Projecting long-term care use in Europe

ANCIEN projection model and results for Germany, the Netherlands, Spain and Poland

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Background

- Population ageing will increase demand for and use of long-term care (LTC) and have a profound impact on availability of formal and informal caregivers in all European countries.

- Impact of population ageing on future use and supply of care is likely to differ across Europe.

- Considerable cross-national differences in:
  - Timing, extent and pace of population ageing
  - Prevalence of disability among older population
  - LTC system characteristics
  - Formal and informal care use
  - Informal care giving and LTC workforce participation
## Cross-national differences in LTC needs, use and supply

<table>
<thead>
<tr>
<th>ADL Disability</th>
<th>Care use</th>
<th>Care supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence 65+</td>
<td>Residential</td>
<td>Home</td>
</tr>
<tr>
<td>Men</td>
<td>Women</td>
<td>Form.</td>
</tr>
<tr>
<td>DE</td>
<td>6.7%</td>
<td>12.8%</td>
</tr>
<tr>
<td>NL</td>
<td>5.0%</td>
<td>11.7%</td>
</tr>
<tr>
<td>ES</td>
<td>7.8%</td>
<td>16.1%</td>
</tr>
<tr>
<td>PL</td>
<td>29.8%</td>
<td>39.9%</td>
</tr>
</tbody>
</table>

Source: ANCIEN WP2, 3 and 6
Aim of WP 6 - ANCIEN

- Developing models to project use and supply of LTC for 2010-2060 period

- Focusing on formal and informal care for persons aged 65 and over

- For countries representative of different care systems: Germany, the Netherlands, Spain and Poland

- Using a standardised methodology and cross-nationally harmonized data

- Projecting use of care under a range of bio-demographic, risk-factor and socio-demographic scenarios
Overview of projection models

Projection model of long-term care use  
FPB
For different settings and types of care (residential, formal home, informal)
Focus on nursing and personal care (help with activities of daily living - ADL)
Based on multivariate models linking probabilities of care use to age, gender, ADL limitations, living situation and other relev. variables
Different demographic, epidemiol. and socio-dem. scenarios

Projection model of informal care provision  
LSE
Focus on provision of personal care by persons aged 50 and over
Based on multivariate models linking probabilities of informal care provision to age, gender and marital status
Separate models for intergenerational care and partner care

Projection model of formal care supply  
LEGOS
Simple model based on aggregate workforce projections and assumption of constant fractions of LTC workers
PROJECTION MODEL OF LTC USE

MODEL STRUCTURE
Projecting LTC use - model structure

Cell-based (macro-simulation) model

- Linking explanatory models of care use with projections of older population by relevant characteristics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age cat</th>
<th>ADL</th>
<th>Other Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>No</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Population projections Numbers 65+

Micro models (static)

Probabilities of care use

Numbers of care users
Model structure - two-stage model

Projected numbers of persons 65+
Groups by age (A), gender (G), disability (D), other (O)

Stage 1: logit model/prevalences residential care use

Numbers of persons residing at home by A, G, D, O

Stage 2: multinomial model home care use

Numbers of persons using no LTC*
Numbers of users of formal care only*
Numbers of users of informal and formal care*
Numbers of users of informal care only*
Numbers of residential care users*

* By A, G, D, O
Probabilities of residential and home care use

- Residential care models
  - NL and ES
    - Logit models, using national cross-sectional micro data
    - Predicted probabilities of residential care use by age category, gender, level of ADL disability, household composition, education, cognitive functioning, chronic conditions
  - GE and PL
    - No micro data, only administrative data
    - Prevalence of residential care use by age and gender, assumption all residents are ADL disabled
Probabilities of residential and home care use

• Home care models
  DE, NL and ES (no data for Poland)
  Multinomial logit models, using SHARE (Survey on Health, Ageing and Retirement in Europe), a large cross-national panel data base of persons aged 50+

DATA
• Analytical sample restricted to respondents aged 65 and over, living at home (DE n=2,491; NL n=2,134; ES n=2,265)
Probabilities of residential and home care use

• Home care models

  Care use: receipt of help with personal care (ADL) or nursing care
  
  Four categories: no care, informal care only, formal care only, formal and informal care
  
  Formal care: professional or paid nursing or personal care, including care from private providers
  
  Informal care: help with personal care from someone living in the household, from any family member from outside the household or any friend or neighbour

  Independent variables: age, gender, ADL limitations, household composition, having children, IADL limitations, cognitive functioning, chronic conditions, education, income
Probabilities of formal and informal care use by ADL
Probabilities of care use

• WP 6: Assumption of constant probabilities of care use by age, gender, disability and other relevant characteristics
  • Use of care constrained by supply factors to a similar extent in future than in base year
  • Shifts from residential care to home care or between formal and informal care have not been modelled

• WP 7: Evaluation of system performance and simulations of effects of shifts in use and supply
## Base scenario - DELAY

<table>
<thead>
<tr>
<th>Projected numbers of older persons by</th>
<th>Care use probabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (A), gender (G) and Disability (D)</td>
<td>Household composition (H)</td>
</tr>
<tr>
<td>NIDI DELAY scenario, based on EUROPOP2008</td>
<td>Constant</td>
</tr>
</tbody>
</table>

**DELAY disability scenario**

- Disability incidence is delayed to older ages with same amount of time as mortality is delayed (same absolute decline)
Alternative disability scenarios (NIDI): bio-demographic scenarios

- **CONST**: Constant mortality and disability incidence, only demography
- **PREV**: Constant prevalence of disability
- **CHRON**: Constant incidence of disability
- **BIOL**: Same relative disability incidence decline as mortality decline
### Alternative disability scenarios (NIDI): risk factor scenarios

**SMOKING**

- **SMOK**
  - Constant (high) prevalence of smoking in new cohorts of older people, 0% quit rate

- **TREND**
  - SMOK, 2% quit rate

- **NOSMOK**
  - No new smokers, 0% quit rate

- **NOSQUIT**
  - NOSMOK, high quit rate

**OBESITY**

- **BMI**
  - Higher prevalence of obesity in new cohorts of older people

- **LEAN**
  - Prevalence of obesity decreases by 50%

- **FAT**
  - Prevalence of obesity increases by 50%
Alternative socio-demographic scenarios

Changing household composition

• Household composition older persons changes in line with national household composition projections (DE, NL)

Better education scenario

• Educational level of older persons changes in line with educational level projections of the International Institute for Applied Systems Analysis (DE, NL, ES)
PROJECTION RESULTS
## Projections of residential care use

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
<th>2045</th>
<th>2050</th>
<th>2055</th>
<th>2060</th>
<th>% increase 2010-2060</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>648</td>
<td>729</td>
<td>814</td>
<td>906</td>
<td>978</td>
<td>1,028</td>
<td>1,108</td>
<td>1,218</td>
<td>1,321</td>
<td>1,360</td>
<td>1,310</td>
<td>102%</td>
</tr>
<tr>
<td>NL</td>
<td>142</td>
<td>160</td>
<td>180</td>
<td>206</td>
<td>245</td>
<td>299</td>
<td>339</td>
<td>375</td>
<td>408</td>
<td>429</td>
<td>426</td>
<td>200%</td>
</tr>
<tr>
<td>ES</td>
<td>364</td>
<td>400</td>
<td>426</td>
<td>465</td>
<td>522</td>
<td>593</td>
<td>680</td>
<td>777</td>
<td>858</td>
<td>918</td>
<td>954</td>
<td>162%</td>
</tr>
<tr>
<td>PL</td>
<td>59</td>
<td>67</td>
<td>77</td>
<td>88</td>
<td>98</td>
<td>110</td>
<td>121</td>
<td>129</td>
<td>136</td>
<td>141</td>
<td>149</td>
<td>152%</td>
</tr>
</tbody>
</table>
Prevalence of residential care use, 2010-2060, DELAY

% of total population aged 65 and over

Plan.be
Residential care - bio-demographic scenarios
Residential care use - risk factor scenarios
Residential care use - socio-demographic scenarios

NL - ES

![Graph showing residential care use scenarios for NL and ES over time.](plan.be)
Projections of formal home care use

<table>
<thead>
<tr>
<th>Projected numbers of formal home care users (in thousands), DELAY</th>
<th>% increase 2010-2060</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>DE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>756</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>NL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>229</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>ES</td>
<td></td>
</tr>
<tr>
<td></td>
<td>417</td>
</tr>
</tbody>
</table>
Prevalence of formal home care use, 2010-2060, DELAY

![Graph showing prevalence of formal home care use from 2010 to 2060 with different lines representing different countries and years.](plan.be)
Formal home care use - bio-demographic scenarios

The graph shows the projections for formal home care use over the years 2010 to 2060 for different scenarios: REF (DELAY), CONST, PREV, CHRON, and BIOL. The y-axis represents the number of cases, ranging from 400,000 to 180,0000, and the x-axis represents the years from 2010 to 2060.

- REF (DELAY) shows a steady increase over the years.
- CONST also shows an increase but at a slower rate.
- PREV shows a significant increase in the early years, then stabilization.
- CHRON shows a rapid increase in the initial years, followed by a slower rate.
- BIOL shows a gradual increase with stabilization in the later years.

The graph indicates that the number of formal home care use cases is expected to rise significantly over the next few decades, with different scenarios projecting varying levels of care use.
Formal home care use - risk factor scenarios

ES

- Ref(DELAY)
- SMOK
- TREND
- NOSMOK
- NOSQUIT
- BMI
- LEAN
- FAT
Formal home care use - socio-demographic scenarios

DE – NL - ES
Projections of informal care use

<table>
<thead>
<tr>
<th>DELAY</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
<th>2045</th>
<th>2050</th>
<th>2055</th>
<th>2060</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>2700</td>
<td>2846</td>
<td>3102</td>
<td>3364</td>
<td>3710</td>
<td>3975</td>
<td>4070</td>
<td>4133</td>
<td>4197</td>
<td>4198</td>
<td>4075</td>
</tr>
<tr>
<td>NL</td>
<td>93</td>
<td>107</td>
<td>123</td>
<td>138</td>
<td>150</td>
<td>161</td>
<td>167</td>
<td>165</td>
<td>159</td>
<td>155</td>
<td>154</td>
</tr>
<tr>
<td>ES</td>
<td>1176</td>
<td>1280</td>
<td>1376</td>
<td>1486</td>
<td>1635</td>
<td>1841</td>
<td>2080</td>
<td>2343</td>
<td>2577</td>
<td>2747</td>
<td>2825</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>% increase 2010-2060</th>
<th>DE</th>
<th>NL</th>
<th>ES</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>66</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>140</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DE: Germany, NL: Netherlands, ES: Spain
Prevalence of informal care use, 2010-2060, DELAY
Informal care use - bio-demographic scenarios

![Graph showing informal care use trends across different scenarios.](image-url)
Residential, formal and informal care use, ADL disabled population, 2010 and 2060, DELAY
Projection results LTC use - Summary

• Current patterns of LTC use differ
  Prevalence formal care (residential and at home) much higher in NL than in other countries
  Prevalence informal care low in NL, high in DE, ES

• Large increases in number of users for all types of care, in all countries
  Higher relative increase residential care in NL; higher relative increase formal home care and informal care in ES
  In all countries increase residential > formal care > informal

• Differences are related to demographic, epidemiological and care system factors
Projection results LTC use: Summary

- Rise in care use mainly as a result of demographic factors

- Sensitivity to alternative scenarios differs between countries

  Generally, quite large effect of alternative bio-demographic scenarios

  Little impact of BMI scenarios and changing household composition, larger impact of smoking scenarios and better education scenario
Comparison of use and supply of informal care, 2010-2060

Assumptions
- Use of informal care: constant probabilities by age, gender, disability, household composition, other; DELAY scenario
- Supply of informal care: constant probabilities by age, gender, marital status

![Graph showing comparison of care-givers and care-users from 2010 to 2060](plan.be)
Comparison of use and supply of informal care, 2010-2060

NL

ES

Care-givers
Care-users
Comparison of use and supply of informal care, 2010-2060

- ‘Informal care gap’: numbers of informal care givers needed if supply were to meet demand
- Assumption current ratio of caregivers to care users to remain constant

<table>
<thead>
<tr>
<th></th>
<th>Ratio care givers/care users 2010</th>
<th>Ratio caregivers/care users 2060</th>
<th>‘Informal care gap’ (‘000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>0.59</td>
<td>0.49</td>
<td>405</td>
</tr>
<tr>
<td>NL</td>
<td>0.79</td>
<td>0.67</td>
<td>19</td>
</tr>
<tr>
<td>ES</td>
<td>0.89</td>
<td>0.52</td>
<td>1043</td>
</tr>
</tbody>
</table>
Comparison of use and supply of formal care, 2010-2050

Assumptions

• Use of formal care: constant probabilities by age, gender, disability, household composition, other; DELAY scenario
• Supply of formal care: constant fraction of LTC workers, applied to overall labour force projections
Comparison of use and supply of formal care, 2010-2050
Comparison of use and supply of formal care, 2010-2050

- ‘Formal care gap’: numbers of formal care givers needed if supply were to meet demand
- Assumption current ratio of caregivers to care users to remain constant

<table>
<thead>
<tr>
<th></th>
<th>Ratio care givers/care users 2010</th>
<th>Ratio caregivers/care users 2050</th>
<th>‘formal care gap’ (‘000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE</td>
<td>0.45</td>
<td>0.19</td>
<td>718</td>
</tr>
<tr>
<td>NL</td>
<td>0.64</td>
<td>0.25</td>
<td>353</td>
</tr>
<tr>
<td>ES</td>
<td>0.55</td>
<td>0.20</td>
<td>623</td>
</tr>
<tr>
<td>PL</td>
<td>0.31</td>
<td>0.11</td>
<td>27</td>
</tr>
</tbody>
</table>
Conclusions

• Key factor underlying projected shortages in care is demographic change: rise in numbers of older people in relation to numbers of people of working age

• Main reason that supply of informal care is unlikely to keep pace with demand are trends in intergenerational care
  
  Based on underlying demographic trends in numbers of people aged 50 to 64. Informal care gap’ particularly large in DE and ES reflecting heavy reliance on informal care

• Demographic factors will at the same time influence size and composition of working age population and supply of LTC workers
  
  ‘Formal care gap’ is large in NL (due to increased demand), ES and PL (combination of increased demand and shrinking workforce)
Policy implications

• Key policy issue: how to increase efficiency of use of available carers?

Difficult to increase efficiency of informal care.

Therefore, crucial to take measures to

• use available formal resources as efficiently as possible
  Further research needed into effect of new technologies and differences in efficiency between settings

• sustain and stimulate formal care capacity

• sustain informal care capacity and prevent negative health, financial and labour market consequences of informal care giving

• No single combination of measures will fit all. National approach is required, adjusted to country-specific conditions