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## D2.2 Identify data needed - start-term

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### Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made to through appropriate citation, quotation or both.

### Abstract

This deliverable provides an overview of all data collected during the ValueCare intervention and follow-up. It identifies the general clerical and clinical data needed, and pilot-specific data needed to respond to the ValueCare concept, including the ICT support requirements.

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## EXECUTIVE SUMMARY

This deliverable, **D2.2 Identify data needed**, provides an overview of all data needed in order to achieve the ValueCare concept. The D2.2 establishes a common ontology of data to enable easier and faster exchange of information between social and health care services. This makes it easier for health and social care professionals to exchange information and coordinate care services. D2.2 aims to identify all clerical (e.g. personal data, socio-demographic data) and clinical information (e.g. health-related data, documentation of care delivery) needed in pilot sites. More specifically, D2.2 defines data collected from self-reported questionnaires, clinicians, administrative sources and the ValueCare app. The questionnaires used for evaluation developed in WP5 (D5.1) were used as a source of information. Furthermore, pilot sites provided specific information about the clinical, administrative and ValueCare app data they intend to collect. The pilot-specific data was defined based on the context and target group in each pilot site. D2.2 is a handy resource for partners in order to establish their data flows and infrastructure and support implementation and evaluation of the ValueCare approach.

# 1 Purpose, objectives and scope

The main objective of Work Package (WP) 2 is to develop new value-based social and health integrated care supported by ICT that promotes older persons' goals and the working conditions of professionals. WP2 has the following specific objectives:

- ▶ To define a new model of personalised integrated care based on a value-based approach.
- ▶ To involve end-users in the creation process.
- ▶ To improve quality of life of older people and their families as well as improving the working conditions of health and social care professionals.
- ▶ To ensure the recruitment of end-users for the ValueCare concept co-design.

The purpose of deliverable 2.2 (D2.2) is to identify all data needed. This will enable easier and faster exchange of clerical and clinical information between social and health care services. The exchange would be facilitated by a common ontology of data and an enhanced infrastructure allowing an agile transfer of data from social to health care and vice-versa. In this sense, and according to the previous and next tasks, partners will identify which data are needed in order to achieve the ValueCare concept and, consequently define the ICT support requirements. This information is particularly relevant to WP3 during the development of the ICT solution. Furthermore, the clerical and clinical data identified in D2.2 supports implementation in pilot sites (WP4) and provides detailed information about the outcomes measured for evaluation (WP5) and in the feasibility study (WP7).

In D2.2 the following objectives are envisaged:

- ▶ Identify all clerical and clinical data needed; the minimum data needed to respond to the ValueCare concept.
- ▶ Provide a timeline of the required data.

D2.2 provides input to several other WPs:

- ▶ **WP3** Digital IT for value-based integrated care; in particular, Task 3.3 ValueCare digital solution back-end development (leader: FBK), and Task 3.4 Development of the ValueCare digital solution front-end to enable the ValueCare methodology implementation in pilot sites (leader: VI).
- ▶ **WP4** ValueCare pilots' implementation, in particular, Task 4.1 General framework for the pilots' implementation (leader: EMC), and Task 4.3. ValueCare implementation (leader: MEDRI).
- ▶ **WP5** Formative and summative evaluation of the ValueCare pilots, in particular, Task 5.1 Evaluation Framework (leader: EMC).
- ▶ **WP7** Exploitation, innovation and business models, in particular, Task 7.2 Business models and corresponding feasibility (leader: ECHA).

## 2 Methodology

In this section, the clerical and clinical data needed to respond to the ValueCare concept is defined (Table 1 and 2). Furthermore, we describe the pilot-specific data needed to respond to the Personalised Care Plan and managed by the ValueCare app (Table 3). The information in the tables is based on the questionnaires used for evaluation developed in WP5 (D5.1). Furthermore, pilot sites provided specific information about the clinical, administrative and ValueCare app data they intend to collect. Pilot-specific data was defined based on the context and target group in each pilot site.

**Clerical information** comprises all on personal data (but excluding data specifically about health or social care, and clinical information), record keeping, appointments, coordination and systems for guaranteeing the communication within teams and services and with key persons outside the organisation (meetings, calls, etc.), book-keeping and, if applies, invoicing systems. **Clinical information** consists of information ranging from determinants of health and measures of health (risks) and wellbeing to documentation of care delivery. **Pilot-specific information** includes data collected during the ValueCare intervention and differs per target group. This can be data collected in the ValueCare app, pilot-specific clinical or administrative information, and patient-reported information. The sensitive nature of clinical and clerical data supposes a major barrier for sharing information between services. ValueCare guarantees the security of all sensitive information while ensuring agile sharing.

### 2.1 Definition of clerical variables

Table 1 describes the clerical information collected in all pilot sites. This includes personal data, administrative data, socio-economic information and socio-demographic information. Self-reported data will be collected from older persons ( $\geq 65$  years of age), their informal caregiver (e.g. family member, neighbour, friend) and health and social care professionals (i.e. formal caregiver).

**Table 1:** Clerical information collected in pilot sites.

Variable	Definition	Supporting definition	Inclusion criteria	Source	Type
Participant ID	Indicate the participant record number.	A separate participant identification folder will be created to ensure pseudo-anonymization.	All participants	Self-reported (questionnaire, all forms)	Numerical value
Proxy reporting	Indicate whether a caretaker reported items on behalf of the patient.	N/A	Older persons	Self-reported (questionnaire, all forms)	Single answer
Date	Date of completing questionnaire.	N/A	All participants	Self-reported (questionnaire, all forms)	DD/MM/YYYY

Age	Age in years.	N/A	All participants	Self-reported (questionnaire, baseline)	Numerical value
Sex	Sex at birth.	N/A	All participants	Self-reported (questionnaire, baseline)	Single answer
Ethnicity	Participant indicates in which country he/she was born and his/her parents.	Varies by county and should be determined by country.	All participants	Self-reported (questionnaire, baseline)	Single answer
Telephone number	Contact telephone number.	N/A	Older persons	Self-reported (baseline)	Numerical value
Education level	Highest attained education.	Based upon the International Standard Classification of Education (ISCED).	All participants	Self-reported (questionnaire, baseline)	Single answer
Marital status	What is your marital status?	N/A	All participants	Self-reported (questionnaire, baseline)	Single answer
Employment status	What is your work status?	N/A	All participants	Self-reported (questionnaire, baseline and follow-up)	Single answer
Household income 1	Which kind of income did your household receive in the past year?	N/A	All participants	Self-reported (questionnaire, baseline)	Single answer
Household income 2	Approximately how much is your net monthly household income?	N/A	All participants	Self-reported (questionnaire, baseline)	Single answer
Working hours	What are your working hours?	N/A	Informal and formal caregivers	Self-reported (questionnaire, baseline)	Single answer
Work setting 1	Which setting do you spend most time in?	N/A	Formal caregivers	Self-reported (questionnaire, baseline)	Single answer
Work setting 2	Which statement best describes your staff group?	N/A	Formal caregivers	Self-reported (questionnaire, baseline)	Single answer
Living status and location	Which statement best describes your living arrangement?	N/A	Older persons	Self-reported (questionnaire, all forms)	Single answer
Household composition	What is your household composition?	N/A	Informal and formal caregivers	Self-reported (questionnaire, baseline)	Single answer
Date of index admission	Date of admission for index event.	N/A	Older persons admitted to hospital	Administrative data	Date by DD/MM/YYYY
Date of discharge	Date of discharge from acute care hospital.	N/A	Older persons	Administrative data	Date by DD/MM/YYYY

			admitted to hospital		
Rehabilitation	Did the acute inpatient care or post-acute care include dedicated rehabilitation?	Dedicated rehabilitation during acute inpatient care or post-acute care, either hospital based or outpatient/home based.	Older persons admitted to hospital	Administrative data	Single answer
Discharge destination	What type of place was the patient discharged to?	N/A	Older persons admitted to hospital	Administrative data	Single answer
Name	First name	N/A	All participants	Self-reported (ValueCare app)	Single answer
Surname	Last name	N/A	All participants	Self-reported (ValueCare app)	Single answer
E-mail account	E-mail address of participant.	N/A	All participants	Self-reported (ValueCare app)	Single answer
Username	The participant's username to sign in to the ValueCare app/ dashboard.	N/A	All participants	Self-reported (ValueCare app)	Single answer
Password	The participant's password to sign in to the ValueCare app/ dashboard.	N/A	All participants	Self-reported (ValueCare app)	Single answer
Language choice	Preferred language by the ValueCare app/ dashboard user.	N/A	All participants	Self-reported (ValueCare app)	Single answer
Notification/ coaching preferences	Notification and feedback preferences of the participant.	N/A	All participants	Self-reported (ValueCare app)	Single answer

## 2.2 Definition of clinical variables

Table 2 describes the clinical information collected in all pilot sites. This includes determinants of health, measures of health (risks) and wellbeing, and care delivery information. These outcomes measures are mostly self-reported by the target groups including patients, informal caregivers and health and social professionals (formal

**Table 2:** Clinical information collected in pilot sites.

<b>Variable</b>	<b>Measurement instrument</b>	<b>Definition</b>	<b>Supporting definition</b>	<b>Inclusion criteria</b>	<b>Source</b>	<b>Type</b>
Diagnosis	N/A	Indicate diagnosis made.	N/A	Older persons	Clinical	Single answer
Arm circumference	N/A	Measure mid upper arm circumference of left arm.	N/A	Older persons	Clinical	Numerical value
Activities of daily living functioning	Barthel index	ADL using the Barthel Index.	Total score	Older persons	Clinical	Numerical value
Frailty stage	Tilburg Frailty Indicator	Asses frailty stage using the Tilburg Frailty Indicator.	N/A	Older persons	Self-reported (baseline and follow-up)	Single answer
Falls	FES-I and VAS FOF	Amount of falls and fear of falling.	Based upon the Visual Analogue Scale for Fear of Falling (VAS-FOF) (Scheffer et al., 2010) and Falls Efficacy Scale-International (FES-I) (Yardley et al., 2005)	Older persons	Self-reported (baseline and follow-up)	Numerical value, single answer
Poly-pharmacy	MRQ-10	Usage of medication and appropriate medication use.	N/A	Older persons	Self-reported (baseline and follow-up)	Single answer
Smoking status	ICHOM Older Person Set	Do you smoke cigarettes (or cigars, cigarillos, tobacco, or pipes) at the present time?	N/A	Older persons	Self-reported (baseline and follow-up)	Single answer
Alcohol use	ICHOM Overall Adult Health Set	How often alcohol is consumed and how many standard drink on a typical day.	N/A	Older persons	Self-reported (baseline and follow-up)	Single answer
Body mass index	ICHOM Older Person Set	Height and weight are used to calculate BMI.	N/A	Older persons	Self-reported (baseline and follow-up)	Numerical value
Nutrition	SNAQ65+	Determining (the risk of) undernutrition using Short Nutritional Assessment Questionnaire 65+ (SNAQ65+).	N/A	Older persons	Self-reported (baseline and follow-up), clinical	Single answer, numerical value
Physical activity 1	IPAQ	Assessment of sitting time.	Based upon the International Physical Activity	Older persons	Self-reported (baseline and follow-up)	Numerical value



			Questionnaire (Lee et al. 2011)			
Physical activity 2	SHARE-FI	Assessment of intensity of physical activity.	Based upon the Survey of Health, Ageing and Retirement in Europe (Romero-Ortuno et al. 2010)	Older persons	Self-reported (baseline and follow-up)	Single answer
Co-morbid conditions	ICHOM Older Person Set	Have you ever been told by a doctor that you have any of the following conditions?	Based upon the Self-administered Comorbidity Questionnaire (Sangha et al, 2003)	Older persons	Self-reported (baseline and follow-up)	Multiple answers
Health related quality of life 1	PROMIS-10 Global Health	Assessment of general domains of health and functioning.	N/A	All participants	Self-reported (baseline and follow-up)	Single answer
Health related quality of life 2	EQ-5D-5L	Assessment of general domains of health and functioning.	N/A	Older persons, informal caregivers	Self-reported (baseline and follow-up)	Single answer
Mental health	World Health Organisation-Five well-being index (WHO-5)	Assessment of current mental wellbeing.	N/A	Older persons	Self-reported (baseline and follow-up)	Single answer
Happiness	Happiness scale (one item)	Do you feel happy in general?	Based upon measurement instrument by Abdel-Khalek (2006)	Older persons	Self-reported (baseline and follow-up)	Numerical
Loneliness	UCLA-3-item scale	Measures extent to which someone is lonely and isolated.	Based upon the UCLA Loneliness Scale (Hughes et al., 2004)	Older persons	Self-reported (baseline and follow-up)	Single answer
Support by devices	ICHOM Older Person Set	Indicate any supportive devices for health (e.g. hearing aid, wheel chair).	N/A	Older persons	Self-reported (baseline)	Single answer
Care use 1	SMRC Health Care Utilisation questionnaire	Did you see a medical doctor or nurse practitioner at any time during the past 12 months?	All appointments with healthcare professionals.	Older persons	Self-reported (baseline and follow-up)	Number of appointments
Care use 2	SMRC Health Care Utilisation questionnaire	Due to your health, did you receive help in household activities in the past 12 months?	N/A	Older persons	Self-reported (baseline and follow-up)	Hours per week and amount of weeks
Care use 3	SMRC Health Care Utilisation questionnaire	Did you receive help in caring for yourself in the past 12 months?	Help received from informal caregiver(s).	Older persons	Self-reported (baseline and follow-up)	Hours per week and amount of weeks

Care use 4	SMRC Health Care Utilisation questionnaire	Have you been admitted to a hospital during the past 12 months?	N/A	Older persons	Self-reported (baseline and follow-up)	Single answer
Shared decision making	ICHOM Older Person Set	Assessment of patient participation in decision making.	N/A	Older persons	Self-reported (follow-up)	Single answer
Carer burden	4-item Zarit Burden Interview	Carer reported burden.	N/A	Informal caregiver	Self-reported (baseline and follow-up)	Single answer
Autonomy and control	ICHOM Older Person Set	Which of the following statements best describes how much control you have over your daily life?	Question from the Adult Social Care Outcomes Toolkit	Informal caregiver	Self-reported (baseline and follow-up)	Single answer
Time spent in activities to care for patient	iVICQ	Assessment of the impact of informal caregiving.	Based upon the iMTA Valuation of Informal Care Questionnaire (Hoefman et al., 2013)	Informal caregiver	Self-reported (baseline and follow-up)	Hours per week over the last week
Job satisfaction	Minnesota Satisfaction Questionnaire	Assessment of satisfaction with various aspects of the job.	N/A	Formal caregivers	Self-reported (baseline and follow-up)	Single answer
Work-related burnout	Copenhagen burnout inventory	Assessing work-related burnout.	N/A	Formal caregivers	Self-reported (baseline and follow-up)	Single answer

## 2.3 Definition of pilot-specific data

Table 3(a-g) describes the pilot-specific information collected during the implementation of the ValueCare approach. This includes clinical information, patient-reported information and information gathered in the ValueCare app or the ValueCare dashboard. How pilot sites obtain the data from sources and enable data exchange is in the domain of the pilot site and will be specified in the local plan for implementation.

**Table 3a:** Pilot-specific data collected during ValueCare implementation in Athens.

Missing: pilot site is awaiting approval target group change. Information will follow at a later point in time.

**Table 3b:** Pilot-specific data collected during ValueCare implementation in Coimbra.

Missing: pilot site is recruiting relevant stakeholders to set up the intervention. Information will follow at a later point in time.

**Table 3c:** Pilot-specific data collected during ValueCare implementation in Cork/Kerry.

<b>Category/ variable</b>	<b>Action/ functionality</b>	<b>Definition</b>	<b>Inclusion criteria</b>	<b>Source</b>	<b>Processing output</b>	<b>Type</b>
Nutrition	Awareness and motivation	Assessment of nutrition awareness using a questionnaire.	Older persons	ValueCare app	Scoring answers to determine awareness level	Questionnaire
Nutrition	Monitoring	Meal diary	Older persons	ValueCare app	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Number of meals eaten daily.	Older persons	ValueCare app	Dashboard analytics trend - Compliance to the care plan	Diary - single answer
Nutrition	Monitoring	Nutrients intake (e.g. calcium, protein, vitamin B12, dietary fibre).	Older persons	ValueCare app - meal diary	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Number of videos seen with healthy recipes (once a week).	Older persons	ValueCare app	Compliance to care plan	Numerical value
Nutrition	Monitoring	Lists of products included in the shopping list (once a week).	Older persons	ValueCare app	Compliance to health behavioural change	App data
Physical activity	Monitoring	Duration of physical activity (minutes per week).	Older persons	ValueCare app (manually)	Compliance to care plan	Exercise data
Physical activity	Monitoring	Type of activity (aerobic exercise, strength training, flexibility, balance).	Older persons	ValueCare app	Compliance to care plan	Questionnaire, exercise data
Physical activity	Monitoring	Number of recommended videos seen on physical exercise (weekly).	Older persons	ValueCare app	Compliance to care plan	Numerical value
Medication	Monitoring	Medication/ supplements intake using a questionnaire.	Older persons	ValueCare app (manually)	Compliance to care plan	Questionnaire
Medication	Monitoring	Track medication use and adherence to medication plan.	Older persons	ValueCare app	Compliance to medication prescription	Notification
Medication	Monitoring	Reduction or change in medications.	Informal and formal caregiver	ValueCare dashboard	Change in care plan	Notification
Cognitive functions	Games	Type of games played (working	Older persons	ValueCare app	Compliance to care plan	App data

		memory, executive functions, attention, speech).				
Cognitive functions	Games	Play time (in minutes).	Older persons	ValueCare app	Compliance to care plan	App data
Cognitive functions	Games	Number of games played.	Older persons	ValueCare app	Compliance to care plan	App data
Social interaction	Monitoring	Who they spoke to on the telephone (weekly).	Older persons	ValueCare app	Deviation from social interaction goal	Interaction data
Social interaction	Monitoring	Who they sent messages to (weekly).	Older persons	ValueCare app	Deviation from social interaction goal	Interaction data
Social interaction	Monitoring	Engagement with Local Services and Resources Information Hub.	Older persons	ValueCare app (interview)	Deviation from social interaction goal	Questionnaire
Social interaction	Monitoring	Social Activities Attended / Meet up with relatives or friends (weekly).	Older persons	ValueCare app (interview)	Deviation from social interaction goal	Questionnaire

**Table 3d:** Pilot-specific data collected during ValueCare implementation in Rijeka.

Category/variable	Action/functionality	Definition	Inclusion criteria	Source	Processing output	Type
Allergies	N/A	Is the patient allergic to any food or medication?	Older persons	Clinical	N/A	Single answer
Nutrition	Monitoring	Meal diary	Older persons	ValueCare app	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Nutrients intake (high: fruits, vegetables, whole grains, pulses - peas, beans, lentils and chickpeas, nuts, seeds, olive oil and fish; moderate: dairy products and white meats; and low: red meat and sugars).	Older persons	ValueCare app – meal diary	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Calorie intake.	Older persons	ValueCare app – meal diary	Dashboard analytics trend, compliance to care plan	Diary - multiple answers

Nutrition	Awareness and motivation	Recipe videos or PDF; Q&A/tips regarding nutrition for persons with myocardial infarction.	Older persons	ValueCare app	Dashboard analytics trend, compliance to care plan	Written and visual information
Physical activity	Awareness and motivation	Canada's Physical Activity Readiness Questionnaire (PAR-Q) and PARmed-X to assess physical activity information.	Older persons	ValueCare app, or interview (in-person, by phone)	Scoring answers to determine physical activity level and intensity of exercising	Questionnaire
Physical activity	Monitoring	Duration of physical activity (minutes per week).	Older persons	ValueCare app	Compliance to care plan	Exercise data
Physical activity	Monitoring	Heart rate.	Older persons	Fitness tracker	Compliance to care plan	Heart rate data
Physical activity	Monitoring	Reminder to move/exercise.	Older persons	Fitness tracker	Compliance to care plan	Notification
Physical activity	Monitoring	Number of steps.	Older persons	Fitness tracker	Compliance to care plan	Exercise data
Physical activity	Monitoring	Daily distance covered.	Older persons	Fitness tracker	Compliance to care plan	Exercise data
Physical activity	Monitoring	Achievement of daily activity target (YES/NO).	Older persons	Fitness tracker	Compliance to care plan	Exercise data
Physical activity	Monitoring	Type of activity (aerobic exercise, strength training, flexibility, balance).	Older persons	ValueCare app	Compliance to care plan	Exercise data
Physical activity	Monitoring	Burned calories.	Older persons	Smart-watch	Dashboard analytics trend, compliance to care plan	Nutrition and exercise data
Medication	Monitoring	Track medication use and adherence to medication plan.	Older persons	ValueCare app	Compliance to medication prescription	Questionnaire
Medication	Monitoring	Information on medication (track whether information was accessed).	Older persons	ValueCare app	Dashboard analytics trend, number of views	Information
Sleep	Monitoring	Quantitative assessment of sleep phases (e.g. hours of sleep, REM phases).	Older persons	Smart-watch	Quantitative assessment of sleep	Sleep data
Interaction with GP	Monitoring	Number of emails or video calls.	Older persons	ValueCare app	Compliance to care plan, number of interactions	Interaction data

**Table 3e:** Pilot-specific data collected during ValueCare implementation in Rotterdam.

Category/ variable	Action/ functionality	Definition	Inclusion criteria	Source	Processing output	Type
Prestroke functional status	Care plan definition	Assessment of prestroke functional status (ambulation, dressing, toileting)	Older persons	Clinical	N/A	Single answer
Living status and location pre-index	Care plan definition	Living arrangements of the patient prior stroke.	Older persons	Patient-reported (admission for index-event)	N/A	Single answer
Prior stroke	Care plan definition	Patient has had a stroke prior to this hospitalization (YES/NO).	Older persons	Clinical	N/A	Single answer
Type of stroke	Care plan definition	Indicate stroke type.	Older persons	Clinical	N/A	Single answer
Ability to communicate	Care plan definition	Assessment of problems with communication or understanding.	Older persons	Clinical	N/A	Single answer
Report of new stroke	Care plan definition	Report of new stroke within 90 days after admission for stroke.	Older persons	Clinical	N/A	Single answer
Feeding	Care plan definition	Does the patient need a tube for feeding?	Older persons	Clinical	N/A	Single answer
Nutrition	Awareness and motivation	Assessment of nutrition awareness using a questionnaire.	Older persons	ValueCare app	Scoring answers to determine awareness level	Questionnaire
Nutrition	Monitoring	Meal diary	Older persons	ValueCare app	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Nutrients intake (e.g. calcium, protein, vitamin B12, dietary fibre).	Older persons	ValueCare app – meal diary	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Calorie intake.	Older persons	ValueCare app – meal diary	Dashboard analytics trend, compliance to care plan	Diary - multiple answers
Nutrition	Monitoring	Number of videos seen with healthy recipes (once a week).	Older persons	ValueCare app	Compliance to care plan	Numerical value
Physical activity	Monitoring	Duration of exercise, exercise repetitions,	Older persons	ValueCare app,	Compliance to care plan	Exercise data

		report injuries or complaints.		activity tracker		
Physical activity	Monitoring	Number of steps.	Older persons	Activity tracker	Compliance to care plan	Exercise data
Physical activity	Monitoring	Type of activity (aerobic exercise, strength training, flexibility, balance).	Older persons	ValueCare app	Compliance to care plan	Exercise data
Physical activity	Monitoring	Burned calories.	Older persons	Activity tracker	Dashboard analytics trend, compliance to care plan	Nutrition and exercise data
Medication	Monitoring	Information on medication (track whether information was accessed).	Older persons	ValueCare app	Dashboard analytics trend, compliance to care plan	Information
Medication	Monitoring	Track medication use and adherence to medication plan.	Older persons	ValueCare app	Compliance to medication prescription	Questionnaire
Medication	Monitoring	Reminder to take medication.	Older persons	ValueCare app	Dashboard analytics trend, compliance to care plan	Notification
Mental health	Mood	Patient reports mood in app daily.	Older persons	ValueCare app	Dashboard analytics trend, compliance to care plan	Diary - single answer
Information	Tailored information	Type of information (e.g. disease-specific, FAQs, education videos), number of searches.	Older persons	ValueCare app	Analytics of searches	Written and visual information
Social interaction	Motivation	Encourage users to participate in local community activities.	Older persons	ValueCare app	Deviation from social interaction goal	Information
Social interaction	Information	Information regarding social services available (e.g. telecare, home care services, meals).	Older persons	ValueCare app	Deviation from social interaction goal	Information
Social interaction	Support	Social group in the app where members can contact each other to meet.	Older persons	ValueCare app	Deviation from social interaction goal	N/A

**Table 3f:** Pilot-specific data collected during ValueCare implementation in Treviso.

<b>Category/variable</b>	<b>Action/functionality</b>	<b>Definition</b>	<b>Inclusion criteria</b>	<b>Source</b>	<b>Processing output</b>	<b>Type</b>
Cognition screening	N/A	Assessment of cognitive functioning using Mini Mental State Examination (MMSE)	Older persons	Clinical	Inclusion or exclusion of participant	Interview-single answers
Nutrition	Awareness and motivation	Assessment of nutrition awareness using a questionnaire.	Older persons	ValueCare app	Scoring answers to determine awareness level	Questionnaire
Nutrition	Monitoring	Meal diary	Older persons	ValueCare app	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Nutrients intake (e.g. calcium, vitamin D, vitamin B12, dietary fibre, potassium, protein, omega-3 fatty acids, water intake)	Older persons	ValueCare app – meal diary	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Calorie intake	Older persons	ValueCare app – meal diary	Dashboard analytics trend, compliance to care plan	Diary - multiple answers
Physical activity	Monitoring	Duration of exercise	Older persons	Smart-watch	Compliance to care plan	Exercise data
Physical activity	Monitoring	Number of steps	Older persons	Smart-watch	Compliance to care plan	Exercise data
Physical activity	Monitoring	Type of activity (aerobic exercise, strength training, flexibility, balance)	Older persons	ValueCare app	Compliance to care plan	Exercise data
Physical activity	Monitoring	Burned calories	Older persons	Smart-watch	Dashboard analytics trend, compliance to care plan	Nutrition and exercise data
Medication	Monitoring	Track medication use and adherence to medication plan	Older persons	ValueCare app	Compliance to care plan (medication prescription)	Questionnaire
Sleep	Monitoring	Assessment of quality of sleep using a questionnaire.	Older persons	ValueCare app	Patient's perception of sleep	Questionnaire
Sleep	Monitoring	Quantitative assessment of sleep phases (e.g. hours of sleep, REM phases)	Older persons	Smart-watch	Quantitative assessment of sleep	Sleep data



Cognitive functions	Games	Type of games played (working memory, executive functions, attention, speech)	Older persons	ValueCare app	Compliance to care plan	App data
Cognitive functions	Games	Play time (in minutes)	Older persons	ValueCare app	Compliance to care plan	App data
Cognitive functions	Games	Number of games played	Older persons	ValueCare app	Compliance to care plan	App data
Social interaction	Motivation	Encourage users to participate in local community activities	Older persons	ValueCare app	Deviation from social interaction goal	Information
Social interaction	Information	Information regarding social services available (e.g. telecare, home care services, meals)	Older persons	ValueCare app	Deviation from social interaction goal	Information
Social interaction	Support	Social group in the app where members can contact each other to meet.	Older persons	ValueCare app	Deviation from social interaction goal	N/A
Social interaction	Monitoring	Number and time of incoming and outgoing call, messaging.	Older persons	Smart-phone	Deviation from social interaction goal	Interaction data
Mental health	Mindfulness	Assessment of mood status using a questionnaire	Older persons	ValueCare app	Compare the different mood levels	Questionnaire
Information	Tailored information	Type of information (e.g. disease-specific, FAQs, education videos), number of searches.	Older persons	ValueCare app	Analytics of searches	Written and visual information

**Table 3g:** Pilot-specific data collected during ValueCare implementation in Valencia.

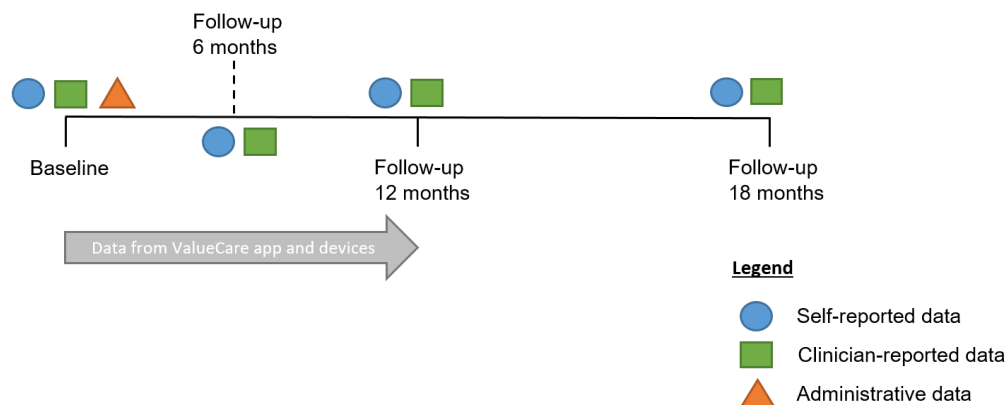
Category/variable	Action/functionality	Definition	Inclusion criteria	Source	Processing output	Type
Frailty screening	Care plan definition	Assessment of frailty using FRAIL Scale and Pfeiffer score	Older persons	Clinical	Inclusion or exclusion of participant	Questionnaire
Frailty screening	Care plan definition	Assessment of physical capacity using Short Physical Performance Battery (SPPB)	Older persons	Clinical	Additional assessment in physical activity pathway	Questionnaire
Frailty screening	Care plan definition	Psychosocial motivational interview (Miller & Rose, 2009)	Older persons	Clinical	Additional assessment in social	Questionnaire

					prescription pathway	
Frailty screening	Care plan definition	Protein Screener (Wijnhoven et al., 2018)	Older persons	Clinical	Additional assessment in nutrition pathway	Questionnaire
Nutrition	Awareness and motivation	Assessment of nutrition awareness using a questionnaire.	Older persons	ValueCare app	Scoring answers to determine awareness level	Questionnaire
Nutrition	Monitoring	Meal diary	Older persons	ValueCare app	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Number of meals eaten daily.	Older persons	ValueCare app	Dashboard analytics trend - Compliance to the care plan	Diary - single answer
Nutrition	Monitoring	Nutrients intake (e.g. calcium, vitamin D, vitamin B12, dietary fibre, potassium, protein, omega-3 fatty acids, water intake).	Older persons	ValueCare app - meal diary	Compliance to the care plan	Diary - multiple answers
Nutrition	Monitoring	Number of videos seen with healthy recipes (once a week).	Older persons	ValueCare app	Compliance to care plan	Numerical value
Nutrition	Monitoring	Lists of products included in the shopping list (once a week).	Older persons	ValueCare app	Compliance to health behavioural change	App data
Nutrition	Monitoring	Monthly weight	Older persons	ValueCare app (manually)	Dashboard analytics trend	Numerical value
Physical activity	Monitoring	Duration of physical activity (minutes per week).	Older persons	ValueCare app (manually)	Compliance to care plan	Exercise data
Physical activity	Monitoring	Type of activity (aerobic exercise, strength training, flexibility, balance).	Older persons	ValueCare app	Compliance to care plan	Questionnaire, exercise data
Physical activity	Monitoring	Number of recommended videos seen on physical exercise (weekly).	Older persons	ValueCare app	Compliance to care plan	Numerical value
Medication	Monitoring	Medication/ supplements intake using a questionnaire.	Older persons	ValueCare app (manually)	Compliance to care plan	Questionnaire

Medication	Monitoring	Track medication use and adherence to medication plan..	Older persons	ValueCare app	Compliance to medication prescription	Notification
Medication	Monitoring	Reduction or change in medications.	Informal and formal caregiver	ValueCare dashboard	Change in care plan	Notification
Sleep	Monitoring	Assessment of quality of sleep using a questionnaire.	Older persons	ValueCare app	Patient's perception of sleep	Questionnaire
Social interaction	Monitoring	Social Activities Attended / Meet up with relatives or friends (weekly)	Older persons	ValueCare app (interview)	Deviation from social interaction goal	Questionnaire

### 3 Timeline

The following timeline (Figure 1) provides an example of when the clerical and clinical information for the evaluation (WP5) could be collected. This includes self-reported questionnaire data from patients, informal caregivers and health and social care professionals. Additionally, data will be collected from clinical and administrative sources. The questionnaire data for the evaluation will be collected at baseline (T0), after 12 months (T1), and after 18 months (T2) (see also D5.1). Pilot sites can decide to collect particular patient-reported or clinician outcomes during the implementation of the ValueCare approach (e.g. a follow-up after 6 months). The exact timeline of collecting data from the ValueCare app and devices (e.g. activity tracker, smartwatch) will be determined by the pilot sites.



**Figure 1.** Timeline of data collected from patients, caregivers, clinicians and administrative sources.

## 4 Conclusions

The present deliverable **D2.2 Identify data needed** aims at enabling easy and fast exchange of information between social and health care services. It identifies the clerical and clinical data needed, and pilot-specific data needed to respond to the ValueCare concept, including the ICT support requirements. The deliverable provides an overview of all data collected during the ValueCare intervention and follow-up. It is a handy resource for partners in order to establish their data flows and infrastructure and support implementation and evaluation of the ValueCare approach. More specifically, WP3 can use this deliverable during the development of the ICT solution (Task 3.3 and 3.4). Furthermore, the clerical and clinical data identified in D2.2 supports implementation in pilot sites (WP4).

Sources of information included the self-reported WP5 questionnaires (D5.1), clinical data, administrative data, data gathered by devices (e.g. activity tracker, smartwatch) and ValueCare app data. Each pilot site defined the required information needed to implement the ValueCare approach including data collected in the ValueCare app. This data will be mostly used for monitoring to assess whether the output is in accordance with the participant goals set in the personalised care plan. How pilot sites obtain the information from sources and enable data exchange is in the domain of the pilot site and will be specified in the local plan for implementation.

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