On the Socio-demographic and Medical Drivers of Long-Term Care Needs in Europe

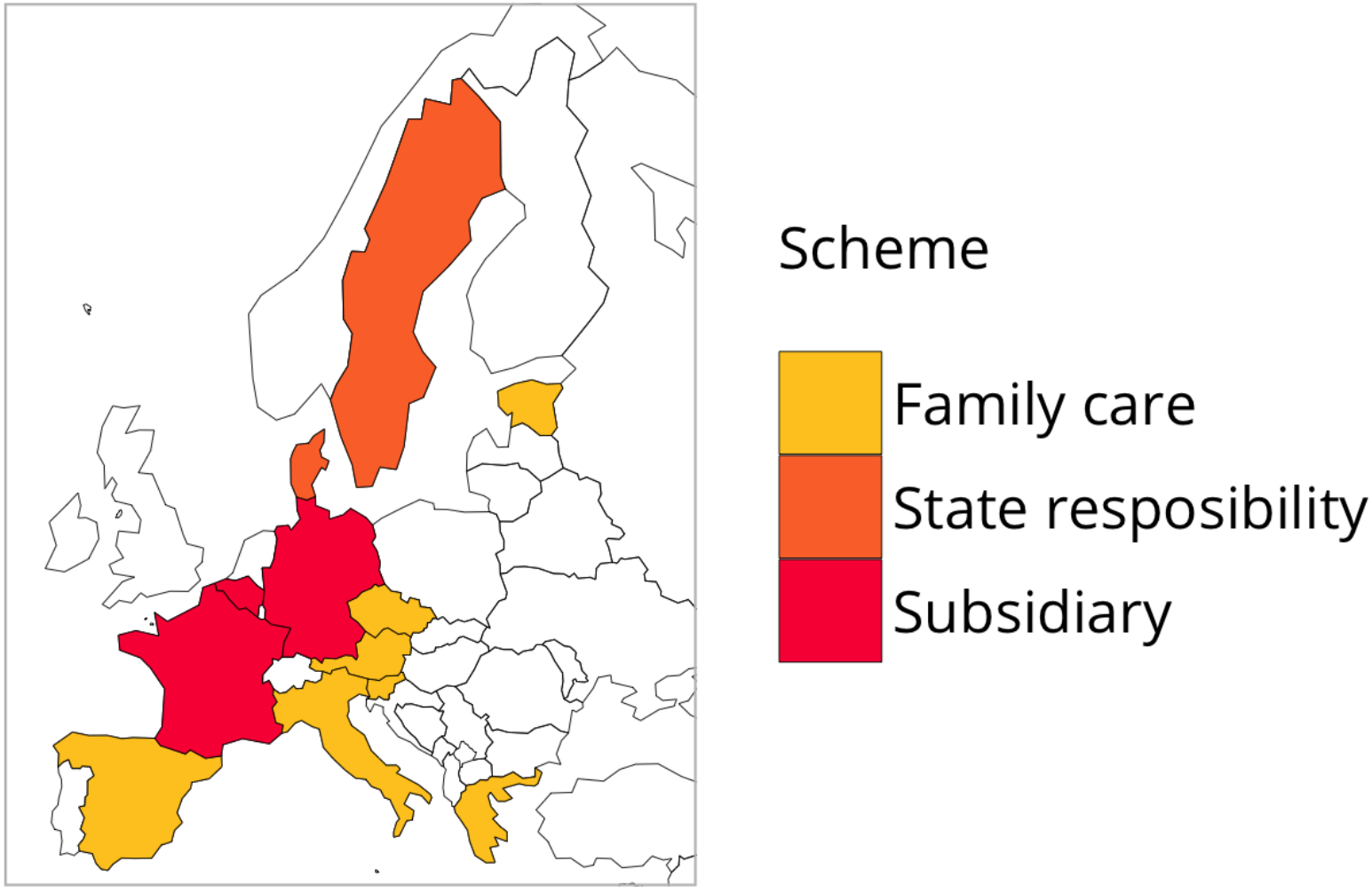
IEGOR RUDNYTSKYI

Joint work with
Michel Fuino and Joël Wagner

Leuven
2018 September 10

Should we care?

LTC systems in Europe



How needs of LTC can be measured?

Activities of daily living (ADL):


Dressing


Walking


Showering


Eating


Getting in and out of bed


Using a toilet

What aspects can explain the demand of LTC?

Demographical

Behavioral

Social

Mental health-related

Physical health-related

Conjectures

1. ADL limitations increase at higher ages and for women.
2. Having a partner in household and having children decrease functional limitations.
3. Higher education and wealth levels are negatively associated with limitations.
4. Pathology has a strong effect on ADL. Cancer leads to less functional limitations than other diseases.
5. Probability of having limitations with ADL significantly differs across LTC schemes.

Dataset

- Based on SHARE wave 6 (2015)
- Individuals: 26 611 (4 165 dependent, 22 788 autonomus)
- Age: 65-99
- Prevalence rate: ~15%
- 13 countries: Austria, Germany, Sweden, Spain, Italy, France, Denmark, Greece, Switzerland, Belgium, Czech Republic, Slovenia, Estonia

Explanatory variables

- Age: continuous, 65-99.
- Gender: binary, Male/Female.
- BMI: categorial, 5 levels.
- Ever smoked daily: binary, Yes/No. Restored from Wave 1.
- Country (LTC Scheme group): categorical, 13 (4) levels.

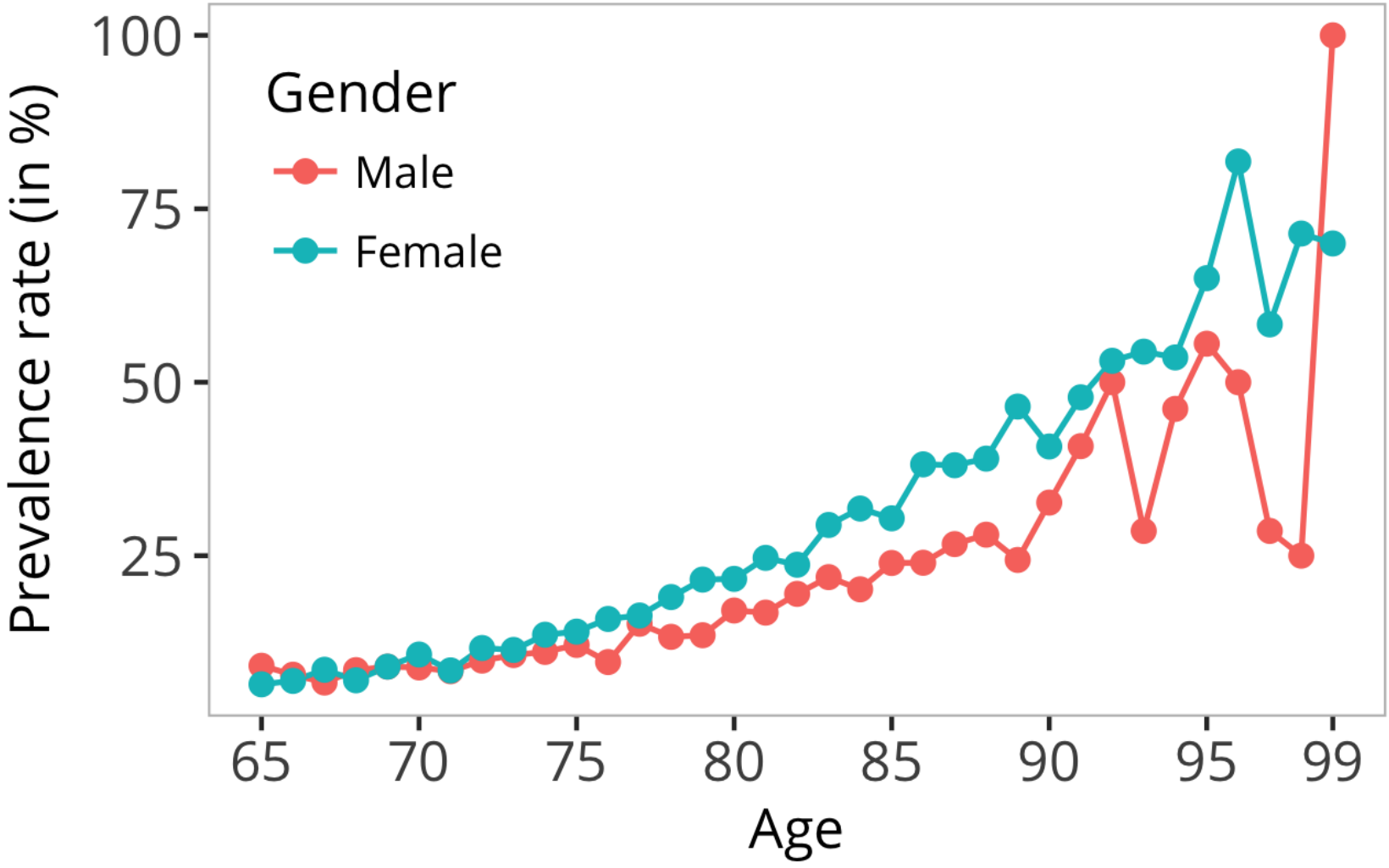
Explanatory variables (cont'd.)

- Partner in household: binary, Yes/No.
- Has any children: binary, Yes/No. Constructed from the # of children.
- Wealth status: categorical, 4 levels. Constructed from "how difficult to make ends meet?". Mimic the income.
- Education level: categorical, 3 levels. Constructed from ISCED-97.

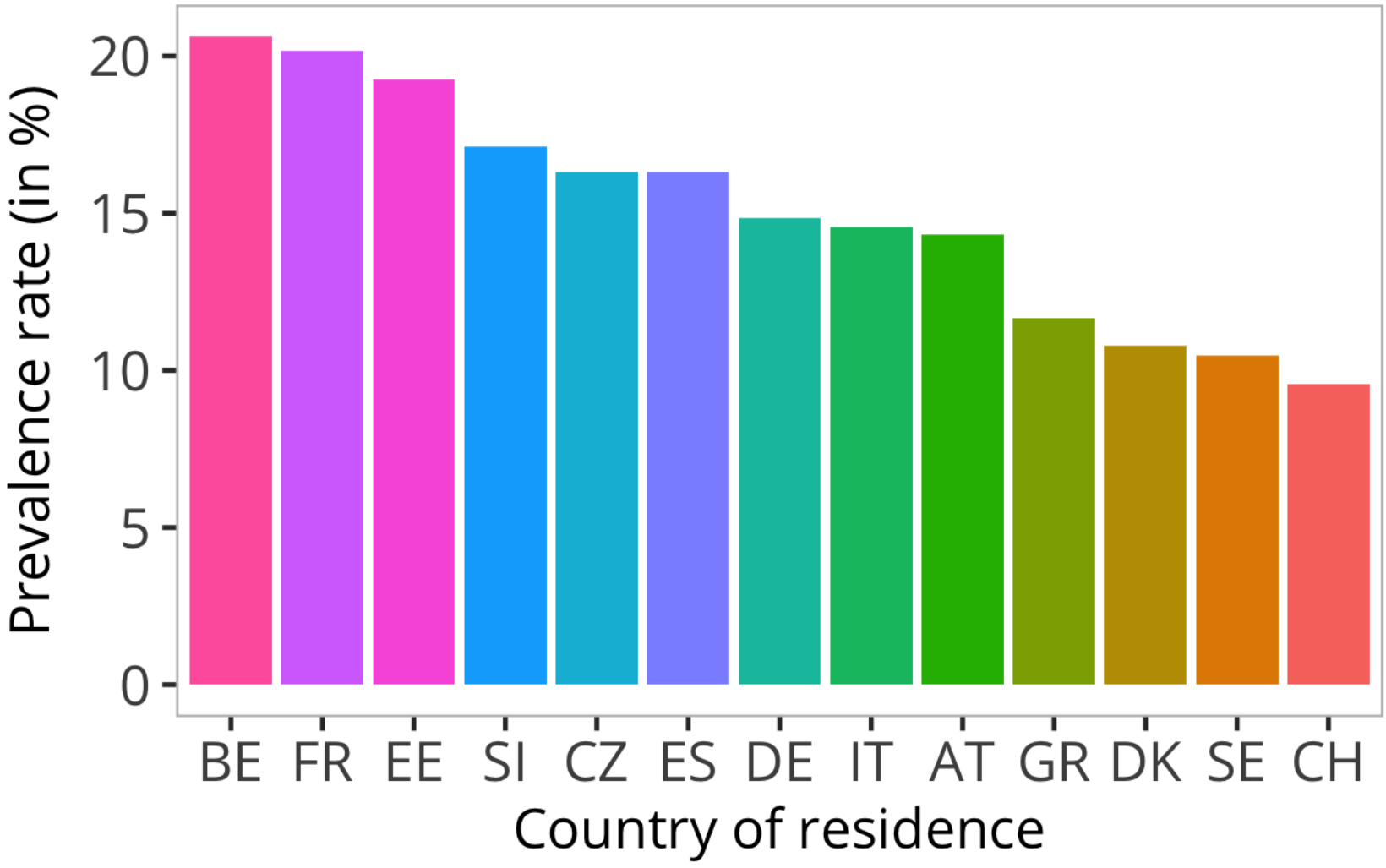
Explanatory variables (cont'd.)

- Mental diseases: binary, Yes/No. Constructed from Alzheimer, dementia and emotional disorders.
- Parkinson diseases: binary, Yes/No.
- Cancer: binary, Yes/No.
- Musculoskeletal system diseases: binary, Yes/No. Constructed from fractures, rheumatoid arthritis, and osteoarthritis.
- Other physical diseases: binary, Yes/No. Constructed from heart attack, stroke, diabetes, chronic lung disease, cataracts and chronic kidney.

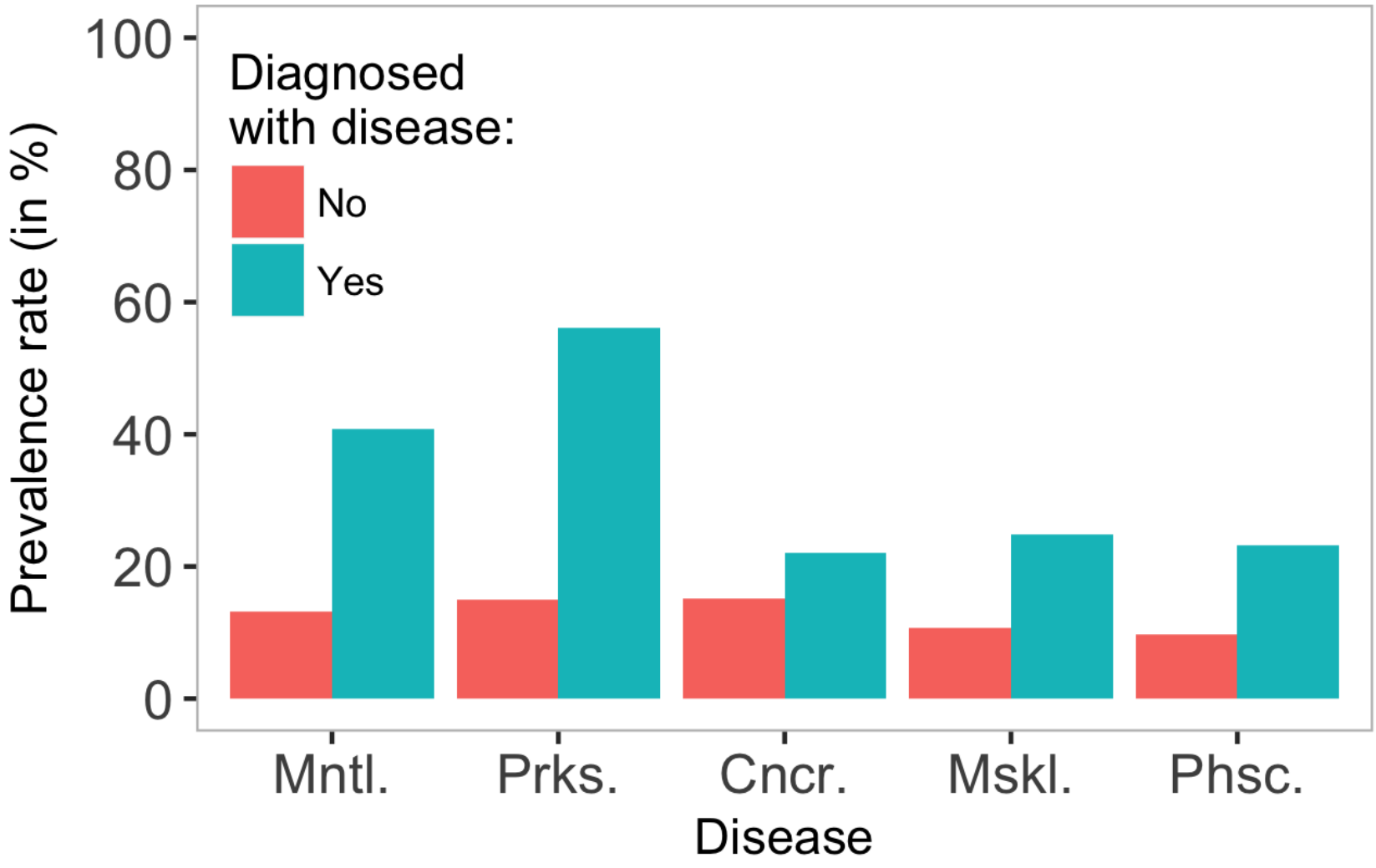
Prevalence rates by age and gender



Prevalence rates by country



Prevalence rates by disease



Model

Logistic regression:

$$\text{logit}\,\frac{\mathbb{P}(\text{ADL} > 0)}{1 - \mathbb{P}(\text{ADL} > 0)} = \alpha + X\beta,$$

where:

- α, β are an intercept and a vector of regression coefficients
- X is a vector of covariates (age, gender, BMI, ...)

Regression results & discussion

Intercept	−8.031	(.353)	***
Age	0.065	(.004)	***
Gender (baseline: Male)			
Female	−2.303	(.406)	***
Age × Gender	0.029	(.005)	***
BMI (baseline: Normal)			
Underweight	0.804	(.134)	***
Overweight	0.064	(.046)	
Moderately obese	0.465	(.055)	***
Severely obese	1.015	(.082)	***
Very severely obese	1.761	(.132)	***
Ever smoked daily (baseline: No)			
Yes	0.082	(.042)	.
Partner in household (baseline: No)			
Yes	−0.201	(.043)	***
Has any children (baseline: No)			
Yes	−0.031	(.061)	
Wealth status (baseline: High)			
Mid-high	0.186	(.051)	***
Mid-low	0.442	(.053)	***
Low	0.713	(.067)	***
Education level (baseline: Primary)			
Secondary	0.023	(.043)	
Tertiary	−0.256	(.062)	***
Mental diseases (baseline: No)			
Yes	1.142	(.052)	***
Parkinson disease (baseline: No)			
Yes	1.797	(.125)	***
Cancer (baseline: No)			
Yes	0.375	(.075)	***
Musculoskeletal system diseases (baseline: No)			
Yes	0.681	(.039)	***
Other physical diseases (baseline: No)			
Yes	0.633	(.039)	***
LTC scheme (baseline: CH)			
Family care	0.112	(.102)	
State responsibility	0.167	(.106)	
Subsidiary	0.506	(.103)	***

Regression results & discussion

Intercept	−8.031	(.353)	***
Age	0.065	(.004)	***
Gender (baseline: Male)			
Female	−2.303	(.406)	***
Age × Gender	0.029	(.005)	***
BMI (baseline: Normal)			
Underweight	0.804	(.134)	***
Overweight	0.064	(.046)	
Moderately obese	0.465	(.055)	***
Severely obese	1.015	(.082)	***
Very severely obese	1.761	(.132)	***
Ever smoked daily (baseline: No)			
Yes	0.082	(.042)	.
Partner in household (baseline: No)			
Yes	−0.201	(.043)	***
Has any children (baseline: No)			
Yes	−0.031	(.061)	
Wealth status (baseline: High)			
Mid-high	0.186	(.051)	***
Mid-low	0.442	(.053)	***
Low	0.713	(.067)	***
Education level (baseline: Primary)			
Secondary	0.023	(.043)	
Tertiary	−0.256	(.062)	***
Mental diseases (baseline: No)			
Yes	1.142	(.052)	***
Parkinson disease (baseline: No)			
Yes	1.797	(.125)	***
Cancer (baseline: No)			
Yes	0.375	(.075)	***
Musculoskeletal system diseases (baseline: No)			
Yes	0.681	(.039)	***
Other physical diseases (baseline: No)			
Yes	0.633	(.039)	***
LTC scheme (baseline: CH)			
Family care	0.112	(.102)	
State responsibility	0.167	(.106)	
Subsidiary	0.506	(.103)	***

Regression results & discussion

Intercept	−8.031	(.353)	***
Age	0.065	(.004)	***
Gender (baseline: Male)			
Female	−2.303	(.406)	***
Age × Gender	0.029	(.005)	***
BMI (baseline: Normal)			
Underweight	0.804	(.134)	***
Overweight	0.064	(.046)	
Moderately obese	0.465	(.055)	***
Severely obese	1.015	(.082)	***
Very severely obese	1.761	(.132)	***
Ever smoked daily (baseline: No)			
Yes	0.082	(.042)	.
Partner in household (baseline: No)			
Yes	−0.201	(.043)	***
Has any children (baseline: No)			
Yes	−0.031	(.061)	
Wealth status (baseline: High)			
Mid-high	0.186	(.051)	***
Mid-low	0.442	(.053)	***
Low	0.713	(.067)	***
Education level (baseline: Primary)			
Secondary	0.023	(.043)	
Tertiary	−0.256	(.062)	***
Mental diseases (baseline: No)			
Yes	1.142	(.052)	***
Parkinson disease (baseline: No)			
Yes	1.797	(.125)	***
Cancer (baseline: No)			
Yes	0.375	(.075)	***
Musculoskeletal system diseases (baseline: No)			
Yes	0.681	(.039)	***
Other physical diseases (baseline: No)			
Yes	0.633	(.039)	***
LTC scheme (baseline: CH)			
Family care	0.112	(.102)	
State responsibility	0.167	(.106)	
Subsidiary	0.506	(.103)	***

Regression results & discussion

Intercept	−8.031	(.353)	***
Age	0.065	(.004)	***
Gender (baseline: Male)			
Female	−2.303	(.406)	***
Age × Gender	0.029	(.005)	***
BMI (baseline: Normal)			
Underweight	0.804	(.134)	***
Overweight	0.064	(.046)	
Moderately obese	0.465	(.055)	***
Severely obese	1.015	(.082)	***
Very severely obese	1.761	(.132)	***
Ever smoked daily (baseline: No)			
Yes	0.082	(.042)	.
Partner in household (baseline: No)			
Yes	−0.201	(.043)	***
Has any children (baseline: No)			
Yes	−0.031	(.061)	
Wealth status (baseline: High)			
Mid-high	0.186	(.051)	***
Mid-low	0.442	(.053)	***
Low	0.713	(.067)	***
Education level (baseline: Primary)			
Secondary	0.023	(.043)	
Tertiary	−0.256	(.062)	***
Mental diseases (baseline: No)			
Yes	1.142	(.052)	***
Parkinson disease (baseline: No)			
Yes	1.797	(.125)	***
Cancer (baseline: No)			
Yes	0.375	(.075)	***
Musculoskeletal system diseases (baseline: No)			
Yes	0.681	(.039)	***
Other physical diseases (baseline: No)			
Yes	0.633	(.039)	***
LTC scheme (baseline: CH)			
Family care	0.112	(.102)	
State responsibility	0.167	(.106)	
Subsidiary	0.506	(.103)	***

Regression results & discussion

Intercept	−8.031	(.353)	***
Age	0.065	(.004)	***
Gender (baseline: Male)			
Female	−2.303	(.406)	***
Age × Gender	0.029	(.005)	***
BMI (baseline: Normal)			
Underweight	0.804	(.134)	***
Overweight	0.064	(.046)	
Moderately obese	0.465	(.055)	***
Severely obese	1.015	(.082)	***
Very severely obese	1.761	(.132)	***
Ever smoked daily (baseline: No)			
Yes	0.082	(.042)	.
Partner in household (baseline: No)			
Yes	−0.201	(.043)	***
Has any children (baseline: No)			
Yes	−0.031	(.061)	
Wealth status (baseline: High)			
Mid-high	0.186	(.051)	***
Mid-low	0.442	(.053)	***
Low	0.713	(.067)	***
Education level (baseline: Primary)			
Secondary	0.023	(.043)	
Tertiary	−0.256	(.062)	***
Mental diseases (baseline: No)			
Yes	1.142	(.052)	***
Parkinson disease (baseline: No)			
Yes	1.797	(.125)	***
Cancer (baseline: No)			
Yes	0.375	(.075)	***
Musculoskeletal system diseases (baseline: No)			
Yes	0.681	(.039)	***
Other physical diseases (baseline: No)			
Yes	0.633	(.039)	***
LTC scheme (baseline: CH)			
Family care	0.112	(.102)	
State responsibility	0.167	(.106)	
Subsidiary	0.506	(.103)	***

Extensions, robustness & validation

- Baseline-category logit model with levels: autonomous, mild, moderate, and severe dependent
- Separate regressions for a particular ADL (dressing, walking, etc.)
- Validated by using previous waves (1, 2, 4, and 5) with slightly different countries and the set of variables
- Cross-validated (10 folds)

Research in progress

ADL


Dressing


Walking


Showering


Eating


In/out of bed


Using a toilet

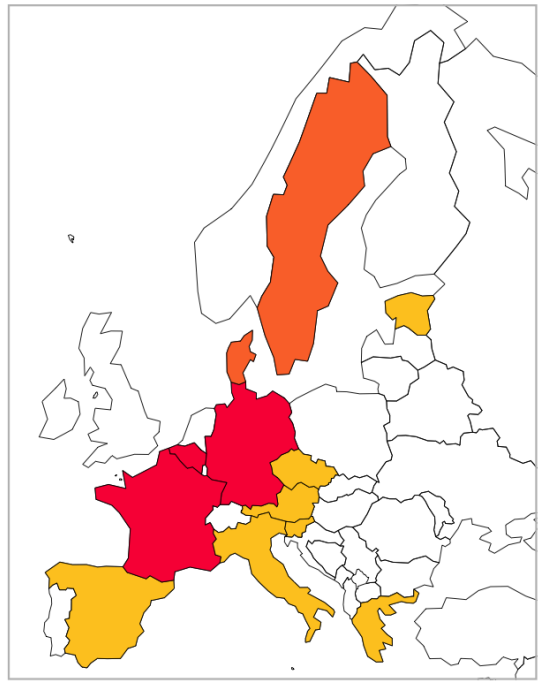
Demand of LTC


Nursing homes


Care at home


Meals-on-wheels

One more thing...

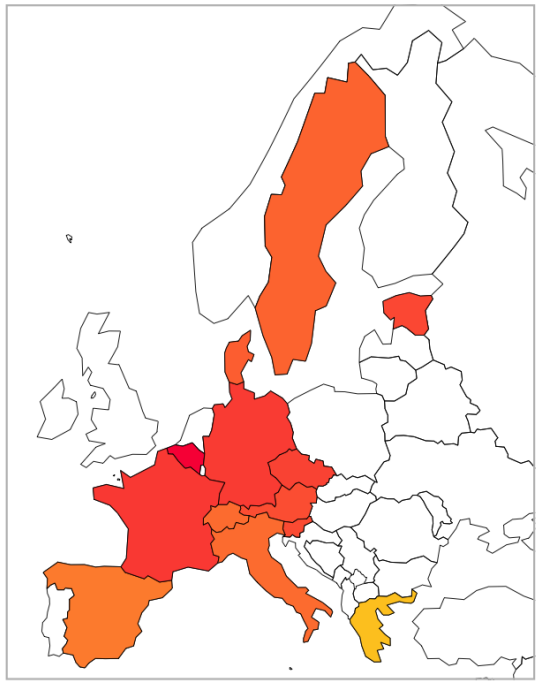


Scheme

Family care

State resposibility

Subsidiary



Regression coefficients (controlled by all other covariates)

0.6

0.3

0.0

-0.3

-0.6

THANK YOU!