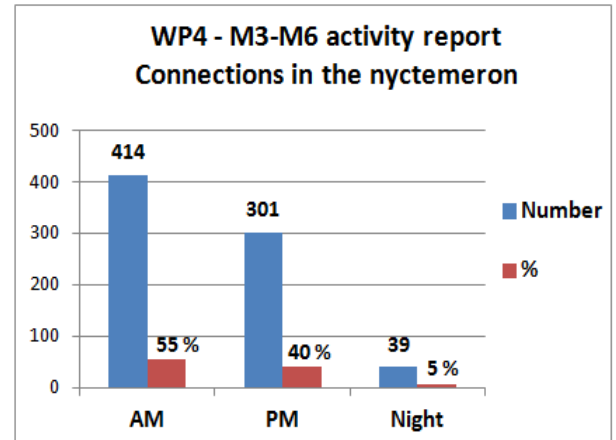
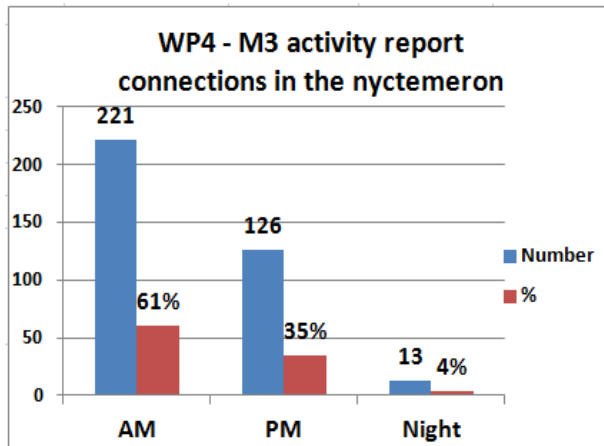
- all the files were completed during M0-M3 ;
- professionals assimilated HHR-Pro ;
- the cohort was reduced as a result of drop outs.

WU included new beneficiaries during M3-M6 and used the mail system for its coaching service. That explains the increase in both the number of connections and the connection time.

Applied to each cohort, the average connection time **per file and per day** during M3-M6 is:

- **CST** = 0 min 36 sec
- **CYB** = 0 min 30 sec
- **WU** = 1 min

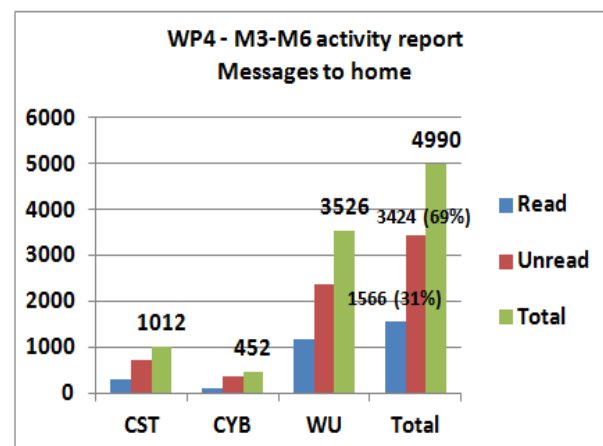
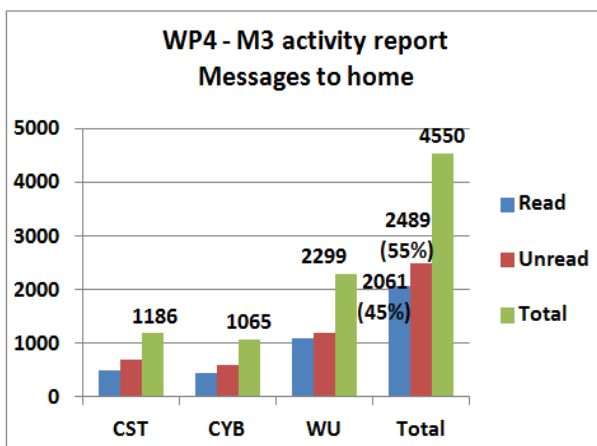
More than 95% of connexions take place before night on both periods. There is no difference between the three Pilots.



The number of actions performed during one connexion is quite identical in both periods of the study.

5.2 – CLINICAL DATA TRADING REPORT

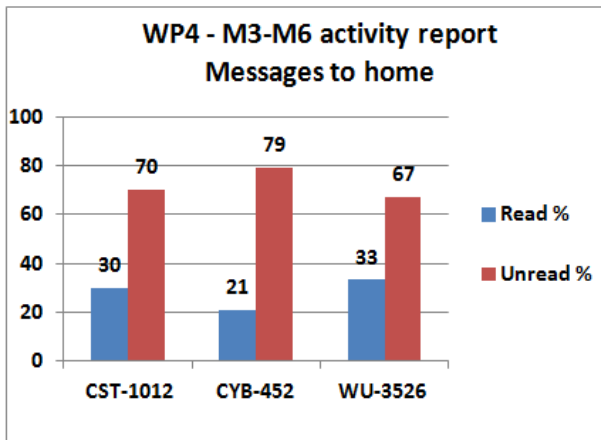
5.2.1 - THE MESSAGING ACTIVITY



On the left:

Horizontal axis: total of messages in the M0-M3 period for the three Pilots

Vertical axis: % read/ unread



More than a message out of two isn't read by the Beneficiaries (55%). This problem has to be considered by the Professionals of the three Pilot sites with two explanations: less interest from the beneficiary or lack of information and training on HHR-Home.

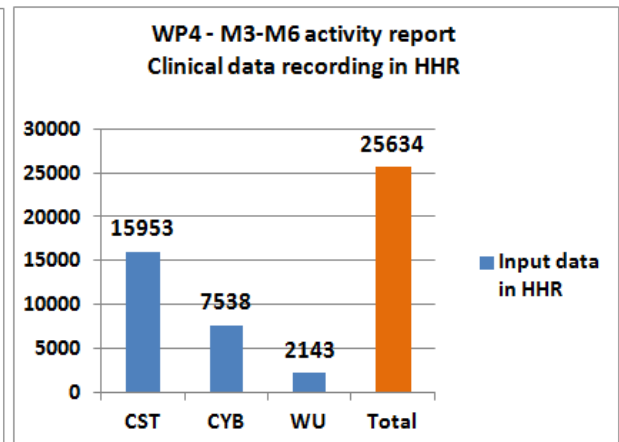
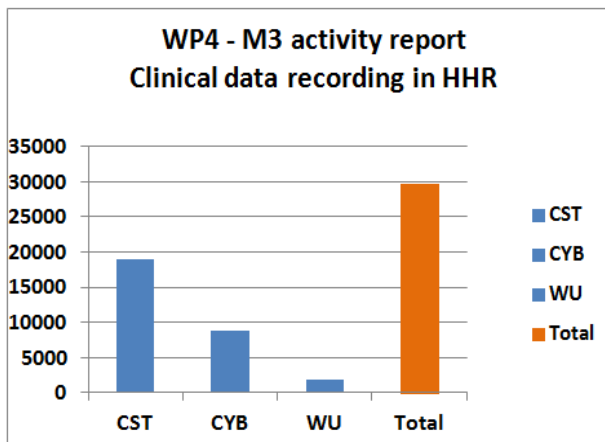
On the right:

During the second period, the total number of messages is slightly augmented (4990) but there isn't any improvement in % of read messages.

See the graph in opposite.

See discussion page 69

5.2.2 - THE CLINICAL DATA RECORDING



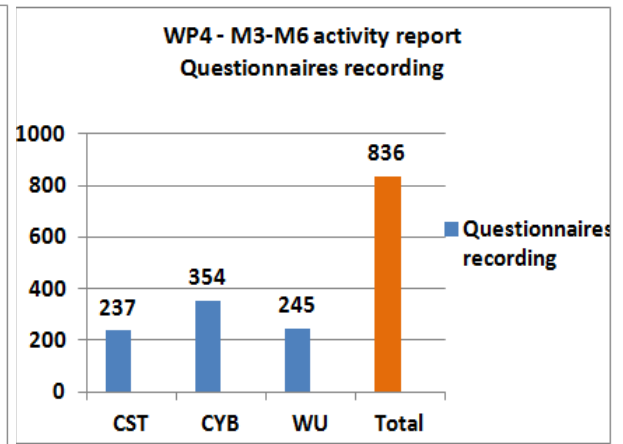
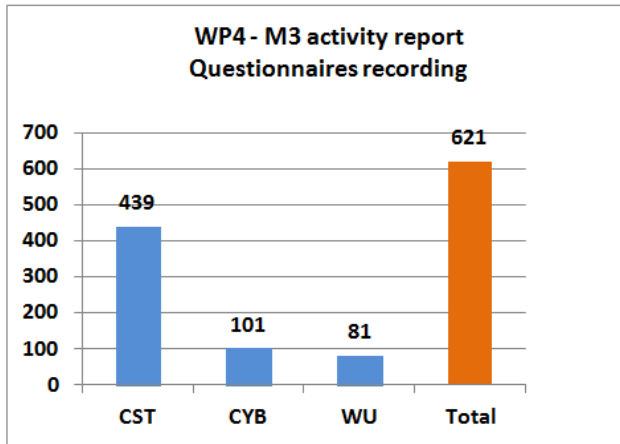
Slight decrease of data recorded during the second phase, owing to the drop outs.

In both periods, **WU** presents a low recorded data because of a reduced number of records.

5.2.3 - THE QUESTIONNAIRES RECORDING

Questionnaires: MNA (standard), MNA (short form), SNAQ, Eetscore (WU), Chair stand

On the left : during the first period M0-M3,



- **CST** put all the questionnaires in the HHR-Pro (out of the SF 36 questionnaire).
- **CYB** filled up the MNA on an separate sheet, explaining the low quantity of questionnaires
- **WU** had less records filled up at this stage of the project than the two other Pilots, so there are fewer questionnaires.

On the right: at the second period M3-M6, a total of 836 questionnaires have been filled up and put in the HHR-Pro by the three Pilot sites.

Overview on the training tasks over the LSPE period

	M-3 – M3	M3 – M6	Total
CST	439	237	676
CYB	101	354	455
WU	81	245	326
Total	836 (57%)	621 (43%)	1457

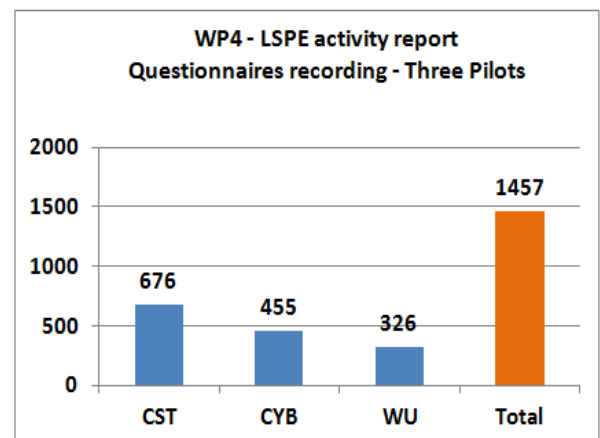


Table 20: Exploitation data – questionnaires recording

Decrease in the second period explained by the reduction of records owing to the drop outs.

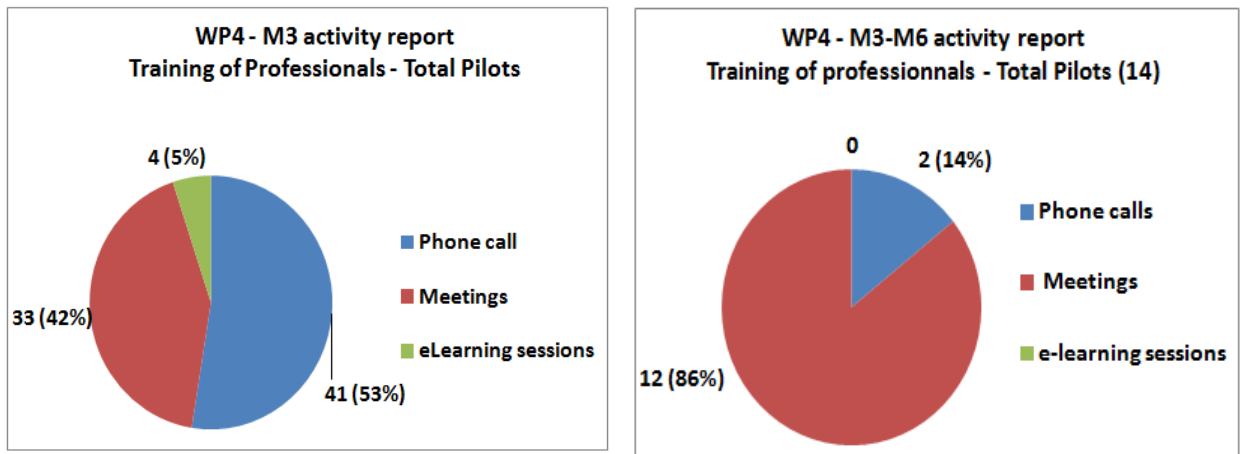
WU has a less number of beneficiaries involved in the study at the stage of the project and so fewer questionnaires are completed.

5.3 – TRAINING ACTIVITY

The organisation of the – trainings sessions, visits at home, meetings has been well described – See –

[Annex 3 – Deliverable D3.2](#) – pages – 29 to 36

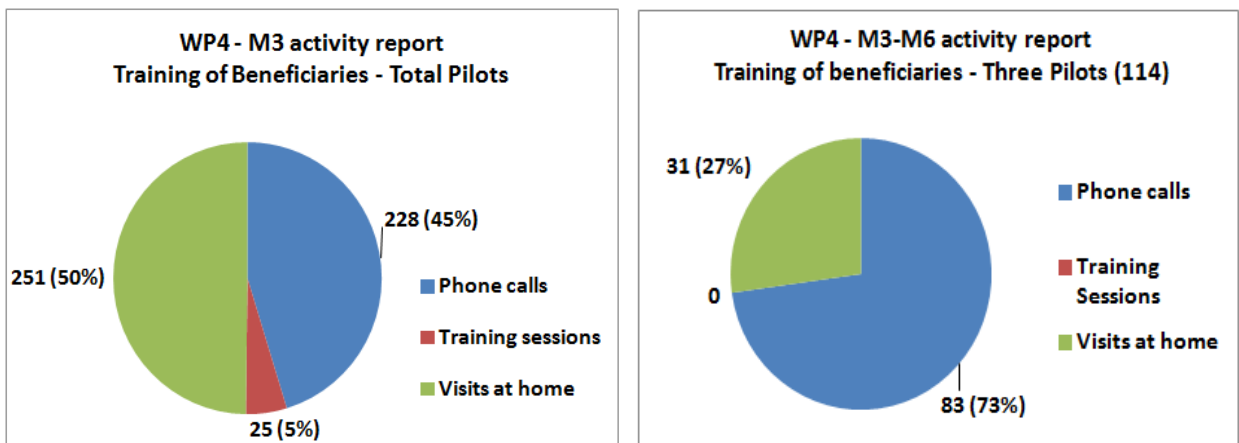
5.3.1 - PROFESSIONALS



On the left: during the first period - 78 training tasks for the Professionals

On the right : 14 training tasks during the second period

5.3.2 - BENEFICIARIES



On the left: during the first period - 504 training tasks.

Few groups of training sessions (5%). Phone calls and Training at home are equal.

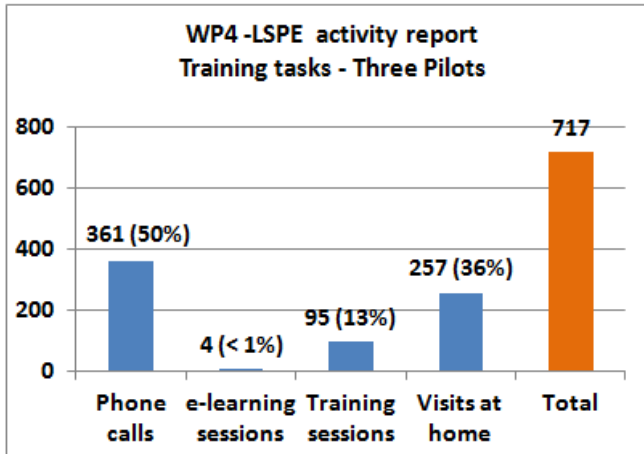
On the right: the number of tasks has reduced dramatically in the second period (114), with fewer visits at home (27%).

Overview on the training tasks over the LSPE period

WP4 – LSPE - Training activity – Nb of sessions (717)			
	M-3 - M3	M3-M6	Total
Technicians	7	0	7
Beneficiaries	504	114	618
Professionals	78	14	92
Total	582(81%)	128 (19%)	717

Table 21: Exploitation data – training activities

81% of the training sessions were organized during the period – M-3 – M3



To train the three categories of users – Technicians, Beneficiaries and Health/Social Professionals, the Pilots have set up four types of training services –

Phone calls > Visits at home > Group training sessions > e-learning sessions.

For **Beneficiaries**: Phone calls + Visits at home = 91%

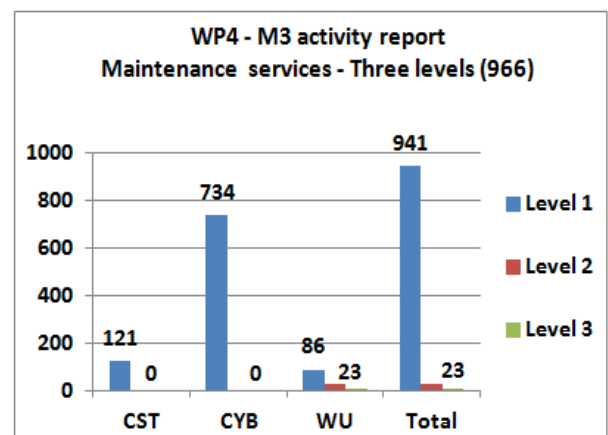
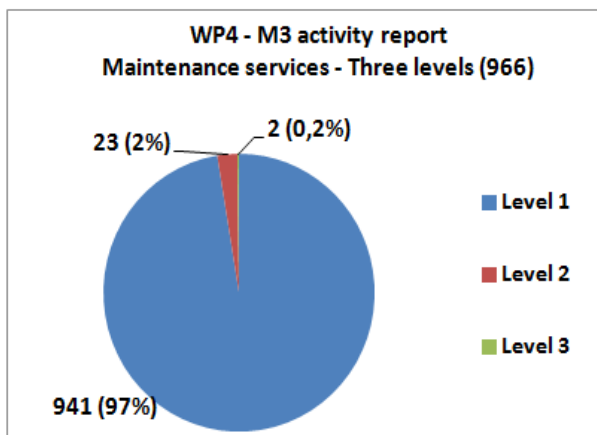
For **Health/Social Professionals**: Phone calls + Group training sessions = 95%

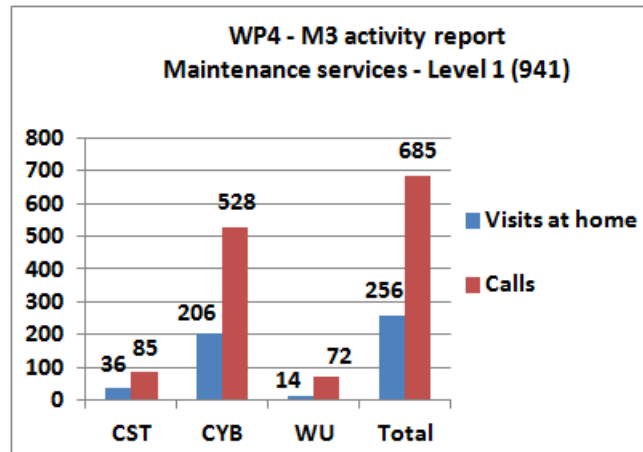
e-learning is anecdotal

5.4 - GENERAL MAINTENANCE ACTIVITY

The maintenance service with the three levels of services is described in - See – [Annex 5 – Deliverable D4.1](#) pages 58/59.

5.4.1 – FIRST PERIOD – M0-M3





During the first period - M0 - M3

The **levels 1&2** represent more than 99% of the total maintenance services and even 100% in CST/ CYB.

Level 1 (calls + visits at home) is by far the most important in the three Pilot sites and especially in CST and CYB where it represents 100% of the whole maintenance services.

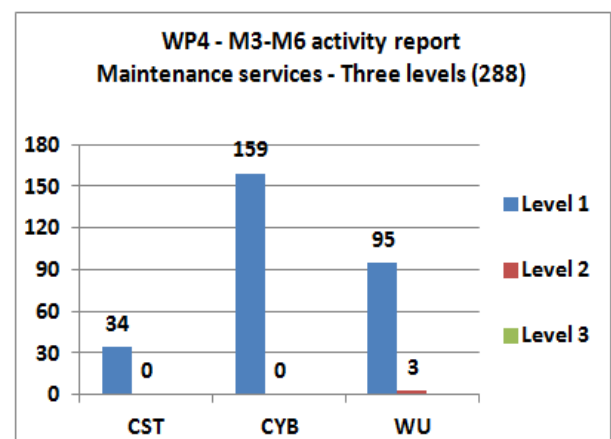
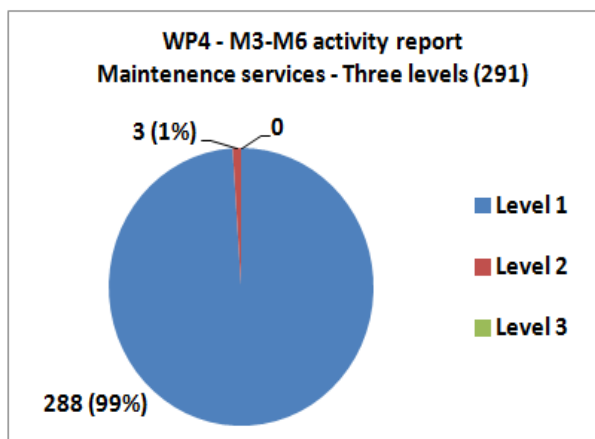
The ratio between both differs across the Pilot sites – visits at home represent 19% in WU and 37% in CYB due to many problems with TV internet links in Cumbria. Most home installs required integration with a home broadband service due to intermittent 3G services – a minority proved challenging, requiring several repeat visits.

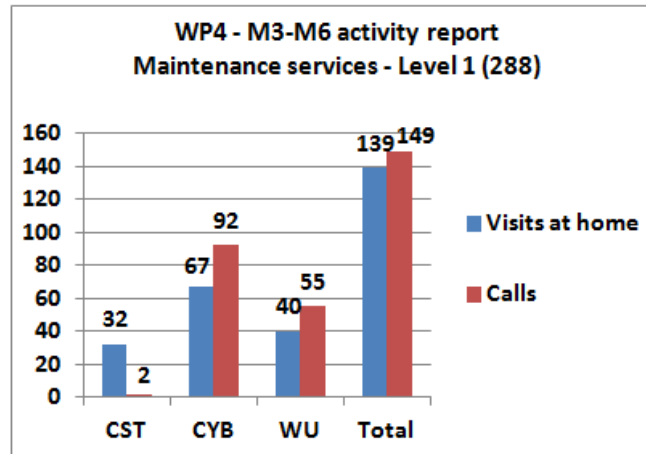
The maintenance service Level 1 is made of phone calls (69%) and visits at home (31%). The ratio between both is changing function of the Pilot sites

% - Visits at Home / Total services level 1 – First period		
CST	CYB	WU
30%	28%	16%

Table 22: Exploitation activity – maintenance services level 1 – first period

5.4.2 - SECOND PERIOD – M3-M6





During the second period – M3-M6

The total of the maintenance services drop down from 966 to 288 actions *id est* more than 300% of fall

Level 1 represents 99% of all the maintenance services and even 100% in CST and CYB.

The ratio - Visit at home / Total services, has augmented compared to the first period.

% - Visits at Home / Total services level 1 – Second period		
CST	CYB	WU
95%	42%	42%

Table 23: Exploitation activity – maintenance level 1 – second period

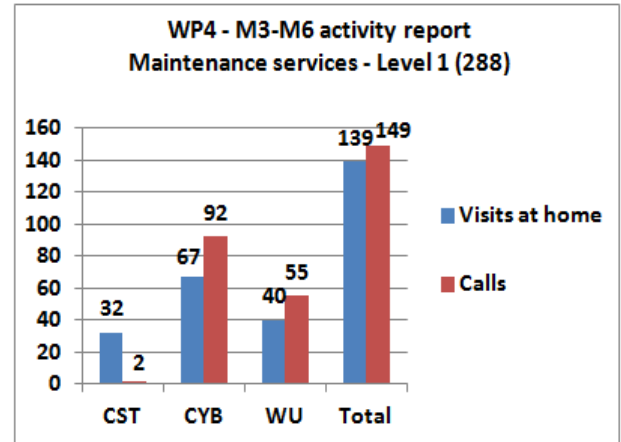
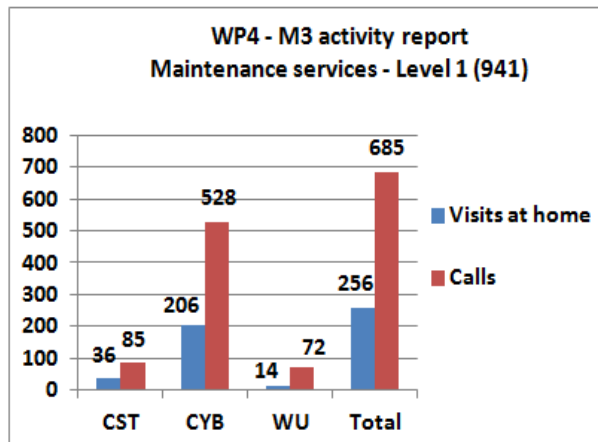
% - Visits at Home / Total services – comparison between both periods			
	CST	CYB	WU
First period	30%	28%	16%
Second period	95%	42%	42%

Table 24: Exploitation activity – maintenance level 1 – both periods

Level 1: during the second period there are less technical problems, but more direct actions at home to help in the devices using.

Level 2: we note only 3 services in WU

5.4.3 - MAINTENANCE-LEVEL 1 -



Maintenance services - level 1

- Important reduction between the two periods from 941 to 288 actions
- CYB presented a great activity in both periods (TV link issues)
- In the three Pilots, the Level 1 services are mainly focused on: TV box, Internet link, weight scale function.
- 3 to 5% of the level 1 services concerned the Professionals' internet browsers or software.

5.4.4 - MAINTENANCE-LEVEL 2

First period: 23 actions

Second period: 3 actions

This expresses the well ownership of the tools by the Beneficiaries and the Professionals.

5.4.5 - MAINTENANCE-LEVEL 3

level 3 : on both periods we have noted only 2 problems – one on TV box and one on the server (Sportal). In the meantime, the Pilots have notified one feature on the HHR-Home.

This means that the platform was well functioning during all the study period.

5.4.6 – CONCLUSIONS ON MAINTENANCE SERVICES

All these data concerning the maintenance services give precious information for the futur deployments of the platform PhysioDom:

- the major part of the maintenance resources must be reserved for the home environment;
- to reduce the maintenance services, the project manager has to invest much resources in the training of all the end users.

6- DIETARY AND PHYSICAL ACTIVITY COACHING SERVICES

- See – [Annex 3 – Deliverable D3.2](#) – pages 8 to 19

Following the presentation on the main service of PhysioDom-HDIM - the **Dietary and Physical Activity Coaching** in the annex on above, the Pilot sites have organized that service on the basis of four levels of services presented, in the document on below - pages 9 to 18.



PhysioDom_Dietary-P
A_Coaching.docx

The coaching services, distributed in four levels during the study phase, are displayed here.

HDIM - Services		CST	CYB	WU	Total
Level 1	Total Beneficiaries follow up	126	156	92	374
Level 2	Alerts / Warnings diagnosis	599	209	482	1290
	Recommendations *	486	33	716	1235
Level 3	Nurses consultations	139	156	112	407
	Dieticians consultations	N/A**	14	5	19
Level 4	GP / Specialist consultations	135	9	9	153
	Hospitalisations ***	0	0	21 days	n.a.

Table 25: Exploitation data – HDIM services

* Many recommendations are given through the Messages to home

**The Dieticians was enrolled in the project to give information to the Nurses and GP and not in face to face with the Beneficiary.

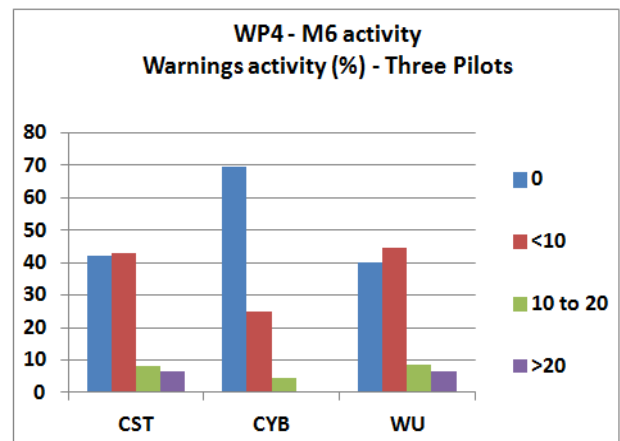
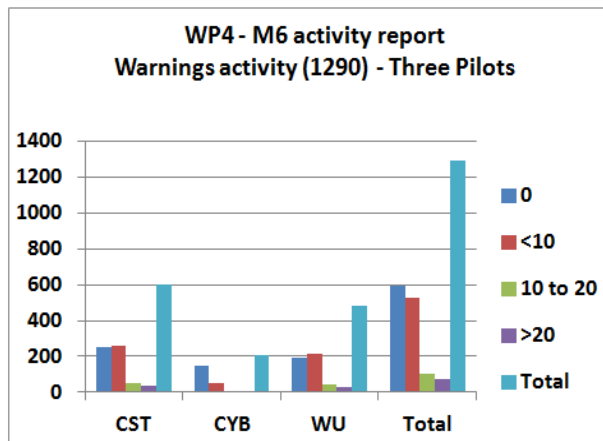
*** Hospitalisations linked to the dietary status or to the evolution of the main pathology listed in the HHR-Pro

6.1 – ALERTS / WARNINGS

For a description of the Alert function - See – [Annex 2 – Deliverable D2.1](#) pages 11to 14

In this chapter are being analyzed the warning function from the 1stJuly to the 31December 2016.

6.1.1 – GLOBAL RESULTS



The total of the warnings during the six months period of the study on the three Pilots = 1290

- **0** = record with no warning during the six months period;
- **< 10** = record with less than 10 warnings;
- **10 to 20** = record with number of warnings comprised between 10 and 20;
- **> 20** = record with 20 and more warnings.

Repartition (%) of the Warnings - 1 st July to 31 December 2016				
Nb of warnings in a record	0	< 10	10 à 20	> 20
Pilots (total warnings)				
CST (599)	42%	43%	8%	7%
CYB (209)	70%	24%	5%	1%
WU (482)	40%	45%	9%	7%

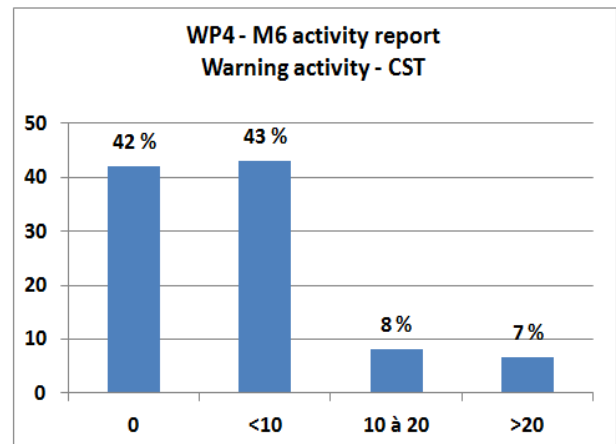
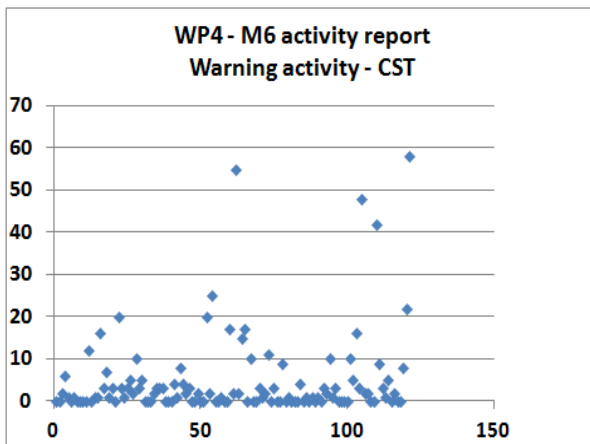
Table 26: Exploitation data - warnings

In the three Pilots, 80% of the records present less than 10 warnings on the six months *i.e.* less than 2 warnings a month.

6.1.2 – PILOTS WARNINGS DETAILS

Horizontal axis: number of records.

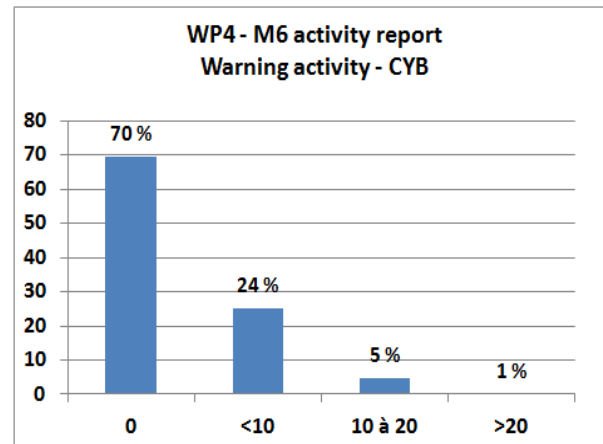
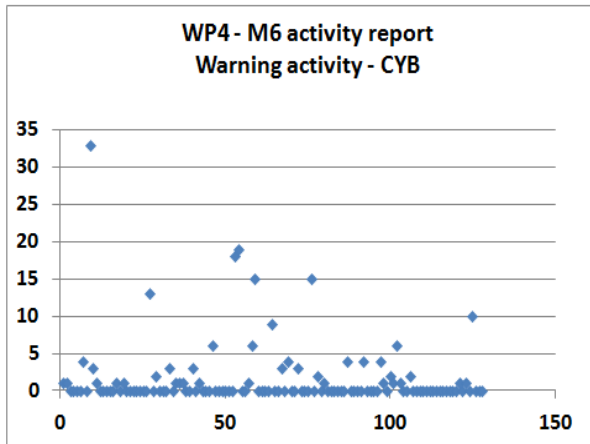
Vertical axis: number of warnings for the period (left) and % (right).



CST : for the 6 months study period : 42% of records are without warning, 43% less than 10 warnings and 15% beyond 10 warnings.

85% of the records included less than 10 warnings during the 6 month period.

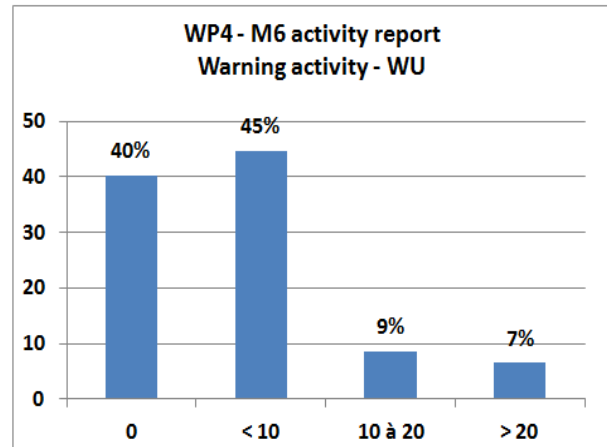
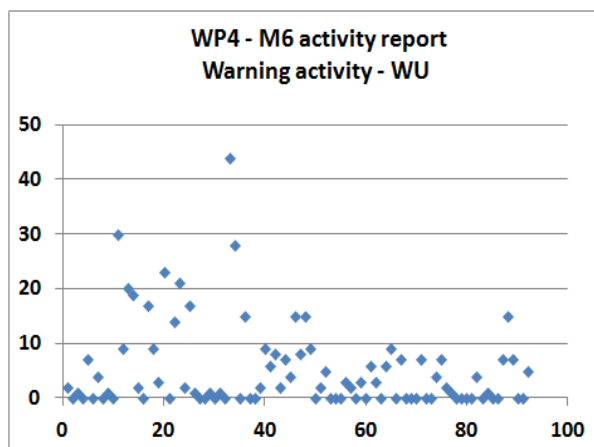
6 records included more than 20 warnings: diabetes (3) and Hypertension (4), with sometime more than 50 alerts in six months.



CYB: for the 6 months period: 70% of records are without warning, 24% less than 10 and 6% beyond 10 records.

94% of the records included less than 10 warnings during the 6 months period.

5 records included more than 20 warnings for the period: Overweight (1) Parkinson (1), Hypertension (1), CNSLD (1), Diabetes (1).

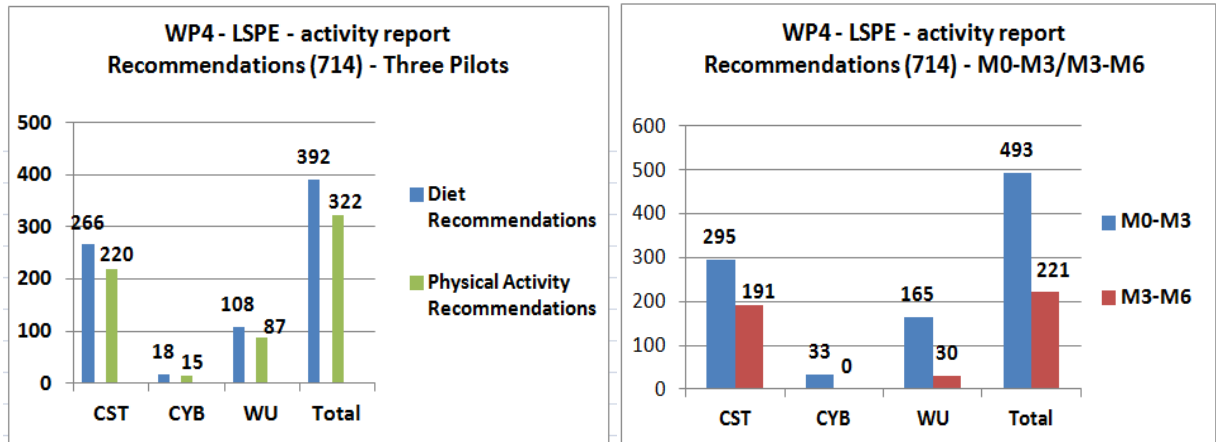


Wu: for the 6 months period: 40% of records are without warning, 45% less than 10 and 16% beyond 10 warnings.

We note that 85% of the records are concerned with less than 10 warnings during the 6 months period.

6 records included more than 20 warnings: Hypertension (1), COPD (1), Catbrain (1), Diabetes(1), Nodisease (2)

6.2 - RECOMMENDATIONS



- A total of 714 recommendations for the six months follow-up – M0-M6.
- Diet and Physical activity are equal.
- There are few recommendations in second period – M3-M6, because of the drop outs and the recommendations done in the first period, always active in second period.
- We see a total of 714 recommendations for 374 active files at M0 and 283 active files at M6. On average, we get 328 files monitored over the six-month period.

So we count an average of 2 recommendations per file for all the study period

6.3 – HDIM SERVICES - LEVEL 2 AND 3

See - page 43

HDIM services		CST	CYB	WU	Total
Level 3	Nurses consult	139	156	112	407
	Dieticians consult	N.A.	14	5	19
Level 4	GP/Special consult	131	9	9	153
	Hospitalisation	0	0	21 days	n.a

Table 27: Exploitation data – HDIM services level 2 and 3

6.4 – EXPLOITATION OF THE PLATFORM PHYSIODOM DURING THE SIX MONTHS STUDY – SYNTHESIS

PhysioDom – Six months exploitation period - Synthesis		
	M0 – M3	M3 – M6
Connexions - nb	1081	754
Connexions - time	362 h	264 h

Time of connexion per file	30'' < > 60''	30'' < > 60''
Messages to home	4550	4990
Questionnaires	621	836
Training Professionals	78	14
Training Beneficiaries	504	114
Maintenance level 1 - calls	685	149
Maintenance level 1 – visits at home	256	139
Maintenance level 2	23	3
Maintenance level 3	2	0
HDIM service – level 1 – Total records follow up	374	337
HDIM service – level 2 - Alertes		1290
HDIM service – level 2 - Recommendations *	374	283
HDIM service – level 3 – Nurses/Dieticians consult.		407
HDIM service – level 4 – GP consultation		153
Hospitalisations		(21 days from WU)

*Many recommendations have been dispensed through the Messages to home

Table 28: Results of the six months exploitation period of PhysioDom – synthesis

Total Nurses= 407, Diet = 19, GP = 153

7– CHANGE MANAGEMENT ORGANISATION

7.1 - INTRODUCTION

Presentation

PhysioDom-HDIM, an e-Health project, established on three Pilot sites, introduces two major changes in the homecare system:

- the deployment of a CIT platform for both the Professionals and the Home Patients;
- the establishment of a new service - dietary and physical activity coaching.

These tools and service disruptions induce changes in organizations that need to be examined closely in order to implement a change management adapted to the project's different groups of actors on each pilot site.

The socio-professional environment being strongly different from one Pilot site to another, we have described a change management model, in the form of a generic approach that must be tailored to each Pilot site. – See – [Annex 6 – T1.9 - Change Management in Organisations – Outline](#)

The DOW

See Section B3.2 – pages 75 and 84, describes how to establish an appropriate change management plan in the project, and how to pilot the ad hoc tasks through the Change Management Committee led by H&S with a representative in each Pilot site.

Pilot site	Representative	e-mail address	Tel	
CST	Esther Jovell	ejovell@cst.cat	+34937871055	SP
CYB	Daniel Heery	daniel.heery@cybermoor.org.uk	+4414343822	UK
WU	Annemien Haveman	annemien.haveman@wur.nl	+3131748530	NL

Table 29: Change management representatives

7.2 – THE PROBLEM

7.2.1 – THE COMPLEXITY

Concerning the change in organisations, PhysioDom-HDIM aligns multiple levels of complexity:

- the heterogeneity of the actors involved in the project: policies, health administrations on a specific territory, institutional and homecare professionals, social services;
- the multiplicity of care networks involved - geriatrics, nutrition, heart failure, renal failure, hypertension, diabetes...;
- the creation of a new service dedicated to homecare for older people: dietary coaching with tracking of physical activity – which is a major innovation in home services;
- the establishment of a technical platform - ICT, which enables the sharing of information between professionals, the remote control of tracking settings and associated alerts, and the use of a communication tool for messages and prescriptions;
- the coexistence of two organisations within the project: the organisation in which the majority of the professionals currently work in and the new organisation resulting from changes made to serve a population of 150 patients only.

7.2.2 – THE RESPONSE

Handling change management in such an environment should be considered as a project within the project. For such a task, we will follow the following plan:

- why the change: to know from where we start and where we are going in terms of organisation;
- to implement an impact study, to identify the different changes to drive in the management of organisations by quantifying the importance of each of them;
- to organize the communication towards the different stakeholders: to communicate throughout the project and make it "fun";
- to organize the learning/training of the main actors: Professionals and Beneficiaries;
- to implement the new Work Procedures which concern the use of ICTs in homecare networks; and the establishment of a new service - food and physical activity remote monitoring.
- to manage the resistances to change: to identify allies and opponents of the project, as well as the key players;
- to manage the transformations - analysis of return on investment seen by the professionals with an impact study on stakeholders.¹

¹ Autissier D, Moutot JM - Méthode de conduite du changement – Dunod - Ed - 2011

7.3 – RESULTS FROM PILOT SITES WORKS ON THAT TASK

7.3.1 - WHY THE CHANGE

PRESENTATION OF THE ACTORS CONSIDERED IN THAT TASK

	CST	CYB	WU	Total
Public Health	1	2	0	3
Coordination	4	3	2	9
GP	5	3	0	8
Nurses	24	2	8	34
Dieticians	2	3	4	9
Social workers	2	5	0	7
Technicians - CIT	6	2	1	9
Total of the Actors	44	20	15	79

Table 30: CM0 – the actors

COMPLIANCE OF THE ACTORS REGARDING THE CHANGE IN THEIR ORGANISATION

	CST	CYB	WU	Total
Total opposition	1	4	N/A (1)	5
OK for Change	34	12	“	46
Total Agreement	9	4	“	13
Total of the Actors	44	20	“	64

1) In the Dutch pilot location, the 8 district nurses were interviewed and no scores could be generated.

LEVEL OF INFLUENCE OF PHYSIODOM ON THE ORGANISATION FROM THE ACTORS POINT OF VIEW

	CST	CYB	WU	Total
Great importance	41	6	N/A	47 (73%)
Important	3	4	“	7 (11%)
Low influence		10	“	10 (16%)
Total of the Actors	44	20	“	64

RELATION BETWEEN - THE LEVEL OF INFLUENCE OF THE ACTORS IN THE ORGANISATION / THEIR COMPLIANCE WITH THE PROJECT

	CST	CYB	WU	CST	CYB	WU	CST	CYB	WU
Great importance	6	1	N/A	30	1	N/A	1	4	N/A
Important	2	3	“		1	“			“
Low influence									“
	Total Agree			OK for Change			Total opposition		

Table 31: CM0 – relation – influence / compliance

The box orange, overlited, represents the area with the greatest risk of complexity in the management of change.

By contrast, the box green overlited represents the area of minimum risk. The numbers of Actors inside the boxes will give a first indication on how important the challenges are in terms of Change management.

CST has only 1 person in orange boxes, and **CYB** has four. So we can predict that change will be more difficult in CYB.

7.3.2 - DIMENSIONS OF CHANGE

Beyond the results given by the previous analysis, focused on the assessment of risk areas, the leader of each pilot must quickly assess the importance of the work to achieve, in order to give a first dimension to the agenda for change.

The project manager will size tasks, based on the two dimensions of change:

The width corresponds to the magnitude of the tasks to consider regarding the different actors involved. It takes into account: the absolute number of players, the number of functional groups and the number of sites. A % above 50 means a significant change.

Measure of the width of Change from 1 to 4 points.

Measure of the Change width		CST	CYB
Number of actors involved in the change	< 50 = 1 point 50 to 200 = 4 points	1	1
Number of functional groups, including Administrations	1 group = 1 point 2 to 3 groups = 2 points 4 to 5 groups = 3 points 6 to 10 groups = 4 points	4	4
Number of sites	1 site = 1 point 2 to 3 sites = 2 points 4 to 5 sites = 4 points	4	4
Total (on 12 points)		9	9
Score (%)		75%	75%

Table 32: CMO – width of change

The depth corresponds to the intensity of the changes felt by the actors and can be appreciated first on the basis of questions, of which the main labels are listed in the tables of the outline . Over 50% means a significant change in organisation.

Measure of the Change depth	CST	CYB
-----------------------------	-----	-----

Perimeter of Change – change of tools or change in professional activities/organisations?	Change of tools = 1 point Redefining some professional activities = 3 New organisation = 5	3	4
Mobilization effort – does the Project Team benefit from a hierarchical link on all the targets for Change?	Direct link = 1 point No link = 5	1	5
The logic behind the organisation of services is consistent throughout the care pathway or we expect some resistance coming from the different values developed by the groups of actors.	Consistency = 1 point Average consistency = 3 No consistency = 5	3	5
The objectives of the proposed change relate to the expected gains (productivity gains), to the assimilation of a new set of tools (Information system), or to the provision of an additional technical tool (software).	Tool delivery = 1 point Assimilation of a new set of tools = 3 Important benefits from Change = 5	3	5
Must the skills of the actors concerned evolve?	Slight change = 1 point Important change = 3 Radical change = 5	1	3
Role of the management and its evolution to ensure the sustainability of the change.	No change needed = 1 point Change in the management process = 5	5	5
Total (on 30 points)		16	27
Score (%)		62%	90%

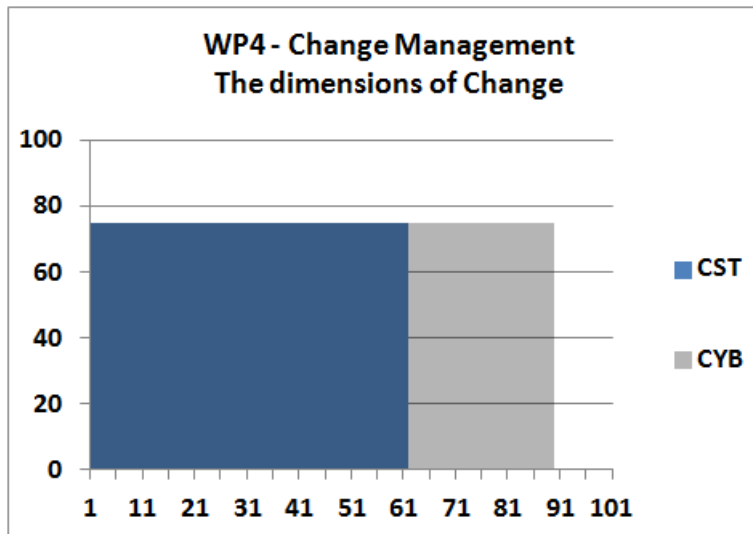
Table 33: CMO - depth of change

Dimension of change - Synthesis

	CST	CYB	WU
Width - %	75%	75%	N/A
Depth - %	62%	90%	"

Table 34: Dimension of change - synthesis

Representation of the Dimensions of Change for CST and CYB



Horizontal axis: depth of change

Vertical axis: width of change

The CYB area is more important, because the depth is greater.

So for CYB's leader it should have been expected change tasks more important than for CST's leader.

No usable data from WU.

Figure 8: Representation of change dimensions

CONCLUSIONS – DIAGNOSIS ON THE SITUATION OF THE CHANGE MANAGEMENT IN THE PILOT SITES .

Changes for Who:

- Seven groups of Actors from CST and CYB are deeply involved in PhysioDom – Health Administration, GP, Nurses, Coordination, Dieticians, Social workers, Technicians of the information system.
- Each group plays a major role in the project.
- Total of actors
 - **CST** - 44 persons with a deep level of compliance - 95 % of the Actors are very compliant with the project. The surface of the blue rectangle is up to 50% and expresses a high level of Change Management worry.
 - **CYB** – 20 persons with a noticeable level of compliance – 80% of the Actors are very compliant with the project. The surface of the grey rectangle is larger than CST's.

Changes for What:

- The major part of the actors have to change - See change width = 75%.in both Pilots
- Changes will occur in more than 50% of the services of the organisations – See-change depth = 62%.(CST) and 90% (CYB) – For details - See table 28.on above

Presentation of the main parameters in the Change Management diagnosis

		CST	CYB	WU
Nb of Professionals interviewed for Change Management Study		44	20	8
Compliance	Agreement	43	16	N/A
	Opposition	1	4	"
Influence of PhysioDom	Important	44	10	"

	Low influence	0	10	“
Dimension of Change	Width	75 %	75 %	“
	Depth	62 %	90 %	“

Table 35: CMO – main parameters of change management - synthesis

Reading this table, one can say that the Change management will be easier in **CST** compared to **CYB**, although 50% of the actors have low influence.
CYB will have to put more resources on that task,.

7.3.2 - IMPACT STUDY REPRESENTATION FROM 9 PARAMETERS SUMMARIZING THE ENVIRONMENT OF THE ACTORS

An impact study is carried out for each category of actors, with the aim of formalising the impacts of change in terms of risks and in terms of opportunity for each of the groups. We have chosen a group of domains, which constitutes the life of the organizations of Homecare services. A value is attributed to each of the areas, which quantifies the importance of change in this area, from 1 to 5.

The radar is the presentation of the results chosen in this study.

This analysis has been conducted for each group of actors on two Pilot sites – CST and CYB.

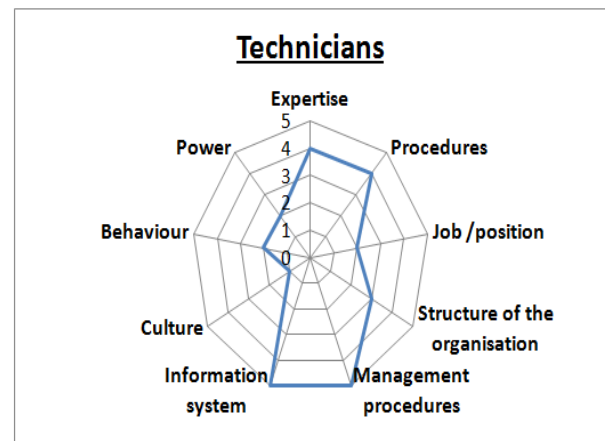
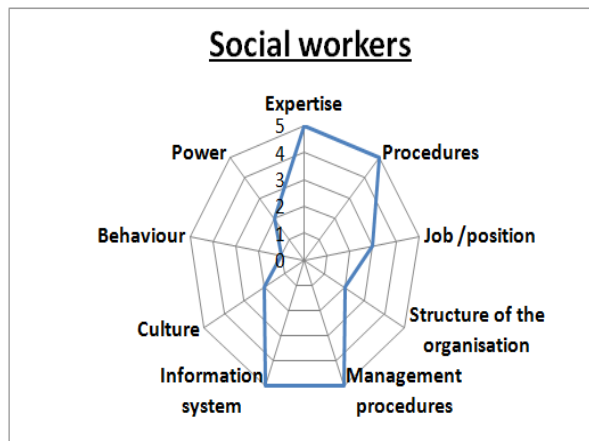
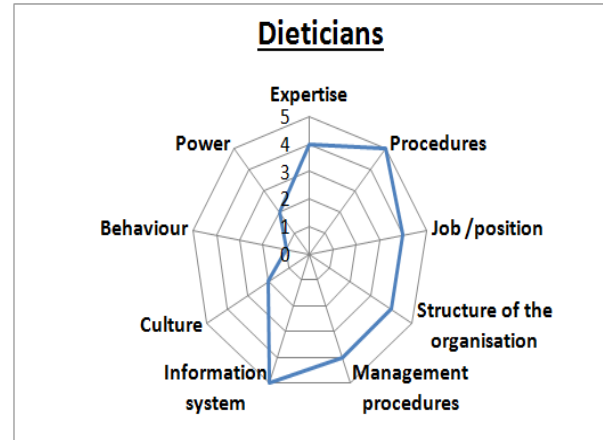
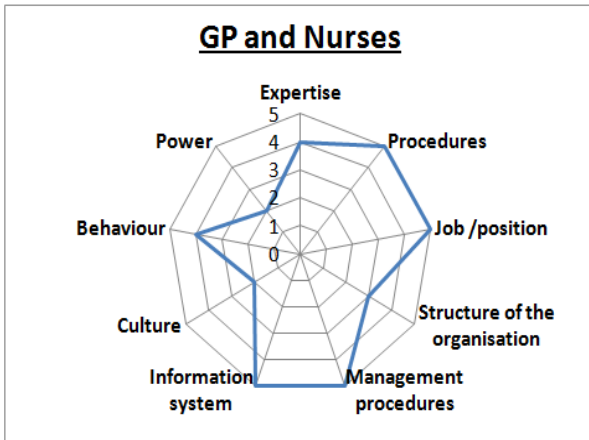
PhysioDom-HDIM – Change Management – Impact study					
A group of Actors (
Fields of Change	Importance of predictable change from 1 to 5				
	1	2	3	4	5
Expertise					
Procedures					
Job /position					
Structure of the organisation					
Management procedures					
Information system					
Culture					
Behaviour					
Power					

Table 36: CMO – impact study - outline

7.3.2.1 - RESULTS FROM CST

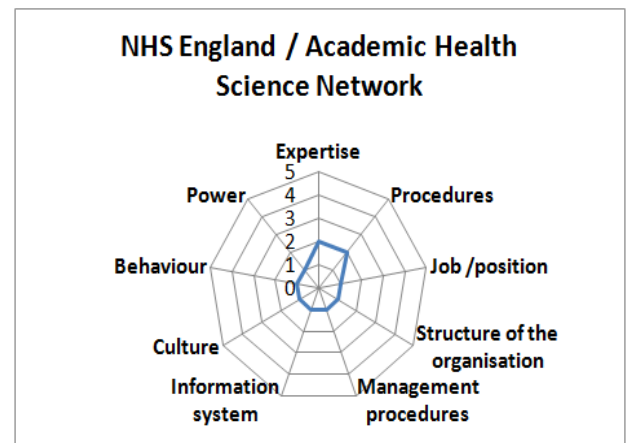
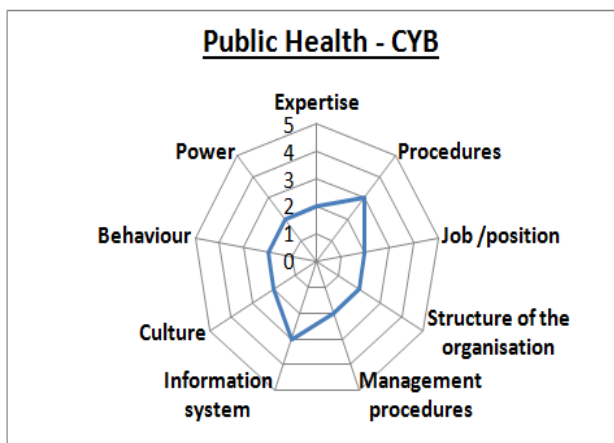
GP and **Nurses** group have an identical profile and are presented on the same radar.

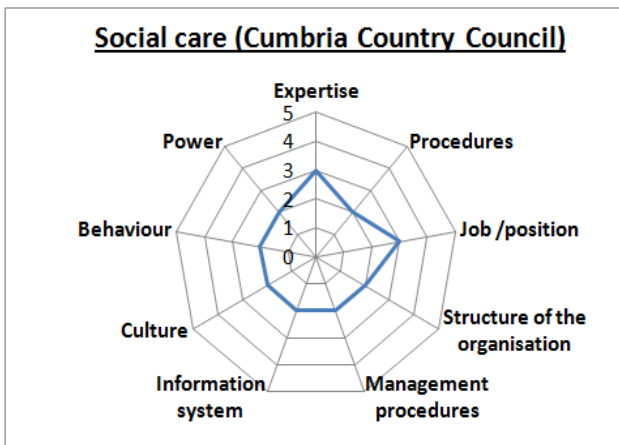
Social workers and **Technicians** present an identical profile.



- Expertise, Work procedures, , Management procedures and Information system are seen by all the Actors, as being deeply impacted by PhysioDom.
- Unlike, Power (Hierarchy relation), Behaviour and Culture are seen as a little bit sensible to PhysioDom.

7.3.2.2 - RESULTS FROM CYB



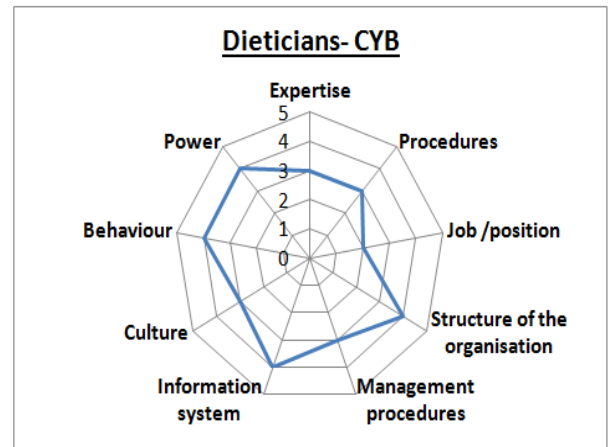
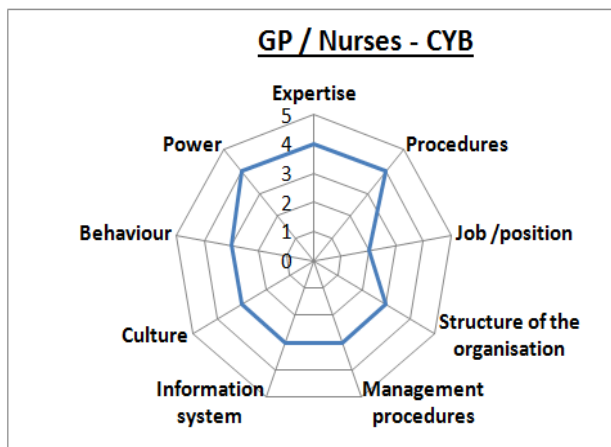


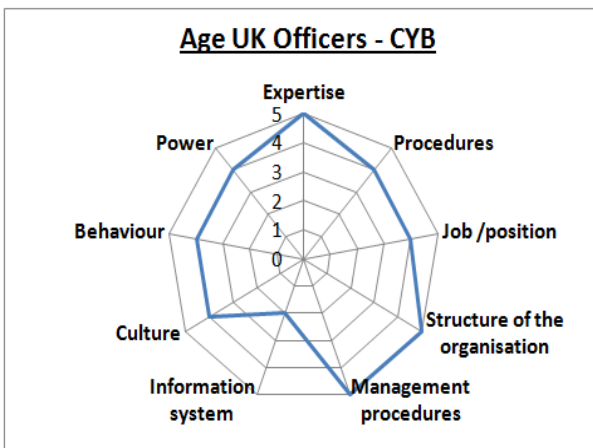
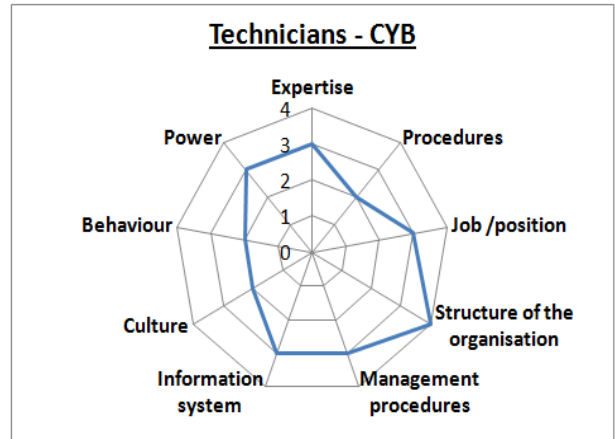
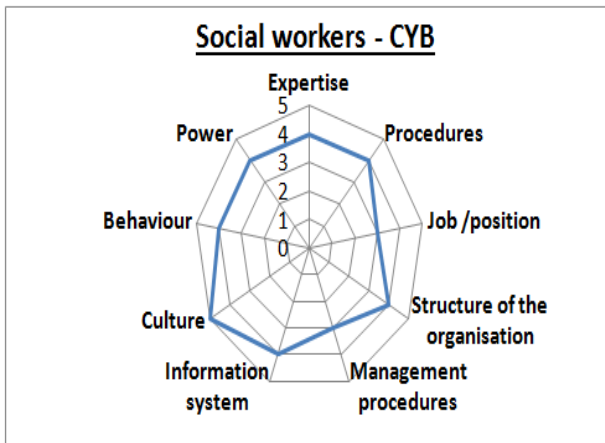
According to these three institutional actors, the area reflecting the PhysioDom's zone of influence on organizations is very small, compared to the areas below, showing the Professionals' diagnosis. Two explanations :

- these managers / experts are dealing with a number of changes to the management of the healthcare system in the territory as funding is reduced and services are closed.

- the outcomes delivered by PhysioDom are not currently a priority for NHS England and they prefer alternative technologies to deliver these services

We note in the graphs below that both **GP/Nurses** and **Dieticians** show a similar profile with values close to 4 for each of the sectors, except for the Job position. For these professionals, PhysioDom does not strongly challenge the Professional hierarchy. This assessment is very different from the one made by the same professionals at CST.





The « **Social workers** » group shows a quite homogenous area, with values higher than 3 for all parameters.

For the « **Technicians** » group, - Behaviour, Culture and Procedures are low-rated, which seems logical considering the position profile.

We note an opposite trend for the « **Age UK Officers** » group, who is working closely with the beneficiaries. All the parameters are highly-rated – 4/5, apart from the « Information system » sector which got a

value of 2. This was due to the HHR-Pro system which required more features to manage the pilot population.

7.3.2.3 - RESULTS FROM WU

Not any results published here.

7.4 – THE LEVERS OF CHANGE

A fair implementation of Change Management suppose to activate three levers - Learning/Training tasks , Communication and Work procedures, adapted to the different Actors involved in PhysioDom.

7.4.1 – 1ST LEVER OF CHANGE - THE LEARNING/TRAINING

The Learning / Training activity can be introduced in a table as below, on the basis of four groups of actors formed at each pilot site: Health Professionals (GP, Dieticians, Nurses), Social Professionals, Beneficiaries at home and Information system Technicians.

See - [Annex 5 – Deliverable D4.1](#) – pages 15 to 18

The group - Health Professionals with its two major fields identified as priority :

- changes in Care procedures – using home sensors, sharing data, Dietary coaching, using basic services--e-mail, calendar, prescriptions and advice;
- adapting to the technical platform tools – home environment (TV + sensors), Home HHR and HHR – Pro.

The group – Professionals of the Social services with its two major fields identified as priority:

- change in the procedures of Social services;
- use of the system at home – devices and HHR-Home - See Table 11.

The group - Beneficiaries with the priority areas:

- changes in the process of data collection, using home sensors and the TV screen;
- using HHR-Home with its four components - calendar, messages, entry of parameters/symptoms, prescriptions/advice.

The group Technical Services of each pilot site focused on the information system :

- deployment of the platform on the site;
- use of HHR-Pro and HHR- Home
- maintenance services – level 1.

Pilot site	Training => Health Professionals			
Procedures				
Tasks	Responsible	Resources	Start date	End date
Home devices use Dietary coaching management PhysioDom Basic services	Pilot site leader	Own Resources from the Pilot sites in Health care and Nutrition science	Large scale Pilot Execution	Large scale Pilot Execution
Information system				
Tasks	Responsible	Resources	Start date	End date
Use of HHR-Home Use of HHR-Pro	Pilot site leader	Own Resources from the Pilot sites in Health care and Nutrition science	Large scale Pilot Execution	Large scale Pilot Execution

For each group, the study has noted: the tasks being the object of training, the resources involved in the task, the dates start/end of the training period.

The global results are presented in this document – See - § [5.3 – Training activity](#)

Table 37: CMO – training

7.4.2 – 2ND LEVER OF CHANGE - THE COMMUNICATION

Communication tools

The communication plan dedicated to the Professionals and their organisations is detailed in the DOW - WP6 – Plan of dissemination, led by CST, and dedicated to the Professionals, the Beneficiaries and their relatives, and to the Stakeholders.

Two main parts are named:

- Creation of the shared tools (Communication Kit) made available to the Partners and to the Professionals under- WP6 – leader – CST:

- logo (CST) and Web site (Viveris);
 - video (CST);
 - production of a quarterly newsletter distributed to the Partners (CYB);
 - design of posters and flyers (Pilot sites).
- Awareness and informational campaigns:
- local press releases;
 - targeted local meetings with Professionals closely linked to the training sessions;
 - local, National and International conferences, and publication of the results in real time;
 - elaboration and periodic update of the dissemination plan – summary of dissemination, actions done, statistics for visits to the web site;
 - creation of a stakeholders committee on each Pilot site.

Communication model

Communication towards Professional Organisations aimed at:

- describing the goals pursued by PhysioDom-HDIM: to deploy an ICT platform on a territory, to allow the establishment of a new service and to monitor senior people from home on both food and physical activity;
- raising awareness on the new tasks to be specified and the new delegations of tasks that can be considered;
- highlighting the benefits gained by both Professionals and Beneficiaries from using the platform.

The communication plan followed by each Pilot was different but has respected the schema : define the actions, the timing and the targets - Professionals - GP, Nurses, Dieticians, Social Workers, or Beneficiaries.

Communication to Professionals / Beneficiaries is inseparable, with different messages. One cannot train one group without taking into consideration the other one on the territory.

7.4.3 – IMPLEMENTATION OF THE 3RD LEVER OF CHANGE - WORK PROCEDURES

It is the third lever of change in organisations.

The main changes to procedures are induced through:

- the use of ICTs in homecare networks;
- the establishment of a new service - food and physical activity remote monitoring.

The use of ICTs

The e-Health platform – PhysioDom in homecare networks is going to lead to:

- A deep change in the concepts underlying the current organisation of healthcare and social services at home:

- sharing data between all partners in the care/social services to facilitate coordination between the different services and therefore the individualized care plan; Practical consequences must be drawn;
 - remote monitoring of the physiological parameters and/or symptoms, foundation of telemedicine;
 - the new role given to the people receiving care in PhysioDom. Beneficiaries are given some of the tasks imposed by their remote monitoring. These people become the protagonists of their own health; we call it self-empowerment.
- To define new tasks and create new jobs in homecare networks, mainly:
- the Coordination role, whose mission is to manage on a technical level the Home Health Records – HHR. This task is essential to develop the coordination between the different home cares services;
 - to train both professionals and beneficiaries to respectively use the platform and the deployed tools at home;
 - the organisation of homes on a specific territory - tool deployment and first level maintenance.

The Nutritional and Physical Activity coaching

It is the main service offered by the PhysioDom HDIM platform with its four levels of services, submitted to the Commission - Brussels-9 September 2013 for approval, and definitely validated during the Kick off meeting in Barcelona - 13/14 March 2014.

The organisation for this totally innovative service has been described in details by each of the pilots in deliverables – See- [Annex 5 – Deliverable D4.1](#) pages 27 to 48, before the launching of the Large Scale Pilot implementation, on the basis of the following data:

- the leader – Name and resume;
- the coordinator (if different from the leader) – Name and resume;
- the Professionals involved – GP, Nurses, Dieticians, Social Workers;
- the schedule for data processing in order to assess:
 - the Nutritional status through:
 - two questionnaires – MNA, SNAQ;
 - Physiological data - Weight, BMI, FM/FFM;
 - the Physical Activity through: the number of steps/week;
- the management of the Alert function on Physiological parameters entered at home;
- the work plan (recommendations) which will vary depending on: the diagnostic, the nutritional state and the physical activity level, the operating modes specific to each pilot site.

7.5 - TO MANAGE THE RESISTANCE TO CHANGE

PhysioDom-HDIM involves a fundamental change in the service organizations and even more, the organization of a new service. The success of the project heavily depends on the commitment of Professionals in the use of ICTs in general and to the use of the PhysioDom platform to ensure

coaching. If Professionals aren't convinced of the merits of the project for themselves and their customers, the adaptation of the Organization will not occur.

Any change requires the acceptance of a loss of certainty for an uncertain future and so, even being committed, one can develop - consciously or not - more or less marked resistances depending on how active the professionals are (proactive (10-20%), passive (70-80%) or frankly resistant (10%).

In the short term, the change causes a decrease in productivity. The management of change allows limiting this loss of productivity relying on the proactive professionals who are the real influencers in the process of change.

7.5.1 - ANALYSIS OF THE ACTORS' BEHAVIOUR

It is important to label the actors involved in PhysioDom-HDIM in the three categories cited on above, to which we add the category 'Not concerned'.

We analyse what is expressed in terms of fears, expectations and even resistances that can be appreciated. An example is presented on below which concerns

CYB – 18 Professionals with interviews

CYB	Positioning of the Actors regarding the Change				
	PhysioDom Actors	Number	Position	Fears	Expectations
GP (3)	2	<input checked="" type="checkbox"/> Proactive	Additional work to check the data	Patients will improve through using the system	Not enough time to participate effectively
	1	<input checked="" type="checkbox"/> Passive	Extra liability if alerts are missed		
		<input type="checkbox"/> Opponent			
		<input type="checkbox"/> Not concerned			
Nurses (2)	2	<input checked="" type="checkbox"/> Proactive	Additional information and work	Will not support people who are most clinically in need	New systems to learn, already busy
		<input type="checkbox"/> Passive			
		<input type="checkbox"/> Opponent			
		<input type="checkbox"/> Not concerned			
Dieticians (3)		<input type="checkbox"/> Proactive	Waste of time as not enough patients will use		Existing systems in place which are commissioned

					and established
	3	<input checked="" type="checkbox"/> Passive			
		<input type="checkbox"/> Opponent			
		<input type="checkbox"/> Not concerned			
Social Workers (2)	3	<input checked="" type="checkbox"/> Proactive	Extra work		Learning how to use the system
	3	<input checked="" type="checkbox"/> Passive			
	2	<input checked="" type="checkbox"/> Opponent	Takes away from personal meetings		
		<input type="checkbox"/> Not concerned			
Information System Technicians (2)		<input type="checkbox"/> Proactive			
	2	<input checked="" type="checkbox"/> Passive	More services to support without additional funds.	Data Governance	Data governance. Business case / ongoing cost of support. Clinical buy in.
		<input type="checkbox"/> Opponent			
		<input type="checkbox"/> Not concerned			

7.5.2 - SYNTHESIS OF THE RESULTS ON THE ACTORS' BEHAVIOUR IN THE THREE PILOTS

	CST	CYB	WU*	TOTAL	
Position				Nb	%
Proactive	25	7	5	37	57%
Passive	9	9	1	19	29%
Opponent	5	2	2	9	14%
Not Concerned	0	0	0	0	0%
Total	39	18	8	65	

Table 38: CMO – actors behaviour on the three pilots

***From WU:** on the question **whether the nurses would like continue the project**, 2 were positive, 3 indicated that they would like to continue the project under two conditions, namely more time and technical improvement of the tool. One person has his doubts and 2 persons did not want to continue with the project.

Conclusions on behaviour appreciation

The involvement of the Professionals in PhysioDom project is important , with 57%.in a Proactive position. There are only 14% of opponents.

7.5.3 - WHAT DID WU DO TO MANAGE BEHAVIOUR CHANGE?

WU adopted a qualitative approach to evaluate the implementation of PhysioDom and to study perceived facilitators and barriers to implement PhysioDom within the context of health care. Many actors were involved in the implementation of Physiodom. The nurse has had a key function. Therefore semi-structured interviews were held with all 8 participating nurses. The interviews were recorded and transcribed verbatim, after which the following themes could be distinguished:

- Collaboration
- Perceived implementation barriers
- Perceived facilitators
- Applicability in daily working procedures, organizational structures

These main themes are further explained below:

Collaboration	<ul style="list-style-type: none"> - Collaboration within team and organisation varied. Some colleagues/managers liked the program and were interested, but also some did not have any interest in it. Sometimes, collaboration was hindered by organizational issues, such as discontinuations in contract, lack of back-up in own team, and implementation of a new management model with self-organizing teams. - Management did not express interest in the experiences of professionals with the project and were more concerned about the managerial issues (hours). - Motivation faded during the project. Possibly due to lack of contact between care professionals, management and researchers. More face-to-face contact or 'professional' contact to discuss cases could be helpful to keep connected to the project. - Collaboration with university was unanimously positive (clear, helpful, accessible).
Perceived barriers	<ul style="list-style-type: none"> - There were system failures that frustrated care professionals and clients. - Many clients needed extra help after the training because older adults have difficulty with handling the system. - Also professionals had difficulty with understanding the system and indicated that they needed more training and guidance. - The system was not very user-friendly. Logging into the system was a hurdle. It took a lot of time to check the alerts (some prefer an email with specific information), and there was no room for making notes of specific persons. Nurses kept next to HHR-PRO their own administration. - Alerts continued to appear, even though there has been taken

	action.
Perceived facilitators	<ul style="list-style-type: none"> - Clear and frequent information for clients (TV messages, feedback on weight, blood pressure etc.) was helpful in keeping persons motivated and connected. - More clients per district nurse were helpful in building up routine, and more nurses in a team facilitated knowledge exchange.
Applicability in daily work	<ul style="list-style-type: none"> - The preventive tasks in Physiodom fit in the profession of the district nurse. Advising on nutrition and physical activity is a task of the nurse which can be shared with the care assistant in the future. It also suits the mission of the care organisations. It is, however, important to emphasize that elderly themselves are in the lead and are responsible for their own health. - Very often, it was difficult to find time to perform the tasks for Physiodom. The tasks did not have the highest priority and sometimes were not carried out in the bustle of everyday life (although professionals received extra time). Technical improvements could enhance this. - Physiodom could be helpful in the provision of care to the nurse's own clients were they already have a relationship with and from whom they have an impression of the health condition. This insight made it easier to interpret alerts. Graphs on weight contributed to more insight in specific health conditions. In situations where the district nurse only had data and no idea of the client, the added value of Physiodom was limited. - Physiodom was more suited to support regular activities than to take over tasks. District nurses experienced that clients appreciate the personal contact and guidance. - Referral to a dietician was not always possible or complicated to organise in the care organisation. This referral could be improved by team discussions of specific cases.

Table 39: CMO – WU to manage behaviour change

7.5.4 - RESITANCE TO CHANGE

An example from CST

Resistances to change	
Types of resistances	Arguments used for the response
Formal statements +/- justified	<ul style="list-style-type: none"> - Research project with no clinical future: Professionals have not observed positive changes in their patients - The project is not validated by the Professionals: The information in HHR pro is not as complete as the IT records 'program used by the professionals. - The project is not strategic for the group: The socio

	cultural level of the population made difficult the system's comprehension for some of our participants.
Informal dialogue	<ul style="list-style-type: none"> - Lack of time: During the deployment, the nursing staff were so busy and had short period of time to dedicate to PhysioDom. - Extra work: an increase number of visits in participants who do not visit the GP/nurse often. - Lack of resources: At the first moment, during the learning phase we experienced moments with a high level of work. - The project is not suitable to the pilot site: The low level of studies of our participants. Once the participants adapted to the system, the level of satisfaction was high. - Irrelevant project: the professionals cannot see the importance of the project because a change is hardest to cope with at the beginning - Too complex: Because of the low level in education, the learning was slower than we expected.
Actions of resistance	<ul style="list-style-type: none"> - Suggesting tools from the competition: Sometimes, the participants needed feedback with the Professionals, and this was not possible through the system. - Actions of discredit: destructive rumours. The participants talked to each other about the problems experienced. - Inertia, no active participation: There were two reasons for non active participants: 1-For repeated technical problems 2-because of the holiday season coincided with the deployment.

Table 40: CMO – CST to manage resistances to change
Synthesis on the ongoing management in CST, from 8 interviews of Professionals

On-going change management - CST			
	Good	Medium	To be improved
Information on PhysioDom	*		
Understanding of PhysioDom			*
Commitment of the Actors	*		

7.5.5 - CONCLUSIONS ON CHANGE MANAGEMENT IN THE THREE PILOTS

CST

Conclusion on procedure, results and knowledge for the future.

For CST, being part of a European-level project was a great challenge, it was great opportunity for the professionals' development too, as our professionals had the chance to learn new ways of working with new technologies. It has been difficult to implement due to a lack of human resources, the daily work in our busy Healthcare Centres and the number of technical problems experienced.

In the near future, the IT will be part of the health care in daily work and IT will be part of the services offered by health care agents, both in public health and in private health. For this reason, carrying out research projects in this field is very important.

Research and development will grow this sector, helping the professionals to offer a person-centred assistance and helping the organizations to manage the increase in demand due to the increase of the chronic pathologies.

Also, the IT solutions in health will be a great tool to help people to maintain their health status and their healthy living habits through the telemonitoring and the ITs.

CYB

NHS has a Digital Maturity Index which assesses how "digital ready" that organisation is to adopt new telehealth initiatives such as PhysioDom.

<https://www.england.nhs.uk/digitaltechnology/info-revolution/maturity-index/>

Organisation	Readiness	Capabilities	Infrastructure
Cumbria Partnership NHS Foundation trust	55	14	48
Southern NHS Foundation Trust	87	39	75
Leicestershire Partnership NHS Trust	80	41	70
East London NHS Foundation Trust	76	43	84
....			

- **Readiness:** covering strategic alignment, leadership, resourcing, governance and information governance
- **Capabilities:** covering records, assessments and plans, transfers of care, orders and results management, medicines management and optimisation, remote and assistive care, asset and resources optimization and standards
- **Infrastructure:** covering areas such as Wi-Fi, mobile devices, single-sign on and business continuity.

Cumbria scores lowest on the Digital Maturity scale for Capabilities and Readiness. This illustrates the complexity facing not just PhysioDom but other projects seeking to promote telehealth initiatives.

Input to strategies

CYB has worked to embed PhysioDom into telehealth strategies developed by the County Council and NHS in Cumbria. PhysioDom has input heavily into the Draft Telehealth, Telemedicine, Technology Enabled Care Strategy being delivered by Cumbria Partnership NHS Foundation Trust in 2016. It also features in the [Older People chapter - Cumbria Intelligence Observatory](#) of the joint Strategic Needs Assessment.

By including the project in these strategies, it is anticipated that future activities will work with PhysioDom.

The project has raised awareness of alternative models for the delivery of services in the territory. This is part of a wider aim of CYB to change the culture of technology adoption within the health and social care sector. Patients regularly use devices to video conference with friends and relatives, and PhysioDom has shown that dietitians can deliver consultations and coaching using the same technology. These small steps can really assist in the delivery of services.

WU

Both Care organisations were willing to invest in new technologies. They both fully supported the introduction of Physiodom in their organisation and district teams. Nurses and dieticians enthusiastically adopted PhysioDom.

Although motivation occasionally faded throughout the implementation period, nurses could invest in the project, and contributed substantially to the recruitment and nutritional guidance of older adults during the 6 months of the project. From the interviews with the nurses we learned that tools like Physiodom should be very user-friendly to really contribute to the daily work of nurses, otherwise it will become a burden to professionals.

To facilitate usage of Physiodom in daily work routines the tool should be further (technically) improved, 2 or more nurses in a team should be responsible for implementation to guarantee back-up and knowledge exchange. Further, a minimum number of older adults should be involved at the start to be able to build up routines.

Taken these suggestions into account, the experiences in the Dutch pilot site showed that PhysioDom services fit into the tasks of the district nurse and can be of added value to health care.

8 – RESULTS OF THE STUDIES CONDUCTED DURING WP4-LSPE - SYNTHESIS

8.1 - ACCEPTABILITY STUDY – COMPLEMENTARY STUDY

See - [Annex 10 – Acceptability study](#)

8.2 - METRICS OF SUCCESS

This chapter takes into account a twofold concern: to complete the DOW and to answer to the Recommendations of the Commission.

- To complete the DOW - § B3.4 – Indicators. This chapter presents 10 indicators defined at the beginning of the project, which set out objectives to reach in terms of both the use of the PhysioDom platform and results. As the project developed, these indicators appeared to be too generic and lacking sensitivity. Therefore, they must be completed and expanded thanks to the data coming from the different studies described in WP5.
- To answer to the PO's Recommendation R10, – « The project must provide metrics of success of a remote nutrition advices service ».
- Metrics of Success are gathered in six tables showing:
 - The results regarding the use of the platform's functionalities.
 - The evolution of the drop-outs number.
 - The results regarding the Dietary and Physical Activity coaching, core of the project.
 - The clinical results obtained in the follow up of the main chronic pathologies and the nutritional status.
 - The number of the admissions to the hospital.
 - The satisfaction levels of the end users.

In that task, three time references are defined in order to assess the results:

- M0 = First month of the study period (1st July 2016)
 - M3 = Third month (end of the period – 30th Sept 2016)
 - M6 = Sixth month (end of the period - 31th Dec 2016)
- If the result reported at M6 is at least equal to the projections (M6 expected), we will write « Yes » in the column – Success. Otherwise, we will write « No ».

TABLE 1

1 - Parameters to measure the Exploitation level of the Platform – Use of the services provided by PhysioDom in both periods					
	M0 to M3	M6 Expected	M6 Results		Success Yes / No
			Nb	%	
Nb of Connexions by the professionals	1081	20 % ↑	754*	↓ 30%	No
Nb of Messages to home	4590	10 % ↑	4990	↑ 10%	Yes
Nb of Unread Messages to home	2612	20 % ↓	3424**	↑ 12%	No
Nb of Dietary advices	279	20 % ↑	392	↑ 40%	Yes
Nb of Physical Activities advices	214	20 % ↑	322	↑ 50%	Yes
Nb of Alerts	671	10 % ↓	719	↑ 7%	No

Table 41: Metrics of success – use of the services

- *The relative decrease of the number of connections during the second period can be explained:
- a great number of the connections during the first period concerned the filling up of the records to incorporate the Beneficiary in the Study
 - during the second period, we have counted 36 drop out (11% of all the records).

**The % of unread messages – We were looking for a 20% decrease and we have noted an increase of 12%

TABLE 2

2 - Drop out					
	M0 to M3	M6 Expected	M6 Results		Success
			Nb	%	Yes / No
Drops out	49	40 % ↓	31	↓ 37%	Yes

Table 42: Metrics of success – drop outs

TABLE 3

3- The Dietary and activity coaching services results					
	M0 Measure	M6 Expected	M6 Results		Success
			NB	%	Yes / No
MNA - Undernutrition (6% of improvement*)	“	30% ** ↑			
MNA – Risk of Undernutrition (45% of improvement*)	“	40% ** ↑			
SNAQ questionnaire (30% of improvement*)	“	50% ** ↑			
Nb of steps per week - < 75 years (20% of improvement*)	“	40% ** ↑			
Nb of steps per week - > 75 years (10% of improvement*)	“	30% ** ↑			
Pre frailty status (following the criteria – D4.1)	“	20% *** ↓			
SF36 questionnaire (12 points of improvement*)	“	30% ** ↑			

Table 43: Metrics of success – dietary and activity coaching services

*Improvement compared to the M0 level

** Increase of the number of persons with an improvement from M0 to M6

*** Decrease of the number of persons in a Pre-Frailty status from M0 to M6

TABLE 4

We rely on the approach described by CST in the deliverable D1.1

4 - Clinical state improvement in chronic pathologies					
	M0 Nb of people	M6 Expected	M6 Results		Success
			Nb	%	Yes / No
Arterial Hypertension (BP at normal range*)		35% with a BP at a normal range**			
Cardiac Insufficiency (remain in the same NYHA level*)	“	50% in the same NYHA level			
Renal Insufficiency (BP stabilized)	“	35%**			
Obesity (BMI – change of class *) (Weight loss > 5% *) (L/F ratio reduction- 20% (men)* (L/F ratio reduction - 30%(women)*	“ “	50%** 50%** 50%** 50%**			
Undernutrition (6% of improvement*)	“	40% ** ↑			
Risk of undernutrition (45% of improvement*)	“	60% ** ↑			

Table 44: Metrics of success – clinical state improvement

*Improvement of the parameter compared to the M0 level

** 60 % of persons in the group “undernutrition” or “risk of...” should have an improvement of 45% from M0 to M6.

TABLE 5

We only record the number of admission to hospital as all the other metrics cannot be clearly defined on all the Pilot sites. We would consider the project to be a success if we get a 10% reduction of admissions to the hospital.

5 - Use of the local Health services					
	M0-M3 Measured	M6 Expected	M6 Results		Success
			Nb	%	Yes / No
Nb Admissions to the hospital		10% ↓			

Table 45: Metrics of success – admissions to the hospital

TABLE 6

The Satisfaction questionnaires and the methodology of the study

See – [Annex 9 – Satisfaction studies](#)

6 - Satisfaction levels of the end users			
	M6 Expected	M6 Results	Success
		%	Yes / No
Satisfaction of Beneficiaries Questionnaire results	76% of beneficiaries with a score > 56 %	76%	Yes
Satisfaction of Professionals Questionnaire results	76% of Professionals with a score > 60%	45,5%	No

Table 46: Metrics of success – satisfaction of the end-users

8.2.1 - CONCLUSIONS ON THE METRICS OF SUCCESS

Table 1

We note three "Yes" and three "NO"

In the group "Yes"

Messages, Diet advices, Physical activity advices, reach the % expected. This is a true success, because it's the core of PhysioDom services

In the group "NO"

- We can explain the relative decrease in connections by the 30% drop outs.
- The number of alerts increase of 7% instead of the 10% expected. This is relatively close to the target.
- We note the great number of **non read messages** far from what it was expected.

CST comments

The variability in the number of messages could be because of the progressive deployment at M0, but, the reason for why the beneficiaries had not use the messages could be that they were focus in the clinical parameters, maybe, the beneficiaries would use better the messages option if it had been an emerging window to be read to continue.

CYB comments

CYB has suggested that a future feature on HHR-Pro could deliver greater personalisation of group messages. Leader board messages, comparing participants' progress against their peers, would make their personal data more interesting by seeing it in a wider context. It would also be automated, reducing the need for staff to compile the data.

Table 2 – We note the 37% drop outs decrease, close to the 40% expected. The study doesn't allow to detect a main cause of these belated drop outs.

Table 3 – waiting for results from Efficacy study (put in an addendum)

Table 4 – waiting for results from Efficacy study (put in an addendum)

Table 5 - waiting for results from Efficacy study (put in an addendum)

Table 6

– **satisfaction of Beneficiaries:** success with a score of 56% calculated in 76% of the beneficiaries group

- **satisfaction of Professionals:** we reach the expected score of 60%, only in 45% of the Professionals group. So we consider this result as “No”.

CST comments

The low satisfaction of the professionals could be caused because Physiodom is not linked to OMI (IT system used in CST by the Healthcare professionals), for this reason the professionals experienced Physiodom as double work. The nurses have been the main group doing the intervention, as is usual in all countries; the nurses have high work’s levels. The busy units could be the reason the professionals see Physiodom as an extra work.

CYB comments

CYB has suggested that a future feature on HHR-Pro could deliver greater personalisation of group messages. Leader board messages, comparing participants’ progress against their peers, would make their personal data more interesting by seeing it in a wider context. It would also be automated, reducing the need for staff to compile the data.

8.3 – THE WP5 STUDIES

Three studies were conducted during the WP4 period – Usefulness, Clinical Efficacy, Costs / Efficacy.

All of them are part of the WP5 and are published in the deliverable – D5.1.

9 - RESPONSES TO THE PO RECOMMENDATIONS FROM RP2 MEETING IN ALSTON - SYNTHESIS

	What	Who	Where
R1	How the nutritional service is structured	Pilots MedTec H&S	D4.1
	How the set top box technology will benefit this service		D4.2
	Monitoring of nutritional data – explain the choice		D4.3
	How is validated the dietary coaching service		D5.1

R2	To address the potential of commercialising dieticians services to a wider public	Viveris Pilots	D7.2
R3	Impact of Dietary Coaching on healthy ageing should be more emphasized and measured	UREN	D4.1
R4	Drop outs – those not being interested to participate should be identified to find some special characteristics that need special processes	UREN H&S	D4.1
R5	The choice of measurements must be described and scientifically justified	UREN	D5.1
R6	It must be very clear whether the system address a type of preventive strategy or is related to particular disease	UREN H&S	D4.1
R7	To demonstrate how external motivation issues are addressed with PhysioDom	Coordin	D4.3
R8	Business model: must represent an attractive proposition for the applicability of PhysioDom	Viveris Pilots	D7.2
R9	To reinforce the commitments to engage with healthcare providers	Pilots	D4.3
R10	To provide Metrics of success of a remote nutrition advice service	H&S UREN	D4.1 D4.3
R11	Effectiveness must be described with regard to the added value over intensive coaching by professionals	H&S	D5.1
R12	Calculation of costs reduction must include coasts of diseases per patient and per day/month. Where prevention of diseases is addressed the cost reduction should be measured in terms of avoidance or later onset of a disease	H&S	D5.1

Table 47: PO recommendations - synthesis

10 - CONCLUSIONS

10.1 – GENERAL CONCLUSIONS

Apart from the Acceptability study, which is complementing the main study conducted during the WP3, the WP4 consisted of three major tasks:

- **Amendments** made to the platform following the acquisition of data during the Pre-Pilot phase, the study of Acceptability and both the PO's and reviewers' recommendations following the second project review (04th - 05th of May 2016, Alston - UK).
- The **exploitation of the platform** from the 1st of April to the 31st of December 2016. Two periods were defined for CST and CYB: a Pre-Study phase from the 1st of April to the 1st of July and a Study phase from the 1st of July to the 31th of December. WU followed a different study design, including a Control group and a recruiting process going from April to September 2016.
- The work done on **Change Management in Organizations**, whose aim was to target the most appropriate changes in order to manage both the introduction of ICT in home monitoring and the implementation of a new service – Dietary Coaching.

This series of works allowed:

- The deployment of a e-Health platform in order to deliver a new service at home – Dietary Coaching, to more than 370 seniors in a 6-months period.
- The conduct of three validation studies – Usefulness, Clinical Efficacy and Costs/Efficacy published in the D5.1 and which give full value to the Project.

10.2 - CONCLUSIONS FROM CST

As a general conclusion, our pilot has faced some difficulties during the deployment and the intervention:

- Some beneficiaries showed problems with the training, in part because the low educational level.
- Technical problems made difficult the first step during the deployment and we lost a high number of beneficiaries for this reason.
- The deployment was during the vocational period and this disturbed the beneficiaries and made them leave the study.

But finally, **the beneficiaries who stay inside the study show a high level of satisfaction** and a real commitment with the system. As example, we have compared the initial weight with the final weight and the results are encouraging.

10.3 - CONCLUSIONS FROM CYB

The system has been very valuable to several of the participants, helping them to improve their lifestyles and overall health.

In many cases, PhysioDom provided the push that they needed to become more active and start to better manage their diet and exercise. Setting up groups of participants with the system allowed them to compete against each other, helping to create habits around the number of steps they were doing.

The offline interventions by the local team – activity and dietary coaching - really supported the participants to change their lifestyles.

The participants were frustrated by some of the technical challenges, but most accepted that these were the consequence of being part of a large scale technical trial. It also prompted a number of positive suggestions for improvements, which we have noted as feature requests when we use the system again on future projects.

10.4 - CONCLUSIONS FROM WU

Despite technical challenges during deployment and throughout the pilot study, the pilot site's technical team often found satisfying solutions for beneficiaries. Rarely, beneficiaries left the project purely because of technical reasons. Many beneficiaries have enjoyed being part of the PhysioDom HDIM intervention, appreciating being monitored by nurses and the focus on a healthy lifestyle. Beneficiaries reported that the project increased their awareness and motivation to be physically active and to maintain a healthy diet. The pilot study has increased insight into the needs of community-dwelling elderly concerning telemonitoring of nutrition and physical activity, and concerning user-friendliness of telemonitoring tools, which is valuable for further development and implementation.

ANNEXES

ANNEX 1 - DELIVERABLE D1.1



D1.1.pdf

ANNEX 2 – DELIVERABLE D2.1



PhysioDom-HDIM_Fun
ctional specification_D

ANNEX 3 – DELIVERABLE D3.2



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ANNEX 4 – DELIVERABLE D3.3



PhysioDom_D3 3_V0
2 .pdf

ANNEX 5 – DELIVERABLE D4.1



WP4_Deliverable D4
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ANNEX 6 – T1.9 - CHANGE MANAGEMENT IN ORGANISATIONS – OUTLINE



PhysioDom_WP1-WP4
- CMO-Outline-Sept16

ANNEX 7 – RESPONSES TO THE R9 - PO RECOMMENDATION



R9-PO
recommendation_Pilot

ANNEX 8 – HOME BOX INSTALLATION MANUAL



TV box
deployment.pdf

ANNEX 9 – SATISFACTION STUDIES



WP5-Efficiency
study_Satisfaction_V0

ANNEX 10 – ACCEPTABILITY STUDY



PHYSIODOM_D4 2
Report on Acceptabilit