# APPCARE

## APPROPRIATE CARE PATHWAY

# *D 6.1 Report on interoperability solutions*

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## Disclaimer

# 1. Introduction

## 1.1 Scope of the document

The scope of the Deliverable 6.1. is to present the interoperability solution developed in the frame of Work Package 6. The interoperability solution is aimed at granting the exchange of health data among the project partners and care professionals involved in the APPCARE project.

## 1.2 History of changes

| Version | Date | Main changes |
|---|---|---|
| V.1 | 12 March 2018 | Tamara Alhambra |
| V.2 | 26 March 2018 | Elena Procaccini |
| V.3 | 30 March 2018 | Tamara Alhambra |

## 1.3 Glossary

| Acronym | Definition |
|---|---|
| CGA | Comprehensive Geriatric Assessment |
| WP | Work Package |
| SPMSQ | Short Portable Mental State Questionnaire |
| Brass | Blaylock Risk Assessment Screening Score |
| GARS | Groningen Activity Restriction Scale |
| FES-I | Falls Self-efficacy Scale |
| MRQ-10 | Medication Risk Questionnaire |

# 2. APPCARE Interoperability Solution

## 2.1 Background

For over two decades, life expectancy has increased globally from 64 to 71 years (WHO, 2015). In 2014, an 8% of the world's population were over 65 and this age group is expected to represent a 15% of the total population by 2050 (World Bank Group, 2015). The progressive growth of life expectancy for the oldest age groups has triggered an increase in the prevalence of specific social and health conditions. These conditions leads to a rising demand for geriatric care and increasing hospitalizations.

To achieve high-quality geriatric care and minimization of the need for hospitalization, an optimum management of geriatric syndromes and an integrated, coordinated system of care is needed. This model should grant patients to be followed in a coordinated manner, avoiding unnecessary hospitalizations and improving patients' clinical trajectories.

The APPCARE project aims at implementing a proactive and comprehensive model to promote health and integrated care for frail elderly people (+75 years) with complex and co-morbid clinical situations from a preventive approach. To this aim, the APPCARE project have designed and it is already implementing a new model for the management of frail elderly people. This new management model includes two phases:

- An standardized application of Comprehensive Geriatric Assessment (CGA)

- Based on the CGA outcomes, coordinated care pathways are delivered to each participant. These care pathways may include:

  a) A short intensive observation period (48h) at the hospital for those participants assessed as more frail;

  b) A preventive approach based on different care pathway (e.g. a cognitive rehabilitation pathway for those participants assessed as suffering from low or mild cognitive impartment).

The intervention will focus on +75 older persons who are frail or at increased risk of developing frailty. A total of 3000 older adults from Italy, The Netherlands and Spain are being evaluated with in-hospital CGA (Hospital Care phase). The CGA identifies medical, psychosocial, and functional capabilities of an older adult and it can help clinicians manage these conditions and prevent or delay their complications (Ward & Reuben, 2016). Besides to the CGA, each pilot includes some extra measures (e.g. perception of social support, depression, etc.) which are evaluated as part of the Continuity of Care phase. On the basis of the T0 assessment results, participants are included in the different pathways according to their needs. These

pathways are individually tailored and consist of multifactorial, evidence-based interventions covering physical, psychological and social needs. The intervention will last 3 months with baseline assessment (CGA at hospital phase (T0a) and CGA + extra variables (T0b)) after hospital discharge and prior to pathways implementation and follow-up assessment at 3 months (T1).

The APPCARE model will follow the following scheme:
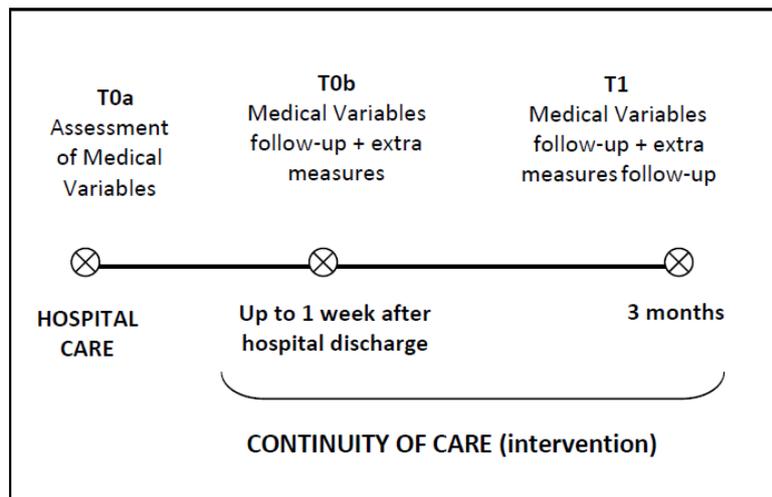


Regarding the assessment, the CGA includes the evaluation of the following medical variables:

| Hospital Care (Medical variables) | |
| --- | --- |
| Variables | • Comorbidity (Cumulative Illness Rating Scale (CIRS); Linn, Linn,& Gurel, 1968)<br><br>• Functional Status (Barthel Index; Mahoney & Barthel, 1965)<br><br>• Risk of pressure ulcer (Braden Scale; Bergstrom, Braden, Laguzza, & Holman, 1987)<br><br>• Dementia (Short Portable Mental State Questionnaire (SPMSQ); Pfeiffer, 1975)<br><br>• Discharge Planning (Blaylock Risk Assessment Screening Score (Brass Index); Blaylock & Cason, 1992)<br><br>• Routine physiological measurements (Mean arterial pressure; Heart rate; Respiratory rate; Sodium (serum) (if available in patient file); Potassium (serum) (if available in patient file); Creatinine (if available in patient file); Haematocrit (if available in patient file); White blood cell count (if available in patient file) |

| | |
|---|---|
| | • Diagnosis (according to International classification ICD9) |
| Where? | Hospital |
| When? | Within 48 hour after the hospital admittance |
| By who? | Hospital health professionals |
| How? | Questionnaire (paper or electronic form) |

These medical variables conforming the CGA are complemented with extra measurement as part of the Continuity of Care phase which provides a more comprehensive and holistic assessment of each participant. Each pilot site will adapt these extra measurement according to the care pathways that are offered in each pilot. In this regard, some examples of extra measurements used in Rotterdam and Valencia pilot sites are:

| | |
|---|---|
| **Continuity of Care**<br>(after hospital discharge) | |
| Variables | • Braden Scale (1st follow-up)<br>• Barthel Index (1st follow-up)<br>• SPMSQ (1st follow-up)<br>• Tilburg Frailty Index<br>• Groningen Activity Restriction Scale (GARS)<br>• Falls Self-efficacy Scale  (FES-I)<br>• Questions:<br>  - Did you fall in the past 12 months?<br>  - Are you afraid of falling?<br>• Medication Risk Questionnaire (MRQ-10)<br>• SF-12v2 Health Survey<br>• De Jong Giervel Loneliness Scale<br>• Living condition (alone, home-assisted by relatives or informal caregivers, homecare assistance with formal caregivers, nursing home) |
| Where? | Participants' home or hospital |
| When? | Up to one week after hospital discharge |
| By who? | Researcher or health professional |
| How? | Questionnaire (paper or electronic form) |

All these measures (CGA + extra measurements) will be collected for each pilot site using a database provided by WP6 as part of the interoperability solution, as it is shown below.

## 2.2 Objective

As part of this larger European Commission APPCARE project, the current work package (WP6) focuses on providing an interoperability solution to guarantee health data information flow and sharing among project partners and the care professionals involved in the participants management.

The specific task of this Work Package are as follows:

- Task 6.1 Communication flows overview: analysis of the existing communication flows in each pilot site, and the related ICT solutions running.

- Task 6.2 Interoperability solution: implementation of an ICT solution to be integrated in the already existing IT systems in order to allow or enhance data exchange. This solution must be compliant with IT protocols to ensure data protection.

- Task 6.3 Interim evaluation of interoperability solution: at month 21, an interim evaluation of the interoperability solution performance will be performed. An updated version will be release accordingly.

- Task 6.4 Final evaluation of interoperability solution: at month 34, a final evaluation report of the interoperability solution, including final recommendations will be issued.

All these actions will be undertaken with the aim to set up an ICT solution granting the exchange of health data among the care professionals involved in the APPCARE participants management, as well as to ensure data flow among project partners. This interoperability solution will have the ability to integrate data from different pilot sites in a common database, which will ensure the data analysis of the APPCARE project as a whole.

## 2.3 Description

The APPCARE interoperability solution is based on a data mapping solution and database solution integrating the data from each pilot site in a common database. To these aims different documents have been developed within WP6.

### 2.3.1 Data mapping solution

The data mapping solution offers a strategy for the APPCARE project data management. Regarding data management, a completed questionnaire will be developed for each pilot site including all the agreed variables to be evaluated. As part of these variables are the measurements conforming the CGA, which are

common for the three pilots and the extra measurements which are adapted to the care pathways that are offered in each pilot as part of the Continuity of Care phase.

For that reason, a data mapping solution is needed in order to ensure a proper data management for each pilot site and for the APPCARE project as a whole. To this aim a data mapping solution has been developed and it is presented in Annex I.

## 2.3.2 Database solution

For each pilot site a database have been designed including all the variables collected in that specific pilot.

From the data collection phase a completed questionnaire (paper or electronic form) is obtained for each participant. The responses from each questionnaire will be transferred into a spreadsheet (.CSV files). The .CSV format file will ensure data integration and interoperability, as this format could be easily uploaded into SPSS software for further analysis.

2 options:

1. Electronic data collection: If the questionnaire was developed in electronic form the software will automatically collate the data. Please, make sure that those data can be downloaded as .CSV files.

2. Paper-based data collection: If the questionnaire was developed in paper form the following procedures can be used to enter the data into a spreadsheet: 1) Manually (someone will need to manually transfer the responses from the questionnaires into a spreadsheet) or 2) Automatic OCR reading (paper based questionnaire will be automatically scanned by an OCR reader). In both cases, please, make sure that the output format is provided in .CSV file.

As a second step, each pilot site database (in .CSV file) will be integrated in a general APPCARE database. This general database will be a MySQL database containing the data (baseline and follow-up) from the three pilots.

MySQL is an open-source relational database management system (RDBMS) based on the relational database model. MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open-source web application software stack. MySQL could manage to import several formats like .CSV. MySQL databases could be easily migrated into SQL Server database.

https://dev.mysql.com/tech-resources/articles/move_from_microsoft_SQL_Server.html

## 2.3.2 Data collection

Each pilot site is responsible to collect at local level the requested data according to the APPCARE mapping solution.

**TREVISO** pilot site decided to collect data directly into the Electronic Health Record (HER) available in the geriatric ward responsible for the APPCARE enrolment: in order to allow a smooth implementation of this task, the EHR had been integrated with the missing variables in order to store all the necessary information and easily retrieve it. In this way, data are also easily updated during the follow up assessments for outpatient visits. In case of homecare assessment, the case manager in charge performed the assessment and register outcomes on a paper base, then update the geriatric EHR as soon as she/he come back to the hospital. This solution was necessary due to the large amount of data to be collected, in order to reduce risk of errors and data losses. Furthermore, a function had been added to extract the information directly on a .CVS database, easing the transfer into the APPCARE common database.

**VALENCIA** pilot site collect data using a paper form questionnaire. This APPCARE questionnaire is divided in two sections: (1) one including the medical data; (2) another section including the continuity of care data. In regard to the first section, medical data are collected at hospital (hospital phase) by health professionals. All the questionnaires completed during the hospital phase are collected from the hospital by a Polibienestar researcher and kept in a secure place at Polibienestar Research Institute. Then, up to one month, a researcher visits each participant' home in order to collect the continuity of care measurements (second section of the APPCARE questionnaire). These extra measurements will serve to refer the participants to the care interventions that best fit each participant needs. Once the questionnaires are completed (section 1on medical data and section 2 on continuity of care data), all data are inserted into a database (Excel file). This Excel database have been designed to fit the APPCARE common database and to be converted into SPSS file, which will be used to perform the APPCARE data analyses.

**ROTTERDAM:** APPCARE researchers at the hospital collect the medical data using paper form questionnaire. The completed paper form questionnaires will be kept in a secure place at the EMC. To collect the information about the bio-psycho-social and environmental context of the participants, a paper form questionnaire will be used. These extra measurements will serve to refer the participants to the care interventions that best fit their needs, in which they will remain during 3-6 months. The completed paper form questionnaires will be kept in a secure place at the EMC. To collect the continuity of care/ preventive care measurements, the participants can choose how to receive the follow-up questionnaire: an electronic form questionnaire (Lime Survey) via email, a paper form questionnaire filled in by a researcher during a

home visit, or a paper form questionnaire sent to their address. The completed paper form questionnaires will be kept in a secure place at the EMC.

*Annex I: Data mapping solution*

# DATA MAPPING

## 1   Questionnaire: Hospital Care

| Identity | Name and surname | NAME/SURNAME/S | |
|---|---|---|---|
| Patient | Patient code | CODE | |
| Evaluator | Evaluator code | CODE | |
| Date | Date | DATE DD/MM/YYYY | |
| Age | Age | NUMBER | |

### 1.1   Control variables

| Sex | Control>>Sex | 1. Man<br>2. Woman |
|---|---|---|

### 1.2   Barthel

| Barthel_eat | 1.   Eat | 0 = unable<br>5 = needs help cutting, spreading butter, etc., or requires modified diet<br>10 = independent |
|---|---|---|
| Barthel_trans | 2. Bed-chair transfers | 0 = unable, no sitting balance<br>5 = major help (one or two people, physical), can sit<br>10 = minor help (verbal or physical)<br>15 = independent |
| Barthel_settling | 3. Settling | 0 = needs to help with personal care<br>5 = independent face/hair/teeth/shaving (implements provided) |
| Barthele_toilet | 4.. Going to the toilet | 0 = dependent<br>5 = needs some help, but can do something alone<br>10 = independent (on and off, dressing, wiping) |
| Barthel_shower | 5. Taking a shower | 0 = dependent<br>5 = independent (or in shower) |
| Barthel_Moving | 6. Moving | 0 = immobile or < 50 yards<br>5 = wheelchair independent, including corners, > 50 yards<br>10 = walks with help of one person (verbal or physical) > 50 yards<br>15 = independent (but may use any aid; for example, stick) > 50 yards |
| Barther_stairs | 7. Going upstairs and downstairs | 0 = unable |

| | | |
|---|---|---|
| | | 5 = needs help (verbal, physical, carrying aid)<br>10 = independent |
| Barther_dressing | 8. Dressing | 0 = dependent<br>5 = needs help but can do about half unaided<br>10 = independent (including buttons, zips, laces, etc.) |
| Barthel_stool | 9. Deposition | 0 = incontinent (or needs to be given enemas)<br>5 = occasional accident<br>10 = continent |
| Barthel_urine | 10. Urination | 0 = incontinent, or catheterized and unable to manage alone<br>5 = occasional accident<br>10 = continent |

## 1.3 Norton Scale (only in the Valencia pilot site)

| No_1 | Norton - Physical condition | 1. Very Bad | 2. Poor | 3. Fair | 4. Good |
|---|---|---|---|---|---|
| No_2 | Norton - Mental condition | 1. Stuporous | 2. Confused | 3. Apathetic | 4. Alert |
| No_3 | Norton - Activity | 1. Bedfast | 2. Chaircound | 3. Walks with help | 4. Ambulant |
| No_4 | Norton - Mobility | 1. Immobile | 2. Very Limited | 3. Slightly impaired | 4. Full |
| No_5 | Norton - Incontinence | 1. Urinary and Fecal | 2. Usually urinary | 3. Occasional | 4. None |
| No_total | Norton - Punctuation (Total) | NUMBER | | | |

## 1.4 Braden Scale

| Brd_1 | Sensorial perception | 1. Completely limited<br>2. Very limited<br>3. Slightly limited<br>4. No impairment |
|---|---|---|
| Brd_2 | Exposition to humidity/Moistuure | 1. Constantly moist<br>2. Very moist<br>3. Occasionally moist<br>4. Rarely moist |
| Brd_3 | Activities | 1. Bedgast<br>2. Chairfast<br>3. Walks occasionally<br>4. Walks frequently |
| Brd_4 | Mobility | 1. Completely immobile<br>2. Very limited<br>3. Slightly limited<br>4. No limitation |
| Brd_5 | Nutrition | 1. Very poor<br>2. Probably inadequate |

| | | 3. Adequate |
| | | 4. Excellent |
| Brd_6 | Friction and shear | 1. Problem |
| | | 2. Potential problem |
| | | 3. No apparent problem |
| UPP_total | Braden scale total score | NUMBER |

## 1.5    SPMSQ -  Pfeiffer

| Pf_1 | 1. Which day is today? (day/month/year) | 1. The patient passes the question |
| Pf_2 | 2. Which day of the week is today? | |
| Pf_3 | 3. Where are we? | 2. The patient doesn't pass the question |
| Pf_4 | 4. Which is your telephone number? | |
| Pf_5 | 5. Which is your address? (Ask only if the patient do not have telephone) | |
| Pf_6 | 6. How old are you? | |
| Pf_7 | 7. Which Is your date of birth? (day, month, year) | |
| Pf_8 | 8. Who is currently the president of the government? | |
| Pf_9 | 9. Who is the former president of the government? | |
| Pf_10 | 10. Which is the surname of your mother? | |
| Pf_11 | 11. Go subtracting by 3 to 3 from 20 to 0 | |
| Pf_total | 12. Total score | Insert total score |

## 1.6    Physiological Measures

| Weight | Weight | Insert weight in kg |
| Height | Height | Insert height in cm |
| Temp | Temperature | Insert temperature in ºC |
| Mean_Arterial_Pressure | Mean Arterial Pressure | Add the Mean Arterial Pressure of the subject |
| F_card | Cardiac Frequency | Insert the Cardiac Frequency of the subject |
| F_resp | Respiratory Frequency | Add the respiratory frequency of the subject |
| Sodium | Sodium | Insert the value of sodium of the patient |
| Potassium | Potassium | Add the value of potassium of the patient |
| Creatinine | Creatinine | Add the value of creatinine of the patient |
| Hematocrits | Haematocrits | Insert the value of haematocrit of the patient |
| White_blood_cells | White Blood Cells | Insert the counting of white blood cells of the patient |
| Physiological | Other physiological measures | Insert another or other physiological measures taken |

## 1.7    CIRS-R

| CIRS_Cardiac | CIRS Cardiac Score | 0. None |
| CIRS_Vascular | CIRS Vascular Score | 1. Mild: does not infere with normal activity; prognosis is excellent |
| CIRS_Hema | CIRS Hematopoietic Score | |
| CIRS_Resp | CIRS Respiratory Score | 2. Moderate: interferes with normal activity, treatment is needed. |
| CIRS_Ea_Na_Th | CIRS Eyes, ears, nose, throat, larynx Pointing | |

| | | |
|---|---|---|
| CIRS_Gastro_sup | **CIRS Gastrointestinal Superior Score** | Prognosis is good |
| CIRS_Gastro_inf | **CIRS Gastrointestinal Inferior Score** | 3. Severe: is disabling and treatment is urgently needed. Prognosis is guarded |
| CIRS_liver | **CIRS Liver Pointing** | |
| CIRS_Renal | **CIRS Renal Pointing** | 4. Extremely severe: life-treatening. Treatment is urgent or of no avail. Prognosis is grave |
| CIRS_Genitourinary | **CIRS Genitourinary Pointing** | |
| CIRS_Musculo_esq | **CIRS Muscoloscheletric/tegumentarius Pointing** | |
| CIRS_Neurologic | **CIRS Neurologic Pointing** | |
| CIRS_Endocrine | **CIRS Endocrin/metabolic mammary Pointing** | |
| CIRS_Enf_ psychiatric | **CIRS Psychiatric diseases Pointing** | |

| | | |
|---|---|---|
| CIRS_Categories_ involved | **CIRS Involved categories Pointing** | Insert the number of categories involved |
| CIRS_Punct_tot | **Total CIRS Punctuation** | Insert the total CIRS Punctuation |
| CIRS_Ind_sever | **CIRS Severity index (total point of category)** | Insert the index of severity |
| CIRS_Num_cat_threes | **CIRS Number of categories at level three of severity** | Insert the number of categories with 3 (level of severity) |
| CIRS_Num_cat_fours | **CIRS Number of categories at level four of severity** | insert the number of categories with 4 (level of severity) |

## 1.8    Brass Index

| | | |
|---|---|---|
| **Brass_1** | **1. AGE** | 0=55 years or less<br>1=56 - 64 years<br>2=65 - 79 years<br>3=80+ years |
| **Brass_2** | **2. LIVING SITUATION** | 0=Lives only with spouse<br>1=Lives with family support<br>2=Lives alone with friends' support<br>3=Lives alone with no support |
| **Brass_3** | **3. FUNCTIONAL STATUS** | 0=Independent in activities of daily living and instrumental activities of daily living<br>1= Dependent in some activity [GO TO THE SUBITEMS] |
| **Brass_3_1** | **Dependent for> Eating/feeding** | 0=empty/no; 1=marked/Yes |
| **Brass_3_2** | **Dependent for> Bathing/grooming** | 0=empty/no; 1=marked/Yes |
| **Brass_3_3** | **Dependent for> Toileting** | 0=empty/no; 1=marked/Yes |
| **Brass_3_4** | **Dependent for> Transferring** | 0=empty/no; 1=marked/Yes |
| **Brass_3_5** | **Dependent for> Incontinent of bowel function** | 0=empty/no; 1=marked/Yes |
| **Brass_3_6** | **Dependent for> Incontinento of bladder function** | 0=empty/no; 1=marked/Yes |
| **Brass_3_7** | **Dependent for> Meal preparation** | 0=empty/no; 1=marked/Yes |
| **Brass_3_8** | **Dependent for> Resposible for own medication administratation** | 0=empty/no; 1=marked/Yes |
| **Brass_3_9** | **Dependent for> Handling own** | 0=empty/no; 1=marked/Yes |

| | financers | |
|---|---|---|
| Brass_3_10 | **Dependent for> Grocery sopping** | *0=empty/no; 1=marked/Yes* |
| Brass_3_11 | **Dependent for> transportation** | *0=empty/no; 1=marked/Yes* |
| **Brass_4** | **4. COGNITION** | 0=Oriented<br>1=Disoriented to some spheres, some of the time<br>2=Disoriented to some spheres, all of the time<br>3= Disoriented to all spheres and some of the time<br>4= Disoriented to all spheres all of the time<br>5=Comatose |
| **Brass_5** | **5. BEHAVIOUR PATTERN** | 0=Appropriate<br>1= Inappropiate [GO TO THE SUBITEMS] |
| Brass_5_1 | **Wandering** | *0=empty/no; 1=Yes* |
| Brass_5_2 | **Agitated** | *0=empty/no; 1=Yes* |
| Brass_5_3 | **Confused** | *0=empty/no; 1=Yes* |
| Brass_5_4 | **Other** | *0=empty/no; 1=Yes* |
| **Brass_6** | **6. MOBILITY** | 0=Ambulatory<br>1= Ambulatory with mechanical assistance<br>2= Ambulatory with human assistance<br>3= Non-ambulatory |
| **Brass_7** | **7. SENSORY DEFICIT** | 0=None<br>1= Visual or hearing deficits<br>2= Visual and hearing deficits |
| **Brass_8** | **8. NUMBER OF ADMISSIONS (hospital)** | 0=None in the last 3 months<br>1=One in the last 3 months<br>2=Two in the last 3 months<br>3=More than two in the last 3 months |
| **Brass_9** | **9. NUMBER OF ACTIVE MEDICAL PROBLEMS** | 0=Up to three medical problems<br>1=Three to five medical problems<br>2=More than five medical problems |
| **Brass_10** | **10. DRUGS AND PRESCRIPTIONS** | 0=Fewer than three drugs<br>1=Three to five drugs<br>2=More than five drugs |

## 1.9    CIE-9

| **CIE_9** | **Diagnosis CIE-9** | text |
|---|---|---|

## 1.10    Results

| Results_1 | **Results after medical assessment:** | 1. Discharge: own home | 2. Discharge: relatives' home | 3. Discharge: nursing home | 4. Discharge: hospitalisation at home | 5. Hospitalisation |
|---|---|---|---|---|---|---|
| Results_2 | **[iif] Discarge: another place** | TEXT | | | | |
| Results_3 | **[iif] Hospitalisation: days** | NUMBER | | | | |

# 2   Questionnaire: Continuity of Care

| Phase | Phase | T0 |
|-------|-------|-----|

Additional explanation on hospitalisation phases, as requested above:

| T0- Hospitalisation Phase (baseline) |
|---|

| Identity_b | Name and surname | NAME/SURNAME/S |
|-----------|------------------|----------------|
| Patient_b | Patient code | CODE |
| Evaluator_b | Evaluator code | CODE |
| Date_b | Date | DATE DD/MM/YYYY |
| Age_b | Age | NUMBER |

## 2.1   Control Variables

| Sex_b | Control>>Sex | 3. Man<br>4. Woman |
|-------|--------------|--------------------|

## 2.2   Barthel

| Barthel_eat_b | 1.   Eat | 0 = unable<br>5 = needs help cutting, spreading butter, etc., or requires modified diet<br>10 = independent |
|---------------|----------|-----|
| Barthel_trans_b | 2. Bed-chair transfers | 0 = unable, no sitting balance<br>5 = major help (one or two people, physical), can sit<br>10 = minor help (verbal or physical)<br>15 = independent |
| Barthel_settling_b | 3. Settling | 0 = needs to help with personal care<br>5 = independent face/hair/teeth/shaving (implements provided) |
| Barthele_toilet_b | 4.. Going to the toilet | 0 = dependent<br>5 = needs some help, but can do something alone<br>10 = independent (on and off, dressing, wiping) |
| Barthel_shower_b | 5. Taking a shower | 0 = dependent<br>5 = independent (or in shower) |
| Barthel_Moving_b | 6. Moving | 0 = immobile or < 50 yards<br>5 = wheelchair independent, including corners, > 50 yards<br>10 = walks with help of one person (verbal or physical) > 50 yards |

| | | 15 = independent (but may use any aid; for example, stick) > 50 yards |
|---|---|---|
| Barther_stairs_b | **7. Going upstairs and downstairs** | 0 = unable<br>5 = needs help (verbal, physical, carrying aid)<br>10 = independent |
| Barther_dressing_b | **8. Dressing** | 0 = dependent<br>5 = needs help but can do about half unaided<br>10 = independent (including buttons, zips, laces, etc.) |
| Barthel_stool_b | **9. Deposition** | 0 = incontinent (or needs to be given enemas)<br>5 = occasional accident<br>10 = continent |
| Barthel_urine_b | **10. Urination** | 0 = incontinent, or catheterized and unable to manage alone<br>5 = occasional accident<br>10 = continent |

## 2.3 Braden SCALE

| Brd_1_b | **Sensorial perception** | 5. Completely limited<br>6. Very limited<br>7. Slightly limited<br>8. No impairment |
|---|---|---|
| Brd_2_b | **Exposition to humidity/Moistuure** | 5. Constantly moist<br>6. Very moist<br>7. Occasionally moist<br>8. Rarely moist |
| Brd_3_b | **Activities** | 5. Bedfast<br>6. Chair fast<br>7. Walks occasionally<br>8. Walks frequently |
| Brd_4_b | **Mobility** | 5. Completely immobile<br>6. Very limited<br>7. Slightly limited<br>8. No limitation |
| Brd_5_b | **Nutrition** | 5. Very poor<br>6. Probably inadequate<br>7. Adequate<br>8. Excellent |
| Brd_6_b | **Friction and shear** | 4. Problem<br>5. Potential problem<br>6. No apparent problem |
| UPP_total_b | **Braden scale total score** | NUMBER |

## 2.4    SPMSQ - Pfeiffer

| | | |
|---|---|---|
| Pf_1_b | 1. Which day is today? (day/month/year) | 1. The patient passes the question |
| Pf_2_b | 2. Which day of the week is today? | |
| Pf_3_b | 3. Where are we? | |
| Pf_4_b | 4. Which is your telephone number? | |
| Pf_5_b | 5. Which is your address? (Ask only if the patient do not have telephone) | |
| Pf_6_b | 6. How old are you? | 2. The patient doesn't pass the question |
| Pf_7_b | 7. Which Is your date of birth? (day, month, year) | |
| Pf_8_b | 8. Who is currently the president of the government? | |
| Pf_9_b | 9. Who is the former president of the government? | |
| Pf_10_b | 10. Which is the surname of your mother? | |
| Pf_11_b | 11. Go subtracting by 3 to 3 from 20 to 0 | |
| Pf_total_b | 12. Total score | Insert total score |

## 2.5    Physiological Measures

| | | |
|---|---|---|
| Weight_b | Weight | Insert weight in kg |
| Height _b | Height | Insert height in cm |
| Temp_b | Temperature | Insert temperature in ºC |
| Mean_Arterial_Pressure_b | Mean Arterial Pressure | Add the Mean Arterial Pressure of the subject |
| F_card_b | Cardiac Frequency | Insert the Cardiac Frequency of the subject |
| F_resp_b | Respiratory Frequency | Add the respiratory frequency of the subject |
| Sodium_b | Sodium | Insert the value of sodium of the patient |
| Potassium_b | Potassium | Add the value of potassium of the patient |
| Creatinine_b | Creatinine | Add the value of creatinine of the patient |
| Hematocrits_b | Haematocrits | Insert the value of haematocrit of the patient |
| White_blood_cells_b | White Blood Cells | Insert the counting of white blood cells of the patient |
| Physiological _b | Other physiological measures | Insert another or other physiological measures taken |

| | | | |
|---|---|---|---|
| CIE_V667_b | Paliative Care  (CIE: V66.7) | 1. No | 2 Yes |

## 2.6    Care Received

### ATTENTION: QUESTIONS DIFFERENTIATED BY PHASE (T0b and T1)

| T0 | | | |
|---|---|---|---|
| HomeAid_1_b | Due to your health problems, did you receive professional aid with household affairs in the last 12 months? (e.g., cleaning, cooking or any help related to your house) | 1. No | 2. Yes |
| HomeAid_2_b | How many hours per week? | NUMBER | |

| HomeAid_3_b | For how many weeks? | NUMBER | |
|---|---|---|---|

| T0 | | | |
|---|---|---|---|
| HomeCare_1_b | Did you receive professional aid for your own healthcare in the last 12 months? (e.g., helping you to get dresses, to take a shower, etc.) | 1. No | 2. Yes |
| HomeCare_2_b | How many hours per week? | NUMBER | |
| HomeCare_3_b | For how many weeks? | NUMBER | |

| T0 | | | |
|---|---|---|---|
| Physician_1_b | Did you visit your physician/s (general practitioner or specialist) in the last 12 months? | 1. No | 2. Yes |
| Physician_2_b | Please, indicate how many visits approximately you had in this period | NUMBER | |

| T0 | | | |
|---|---|---|---|
| Urg_1_b | Did you go to the hospital's Emergency services (A&E department) in the last 12 months? | 1. No | 2. Yes |
| Urg_2_b | How many times in the last 12 months? | NUMBER | |

| T0 | | | |
|---|---|---|---|
| Hosp_1_b | Have you been admitted for an Emergency Hospital Admission in the last 12 months? | 1. No | 2. Yes |
| Hosp_2_b | How many times have you been admitted? | NUMBER | |

## 2.7    MRQ-10

| MRQ-10_1_b | Do you take five or more different medications? | Insert |
|---|---|---|
| MRQ-10_2_b | Do you take 12 or more pills a day? | |
| MRQ-10_3_b | Do you take medication for 3 or more different diseases? | 1= YES |
| MRQ-10_4_b | Have they changed 4 times or more medications or instructions on how to take them in the last 12 months? | 2= NO |
| MRQ-10_5_b | Is it difficult for you to take your medications as prescribed? | |
| MRQ-10_6_b | Do you normally recipe more than one doctor for your drugs? | |
| MRQ-10_7_b | Do you collect yourself your medicine from the pharmacy? | |
| MRQ-10_8_b | Did you always dispense your prescriptions at the same pharmacy? | |
| MRQ-10_9_b | Do you know what takes all your medications? | |
| MRQ-10_10_b | Do you take any of the following drugs: carbamazepine, lithium, phenytoin, warfarin, digoxin, phenobarbital, procainamide, theophylline, and quinidine? | 1= YES<br>2=NO<br>3=UNKNOWN |

## 2.8    Tillburg Index

| Till_1_b | Do you feel physically healthy? | 1= yes<br>2= no |
|---|---|---|

| Till_2_b | Do you involuntary loose weight recently?<br>(6 kg or more last 6 months o 3 kg in the last month?) | 1= yes<br>2= no |
|---|---|---|
| **Do you experiment problems in your daily life like?** | | |
| Till_3_b | Difficulties on walking? | 1= yes<br>2= no |
| Till_4_b | Difficulties in maintaining balance? | 1= yes<br>2= no |
| Till_5_b | Poor hearing? | 1= yes<br>2= no |
| Till_6_b | Poor vision? | 1= yes<br>2= no |
| Till_7_b | lack of strength in your hands? | 1= yes<br>2= no |
| Till_8_b | Physical tiredness? | 1= yes<br>2= no |
| Till_9_b | Do you have problems with your memory? | 1= yes<br>2= no<br>3=sometimes |
| Till_10_b | Have you felt down during the last month? | 1= yes<br>2= no<br>3=sometimes |
| Till_11_b | Have you felt nervous or anxious during the last month? | 1= yes<br>2= no<br>3=sometimes |
| Till_12_b | Are you able to cope with problems well? | 1= yes<br>2= no<br>3=sometimes |
| Till_13_b | Do you live alone? | 1= yes<br>2= no<br>3=sometimes |
| Till_14_b | Do you sometimes miss having people around you? | 1= yes<br>2= no<br>3=sometimes |
| Till_15_b | Do you receive enough support from other people? | 1= yes<br>2= no |

## 2.9 Questions related to the concern about fallings

| Falls_1_b | Are you afraid of falling? | 1. Yes | 2. No |
|---|---|---|---|
| Falls_2_b | Did you fall one or more times during the last 12 months? | 1. Yes | 2. No |
| Falls_3_b | How many times you fell? | Number | |

| Concern_1_b | Dressing and undressing | 1. Not worried at all |
|---|---|---|
| Concern_2_b | Taking a shower | 2. Slightly worried |
| Concern_3_b | Sitting and getting up | 3. Considerably worried |
| Concern_4_b | Going upstairs and downstairs | 4. Very worried |
| Concern_5_b | Picking something up (something high or off the | |

| | | |
|---|---|---|
| | ground) | |
| Concern_6_b | Ascending and descending a ramp | |
| Concern_7_b | Going out to a social event (e.g.,a religious or familiar one) | |

## 2.10   The Gronigen Activity Restriction Scale (GARS)

| | | |
|---|---|---|
| GARS_1_b | dress yourself? | 1= yes I can do it totally independently |
| GARS_2_b | get in and out of bed? | 2= yes I can do it totally independently but with some difficulties |
| GARS_3_b | stand up from sitting in a chair? | |
| GARS_4_b | wash your face and hands? | |
| GARS_5_b | wash and dry your whole body? | |
| GARS_6_b | get on and off the toilet? | |
| GARS_7_b | feed yourself? | 3= yes I can do it totally independently but with great difficulties |
| GARS_8_b | get around in the house (if necessary with a cane)? | |
| GARS_9_b | go up and down the stairs? | |
| GARS_10_b | walk outdoors (if necessary with a cane)? | |
| GARS_11_b | take care of your feet and toenails? | 4 = No I can't do it independently |
| GARS_12_b | prepare breakfast or lunch? | |
| GARS_13_b | prepare dinner? | |
| GARS_14_b | do "light" household activities (for example dusting and tidying up)? | |
| GARS_15_b | do "heavy" household activities (for example mopping cleaning the windows and vacuuming)? | |
| GARS_16_b | wash and iron your clothes? | |
| GARS_17_b | make the beds? | |
| GARS_18_b | do the shopping? | |

## 2.11   Quality of Life and Social Support

| | | |
|---|---|---|
| SF-12v2_1_b | In general, would you say your health is: | *Insert* 1   Excelent 2   Very Good 3   Good 4   Regular 5   Bad |
| *The following questions refer to activities or things you could do on a normal day. Health now limit you in these activities or things? If so, how much?* | | |
| SF-12v2_2_b | Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf more than 1 hour | 1= Yes, I'm highly limitated 2= Yes, I'm limitated a bit 3= No, I'm not limitated |
| SF-12v2_3_b | Climbing several flights of stairs | 1= Yes, I'm highly limitated 2= Yes, I'm limitated a bit 3= No, I'm not limitated |
| *During the past 4 weeks, how much of the time have you had any of the following result of your physical health?* | | |
| SF-12v2_4_b | Accomplished less than you would like | 1=Always 2=Almost always |

| | | 3=Sometimes<br>4=Only once<br>5=Never |
|---|---|---|
| SF-12v2_5_b | Were limited in the kind of work or other daily activities | 1=Always<br>2=Almost always<br>3=Sometimes<br>4=Only once<br>5=Never |

*During the past 4 weeks, how much of the time have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?*

| | | |
|---|---|---|
| SF12v2_6_b | Accomplished less than you would like? | 1=Always<br>2=Almost always<br>3=Sometimes<br>4=Only once<br>5=Never |
| SF12v2_7_b | Did work or other activities less carefully than usual. | 1=Always<br>2=Almost always<br>3=Sometimes<br>4=Only once<br>5=Never |
| SF12v2_8_b | During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)? | 1 - Not at all<br>2 - A little bit<br>3 - Moderately<br>4 - Quite a bit<br>5 - Extremely |

*These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling. How much of the time during the past 4 weeks?*

| | | |
|---|---|---|
| SF12v2_9_b | Have you felt calm and peaceful? | 1=Always<br>2=Almost always<br>3=Sometimes<br>4=Only once<br>5=Never |
| SF12v2_10_b | Did you have a lot of energy? | 1=Always<br>2=Almost always<br>3=Sometimes<br>4=Only once<br>5=Never |
| SF12v2_11_b | Have you felt downhearted and depressed? | 1=Always<br>2=Almost always<br>3=Sometimes<br>4=Only once<br>5=Never |
| SF12v2_12_b | During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting friends, relatives, etc.)? | 1=Always<br>2=Almost always<br>3=Sometimes<br>4=Only once<br>5=Never |

## 2.12 De Jong Gierveld loneliness scale

| De_jong_1_b | I experienced a general sense of emptyness | 1=Yes |
| De_jong_2_b | There are plenty of people I can rely on when I have problems | 2=No |
| De_jong_3_b | There are enough people I can trust completely | 3=Almost |
| De_jong_4_b | There are many people I can feel close to | |
| De_jong_5_b | I miss having people around | |
| De_jong_6_b | I often feel rejected | |

## 2.13 BSI-18 (only in the Valencia pilot)

| BSI-18_1_b | Fainting or dizziness | 0. None |
| BSI-18_2_b | Disinterest | 1. A Little |
| BSI-18_3_b | Nervousness or trembling | 2. Moderately |
| BSI-18_4_b | Pain: heart or chest | 3. Fairly |
| BSI-18_5_b | Feeling alone | 4. A lot |
| BSI-18_6_b | Feeling tense/anxious | |
| BSI-18_7_b | Nausea or stomach ache | |
| BSI-18_8_b | Sadness | |
| BSI-18_9_b | sudden shocks without reason | |
| BSI-18_10_b | Shortness of breath | |
| BSI-18_11_b | Worthless feelings | |
| BSI-18_12_b | Panic crisis | |
| BSI-18_13_b | Numbness or tingling | |
| BSI-18_14_b | Hopeless think about the future | |
| BSI-18_15_b | Restless (cannot stay seated) | |
| BSI-18_16_b | Weakness (in certain parts of the body) | |
| BSI-18_17_b | Suicidal ideations | |
| BSI-18_18_b | Feeling afraid | |

## 2.14 SOCIAL INCLUSSION/SUPPORT (only in the Valencia pilot)

| SOCIAL_1_b | Scale 1 >> 1. I feel identified with my community or neighbourhood | 1. strongly disagree |
| SOCIAL_2_b | Scale 1 >> 2. My opinions are well received in my neighbourhood | 2. disagree |
| SOCIAL_3_b | Scale 1 >> 3. Only a few people of my community know who I am | 3. partly agree and partly disagree |
| SOCIAL_4_b | Scale 1 >> 4. I feel my neighbourhood as something mine | |
| SOCIAL_5_b | Scale 2 >> 5. I collaborate with organisations in my community | 4. agree |
| SOCIAL_6_b | Scale 2 >> 6. I participate in certain activities within my community | 5. strongly agree |
| SOCIAL_7_b | Scale 2 >> 7. I take part in some groups or social initiatives in my community | |
| SOCIAL_8_b | Scale 2 >> 8. I collaborate with the Support calls in my community | |
| SOCIAL_9_b | Scale 2 >> 9. I do not participate in the socio-recreational activities put in place in my community | |
| SOCIAL_10_b | Scale 3 >> 10. I could find persons for helping me to solve my problems | |
| SOCIAL_11_b | Scale 3 >> 11. I could find someone for listening to me when I feel | |

| | | downhearted | |
|---|---|---|---|
| SOCIAL_12_b | | Scale 3 >> 12. I could find sources for satisfying me | |
| SOCIAL_13_b | | Scale 3 >> 13. I can take heart and feel encouraged | |
| SOCIAL_14_b | | Scale 3 >> 14. I could relax and forget my quotidian issues | |

## 2.15  LSCAPE-25 (only in the Valencia pilot)

| | | | |
|---|---|---|---|
| LSCAPE-25 _5_b | Social integration> | I'm able to visit people whenever I wish | Insert the score from 1 to 5 |
| LSCAPE-25 _6_b | Social integration> | I'm able to travel as much as I would like | 1= Not true for me at all |
| LSCAPE-25 _7_b | Social integration> | I am able to take part in any regular activities I want to | 5= Definitively true for me |
| LSCAPE-25 _8_b | Social integration> | I am able to go on special outings | |
| LSCAPE-25 _9_b | Contribution > | I am able to give to others as much as I want | |
| LSCAPE-25 _10_b | Contribution > | I can provide for others when I wish | |
| LSCAPE-25 _11_b | Contribution > | I can help people whenever I want | |
| LSCAPE-25 _12_b | Contribution > | I can give as much as I like to charity or the church | |
| LSCAPE-25 _13_b | Enjoyment > | I am able to follow my interests | |
| LSCAPE-25 _14_b | Enjoyment > | I am able to do all the things I love* | |
| LSCAPE-25 _15_b | Enjoyment > | I can have everything I need to be happy | |
| LSCAPE-25 _16_b | Enjoyment > | I can have regular treats | |
| LSCAPE-25 _17_b | Security > | I expect to have enough money to last my lifetime | |
| LSCAPE-25 _18_b | Security > | I expect a future without money problems* | |
| LSCAPE-25 _19_b | Security > | I have enough money to feel secure about the future | |
| LSCAPE-25 _20_b | Security > | I have enough money for unexpected costs | |
| LSCAPE-25 _21_b | Restriction > | My choices are limited by money* | |
| LSCAPE-25 _22_b | Restriction > | I have to be careful with spending | |
| LSCAPE-25 _23_b | Restriction > | Lack of money stops me from doing things | |
| LSCAPE-25 _24_b | Restriction > | More money would make my life easier | |
| LSCAPE-25 _25_b | Restriction > | There are things I would like to buy but cannot afford | |

## 2.16  Personal data

| | | |
|---|---|---|
| Data_1_b_b | In which country were you born? | Insert the country |
| Data_2_b_b | In which country was your mother born? | Insert the country |
| Data_3_b_b | In which country was your father born? | Insert the country |
| Data_4_b | What is the highest level of education you have completed? | 1. No studies<br>2. Primary education<br>3. Secondary general education, 1st cycle<br>4. Vocational education and training (VET) of 2nd grade, 2nd cycle<br>5. Secondary general education, 2nd cycle<br>6. Higher Vocational education and training (VET)<br>7. Bachelor Degree or higher tertiary education |

| | | |
|---|---|---|
| **Data_5_b** | **What's your marital status?** | 1. Single<br>2. Married<br>3. domestic partner<br>4. Divorced<br>5. Widower |
| **Data_6_b** | **How many people live in your home?** | Number |
| **Data_7_b** | **What is your household composition?** | 1. Living alone<br>2. Living with partner, no children<br>3. Living with partner and children<br>4. Living without partner, with children<br>5. Living in a household shared with others |

| | | |
|---|---|---|
| **Data_8_b** | **What kind of income you received and other members of your household in the last year?** | 1. Retirement pension<br>2. Private retirement plan/s<br>3. Family benefits<br>4. Unemployment benefit<br>5. Benefit dependency / disability |

| | | |
|---|---|---|
| **Data_9_b** | **About how much is the monthly net household income, considering all family members living together?** | 1. Less than 700 €<br>2. Between 700 € and 900 €<br>3. Between 900 € and 1200 €<br>4. Between 1200 € and 1400 €<br>5. Between 1400 € and 1700 €<br>6. Between 1700 € and 1900 €<br>7. Between 1900 € and 2300 €<br>8. Between 2300 € and 2700 €<br>9. Between 2700 € and 3500 €<br>10. 3500 € or more |

| | | |
|---|---|---|
| **Data_10_a_b** | **What religion do you belong or feel attached to mostly?** | 1. I do not belong or feel attached to any religion<br>2. Protestant (e.g., Lutheran or Anglican church)<br>3. Protestant (evangelist) free church / other protestant<br>4. Roman Catholic<br>5. Greek or Russian Orthodox<br>6. Jewish<br>7. Islam<br>8. Hinduist<br>9. Buddhist<br>10. Esoteric, New Age<br>11. Other |
| **Data_10_b_b** | **If-f 3. Other [11]>** What religion do you belong or feel attached to mostly? | Insert text |