VIRTUAL MEETING OF THE SOCIAL SECURITY SUB-COMMITTEE ON THURSDAY SEPTEMBER 30, 2021 FROM 09.00-12.45 CEST

# Mortality, Population Dynamics and Long-term care - comparison of Ageing report 2018 and Ageing Report 2021

**30th of September 2021**

**Task Force Mortality**

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# European Pillar of Social Rights

- **Principle 18** of the **European Pillar of Social Rights** (EC,2017) stresses that **everyone has the right** to **affordable long-term care services** of **good quality**, in particular **homecare** and **community- based services**.
- The **European Pillar of Social Rights action plan** commits the EU-27 to further work on this.

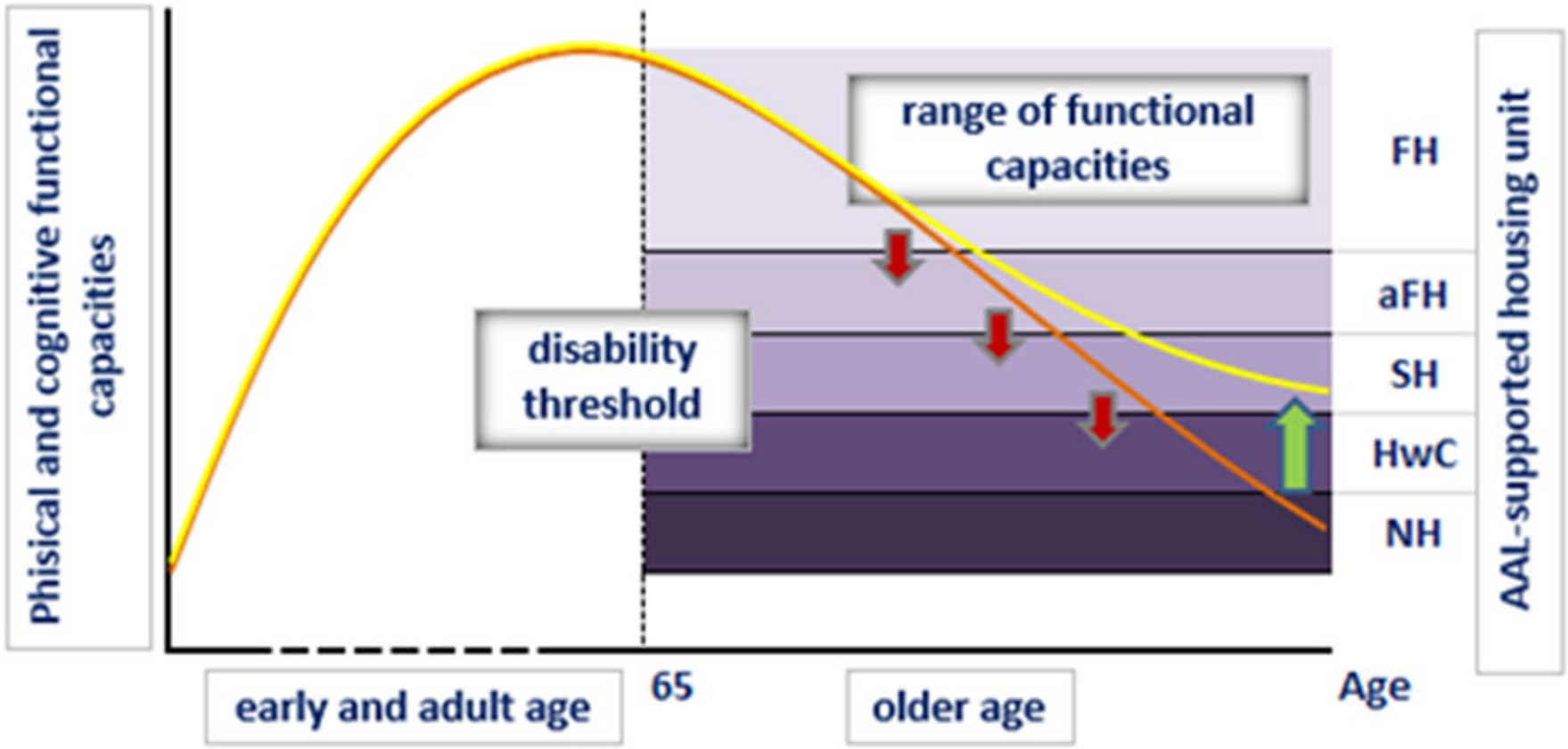
# European Pillar of Social Rights

- **The 2021 Report on Long-term Care** prepared **jointly by the Social Protection Committee and the European Commission analyses common challenges faced by Member States in long-term care.**
- **While acknowledging the diversity of long-term care systems and their close links to social protection, employment, and health policies,**
- **as well as continuing data gaps, the report highlights the following key points.**

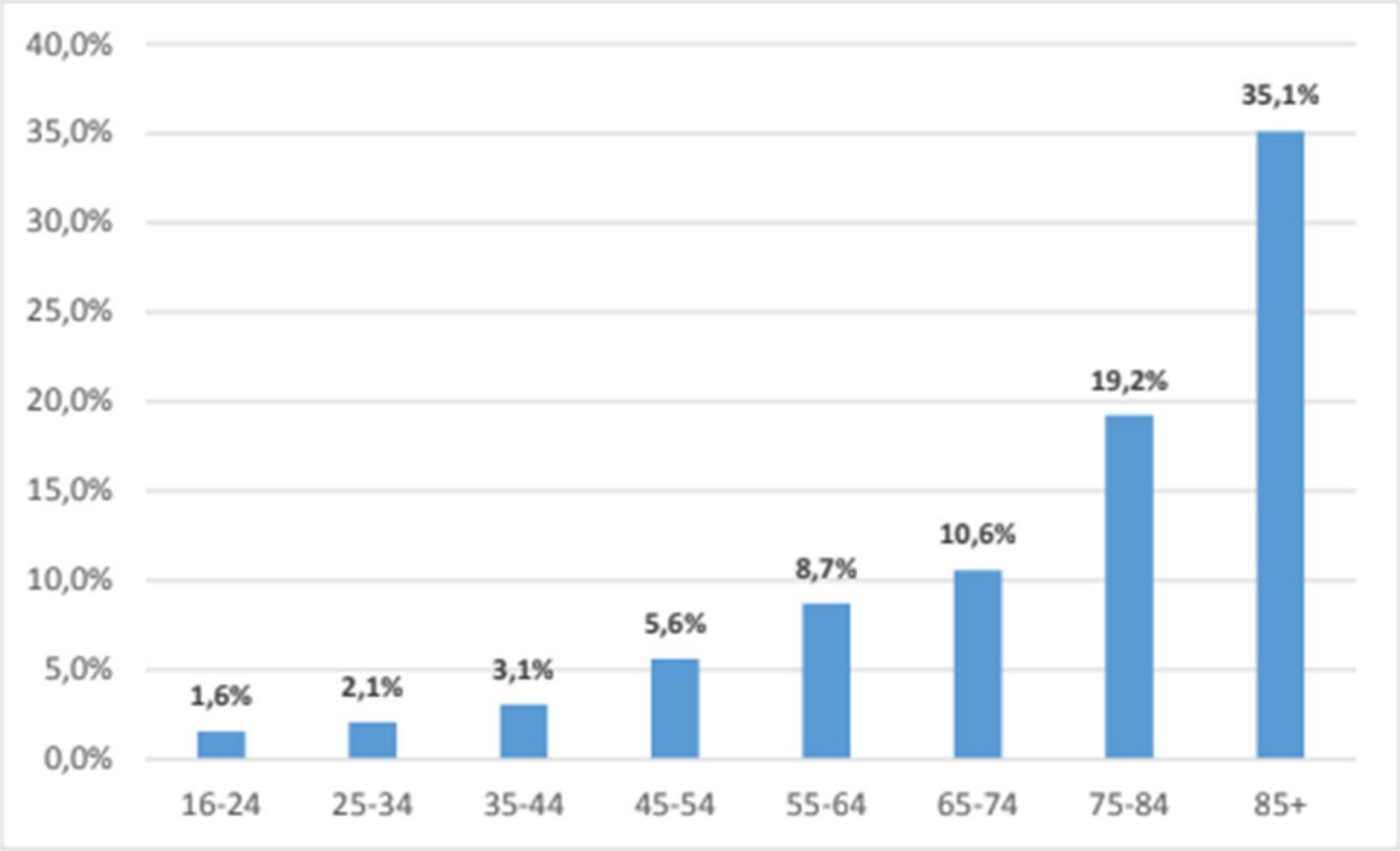
# Demand for long-term care

- **The demand for high-quality long-term care is set to rise, and**
- **reinforcing its provision can contribute to gender equality and social fairness**

# Dynamics of functional capacities in life-cycle



# Share of people dependent on the help of other in period 2015-2019 in EU member states (source: Green paper on Ageing, 2021)



# Long term care in Ageing Report 2018 and 2021

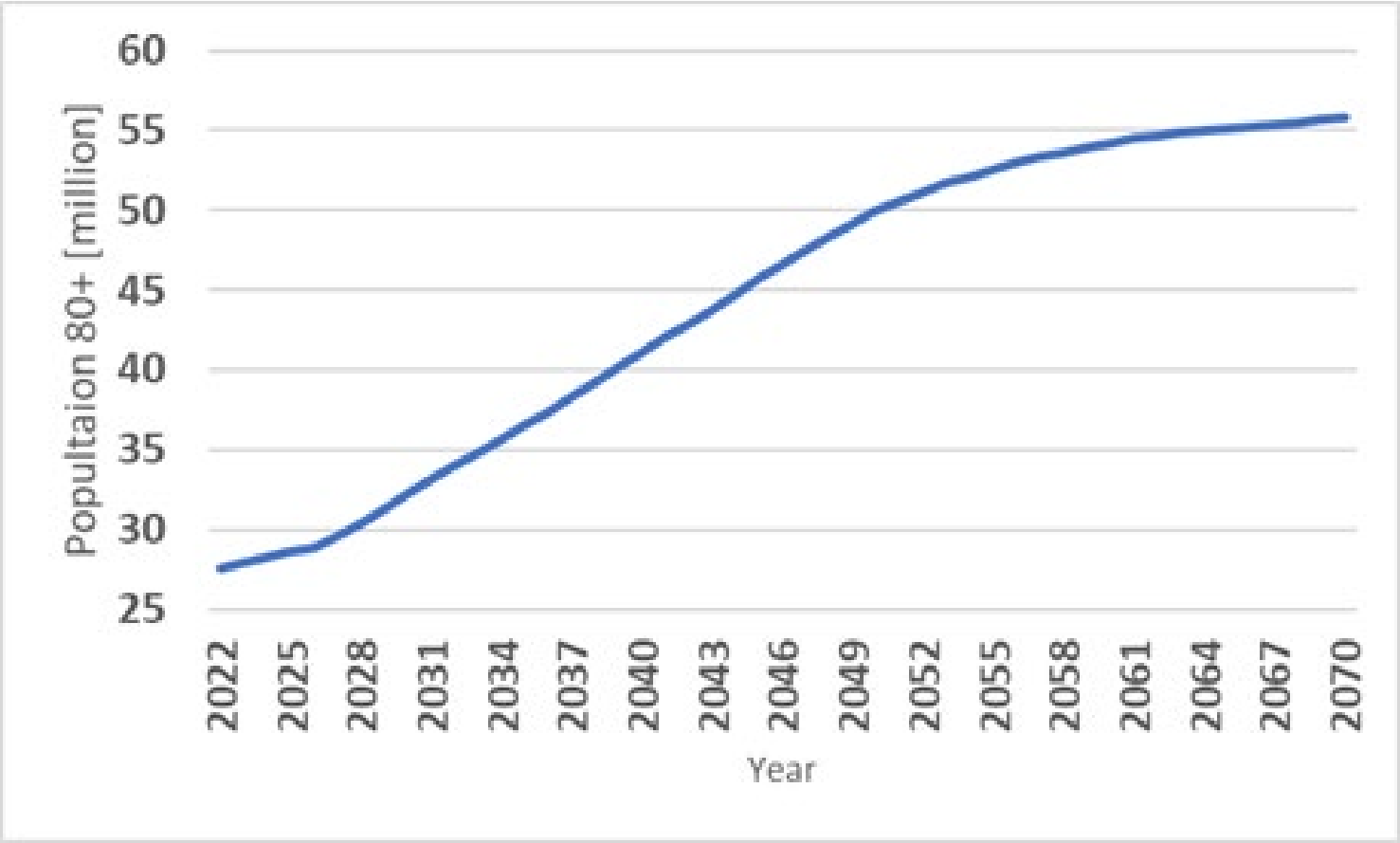
**Different categories of persons that Ageing report is projecting:**

1. **Dependent people**
2. **Institutional care users**
3. **Home care users**
4. **Cash benefits receivers**

# Demand for long-term care

- **Population ageing is expected to lead to a strong increase in demand for long-term care.**
- **Reflecting remarkable gains in life expectancy, the number of people aged 65 or over is projected to rise by 41 %, to 130.1 million, over the next 30 years.**
- **The prevalence of disability and the need for long-term care both increase with age.**

# European population projections 2019 for population 80+ for period 2020-2100 (source EUROSTAT)

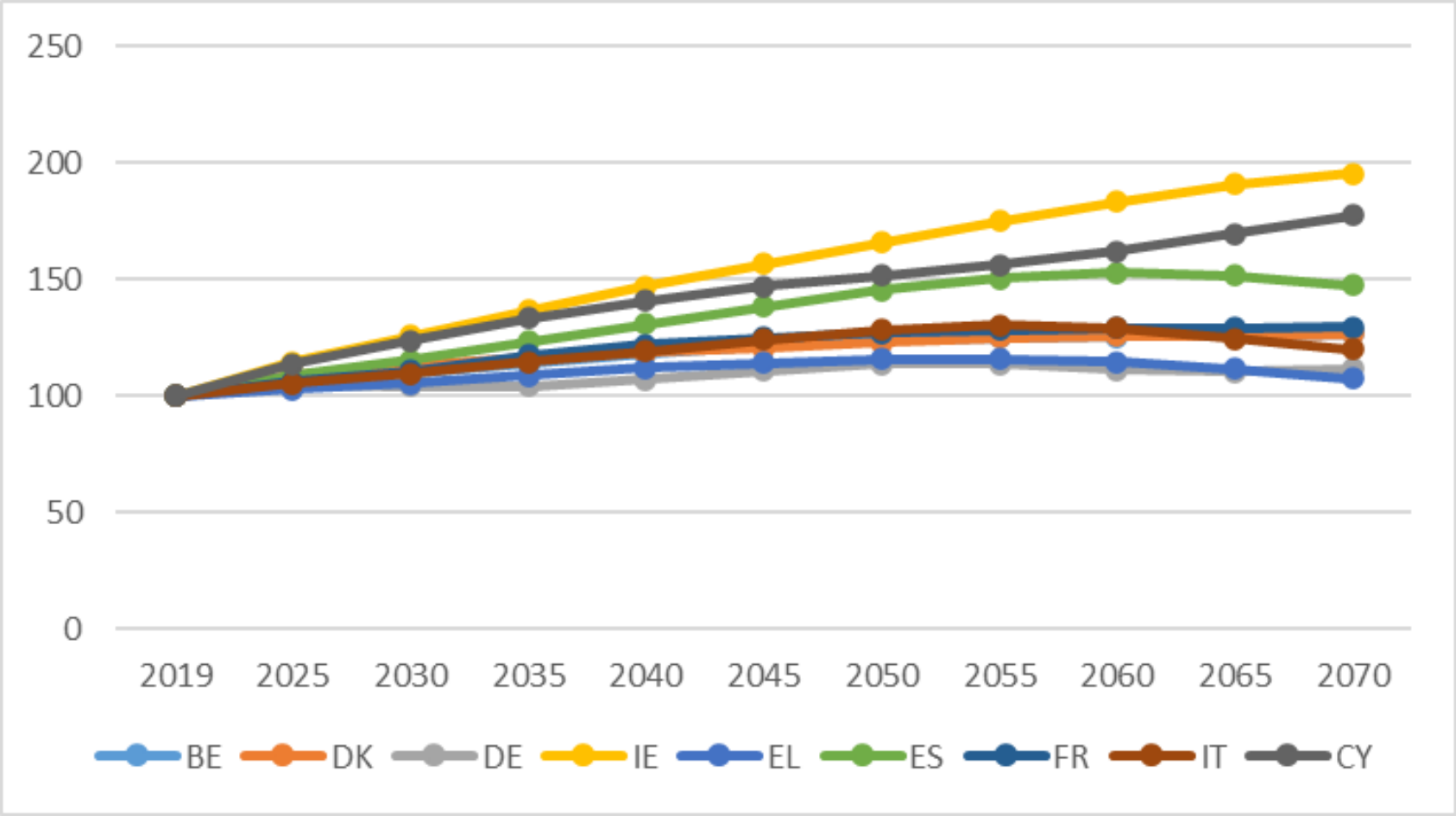


# Demand for long-term care

- **The number of people potentially in need of long-term care in the EU-27 is therefore projected to rise:**
- **from 30.8 million in 2019 to**
- **33.7 million in 2030 and**
- **38.1 million in 2050.**

- **Different dynamics in different EU member states**

# Index of dependent people with base year 2019 (Source: The Ageing Report 2021, EC, 2021)



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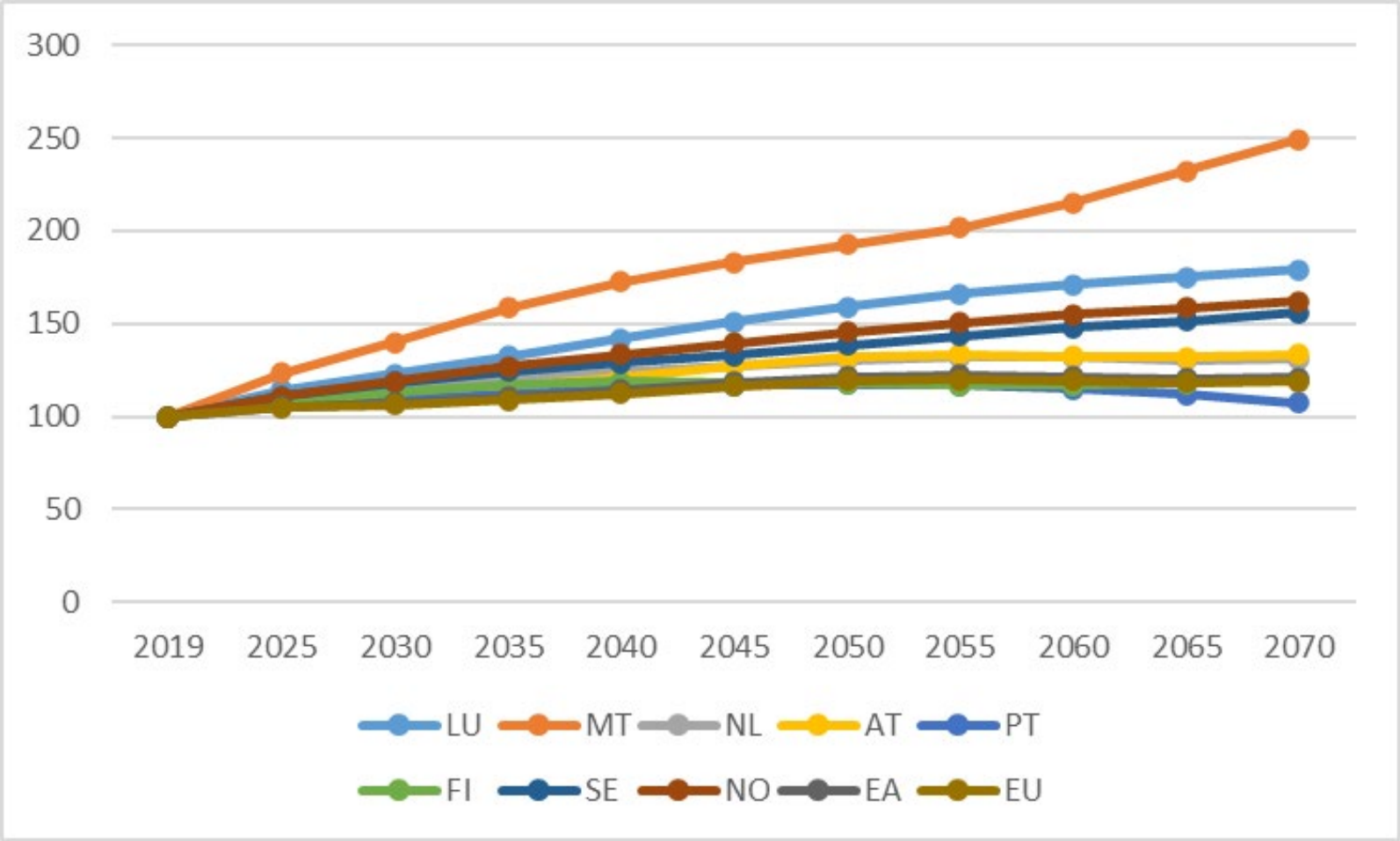
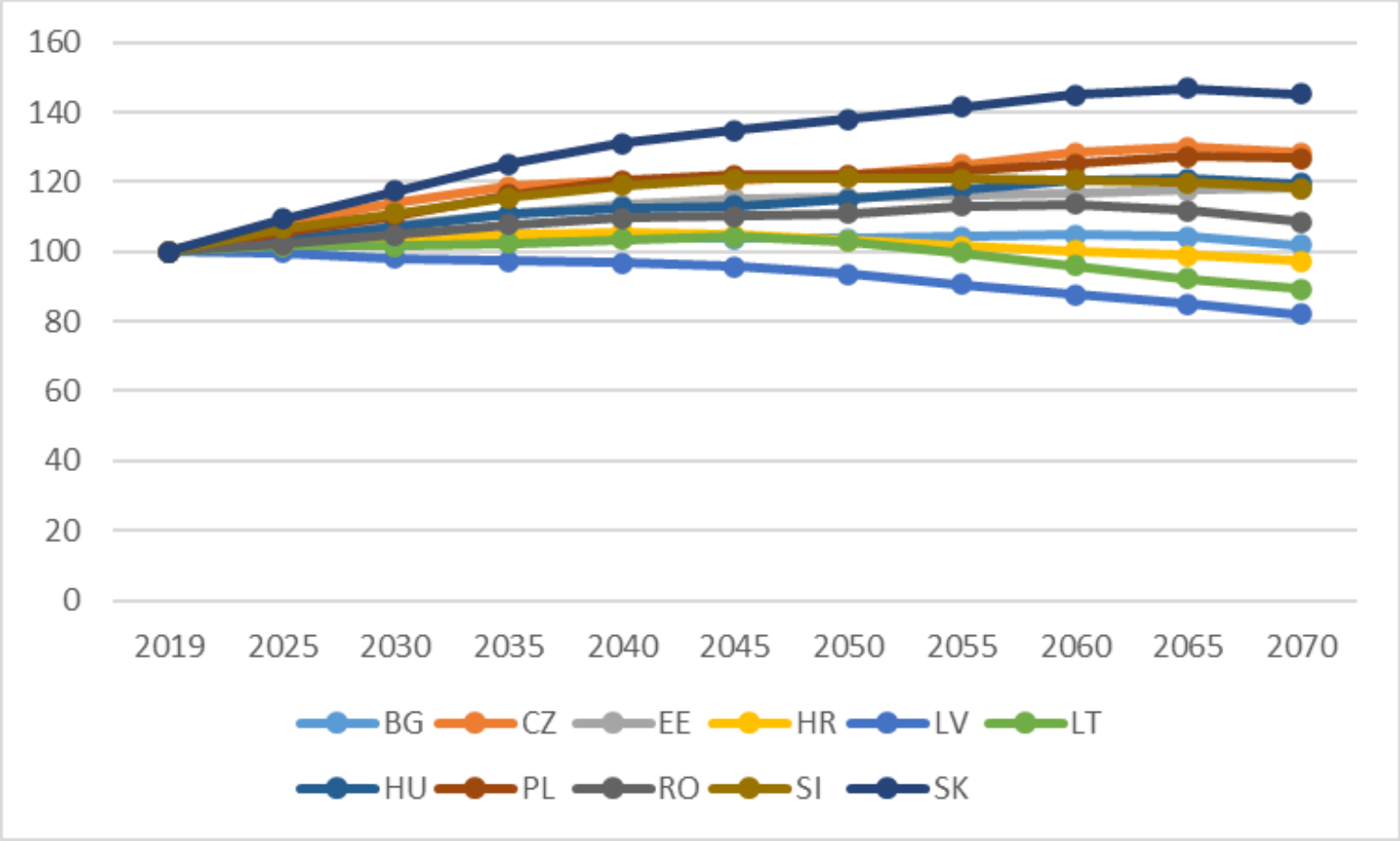
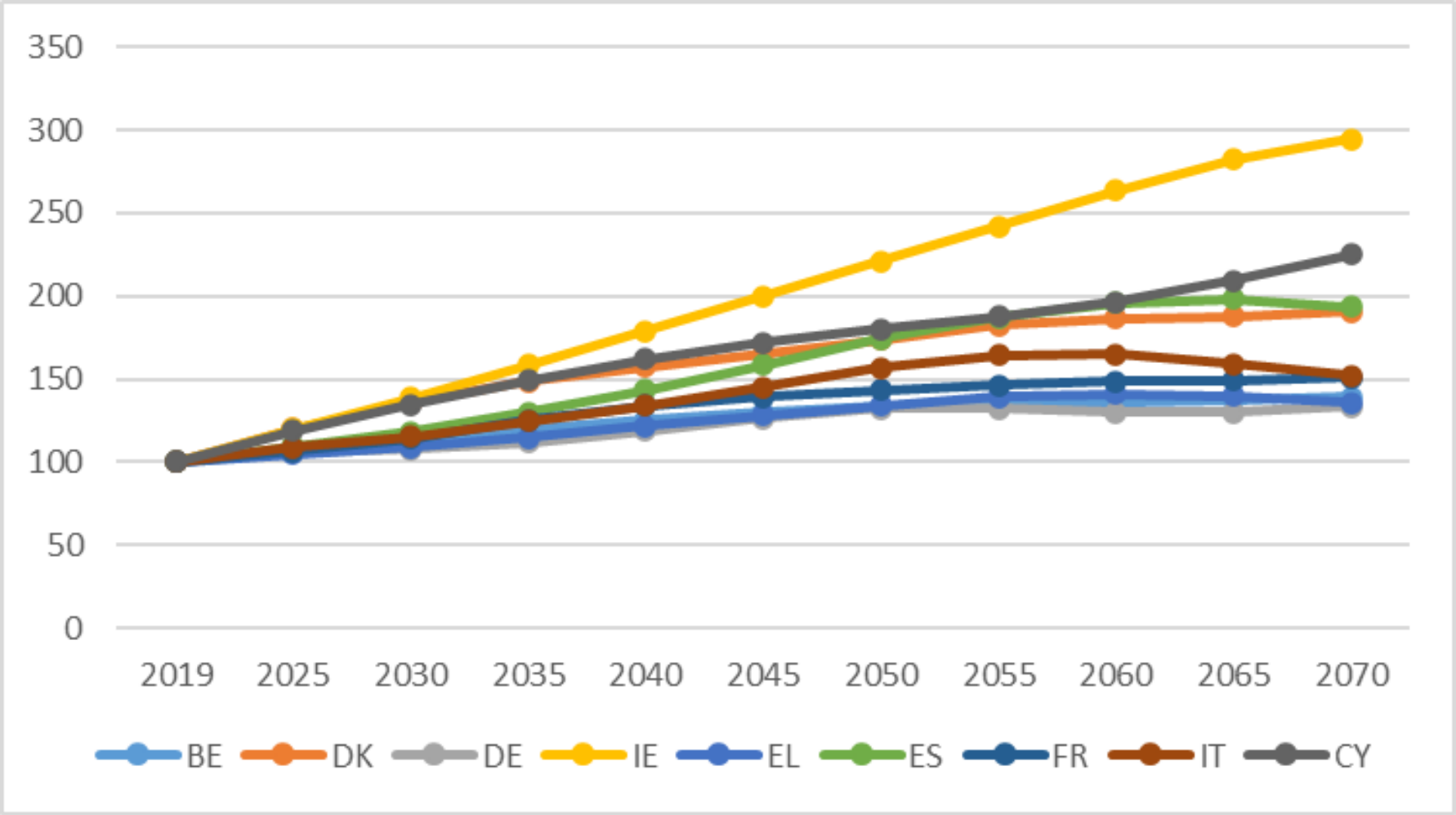


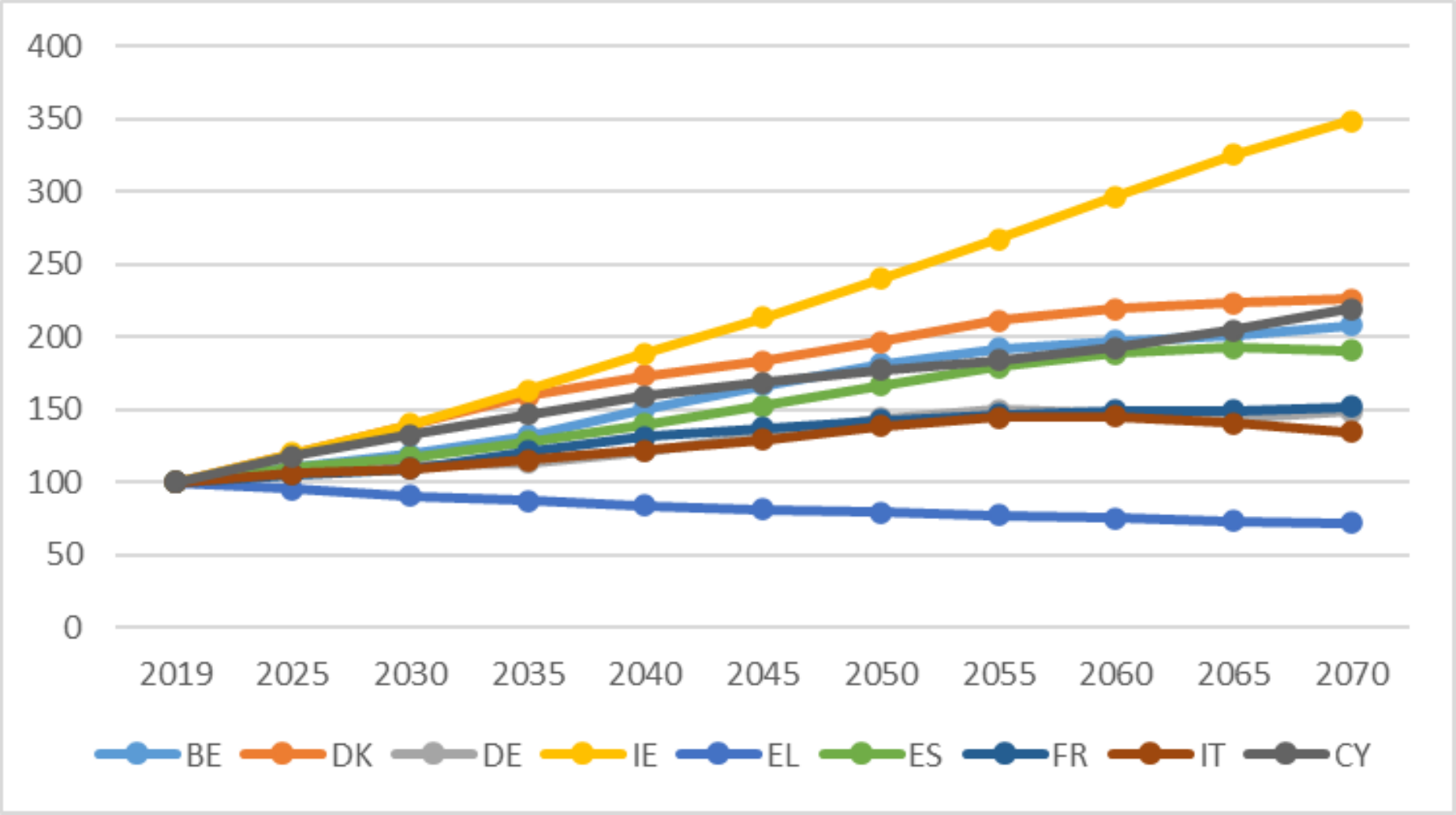
# Index of dependent people with base year 2019 – New EU member states (Source: The Ageing Report 2021, EC, 2021)



# Index of home care users with base year 2019 (Source: The Ageing Report 2021, EC, 2021)



# Indeks of institutional care users with base year (Source: The Ageing Report 2021, EC, 2021)



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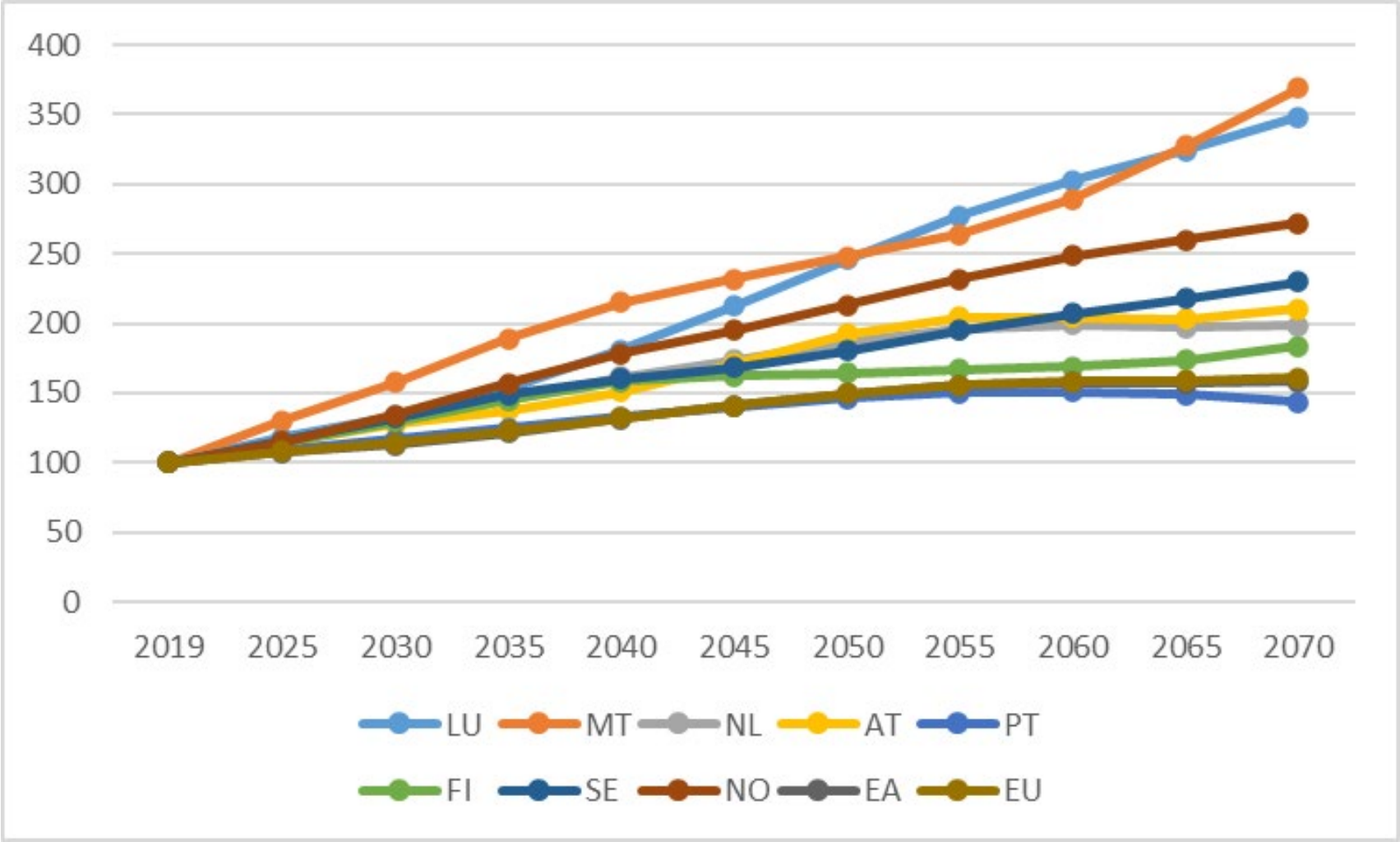
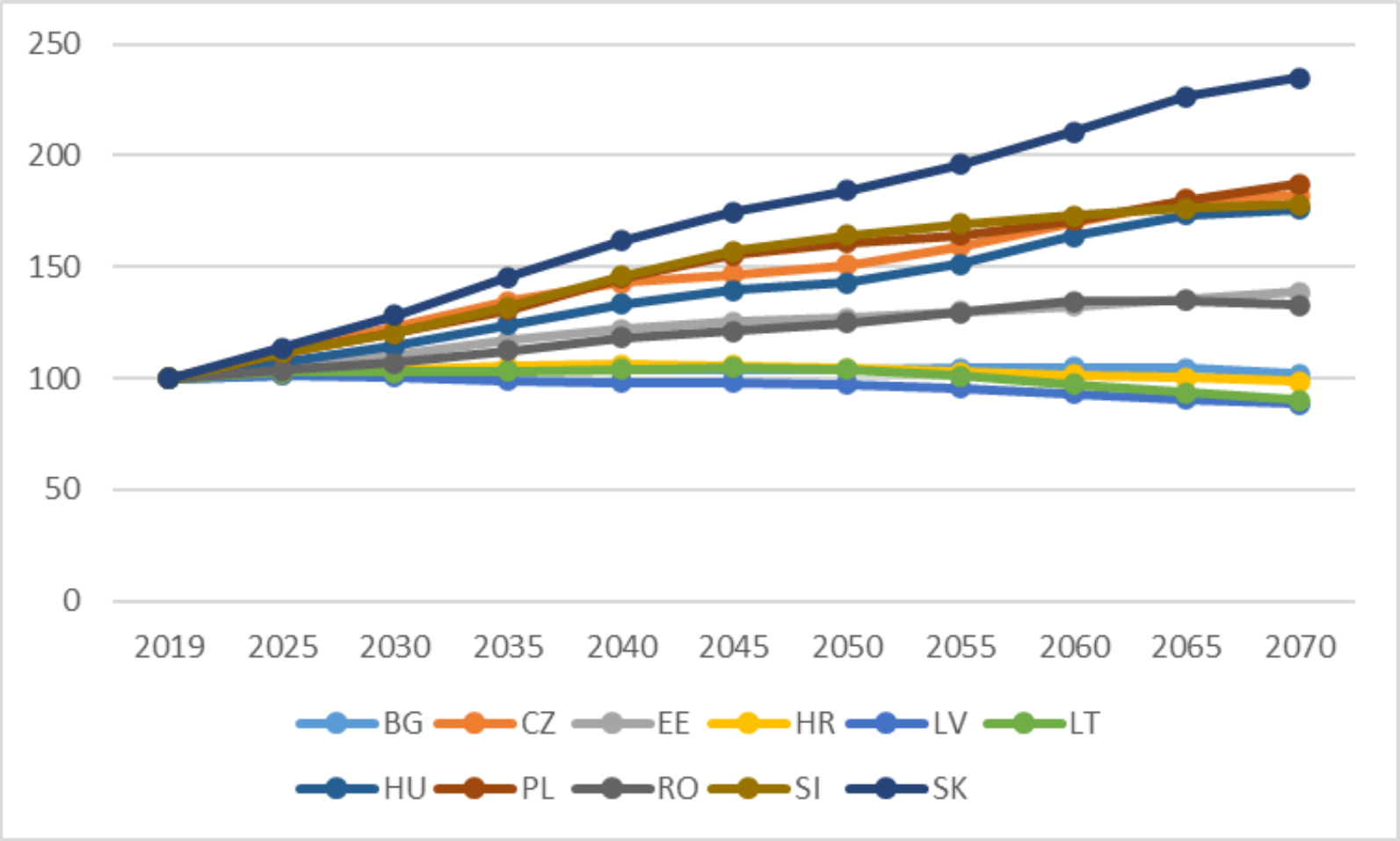
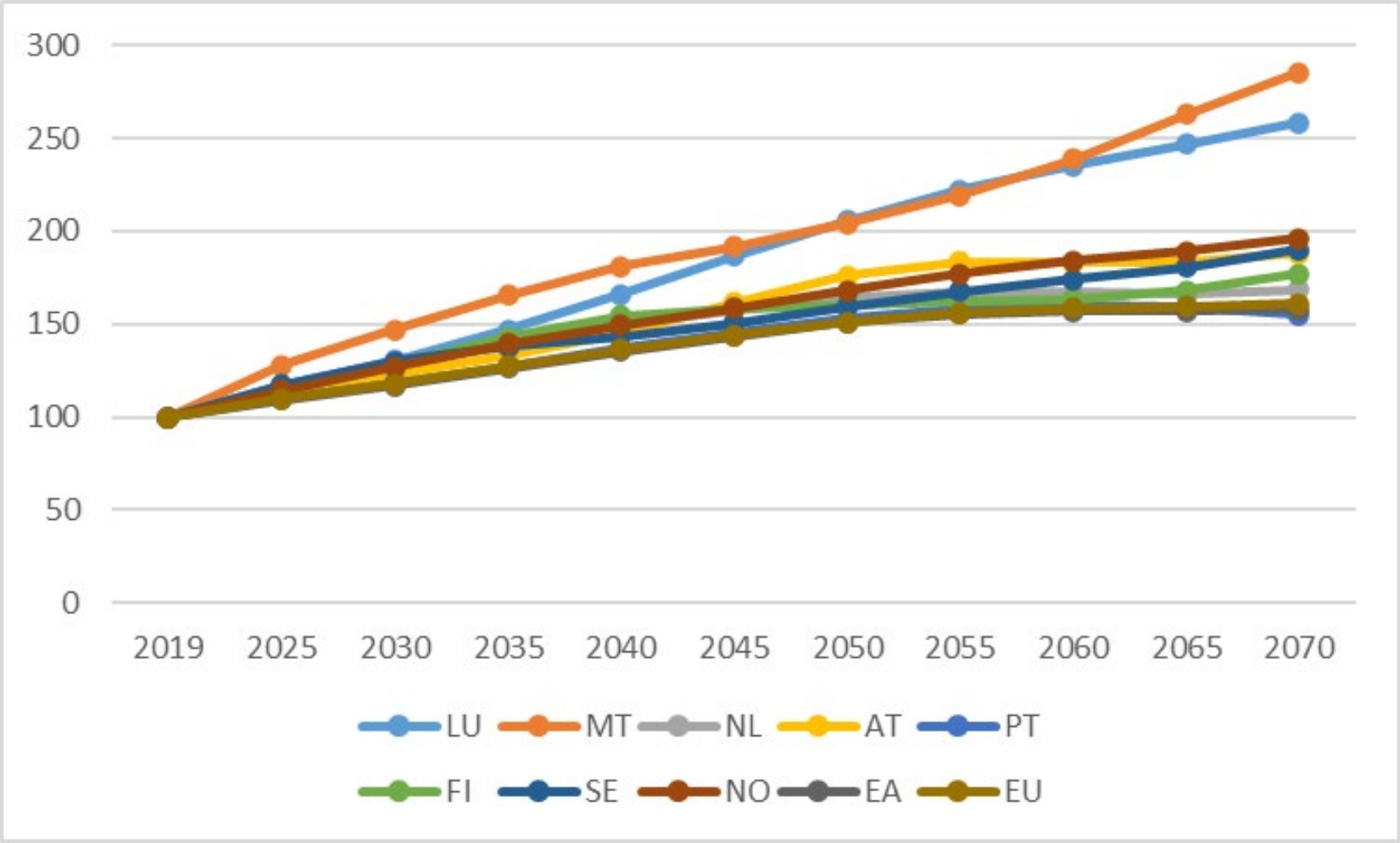


# Index of institutional care users with base year 2019 – New EU member states (Source: The Ageing Report 2021, EC, 2021)



# Index of home care users with base year 2019 (Source: The Ageing Report 2021, EC, 2021)



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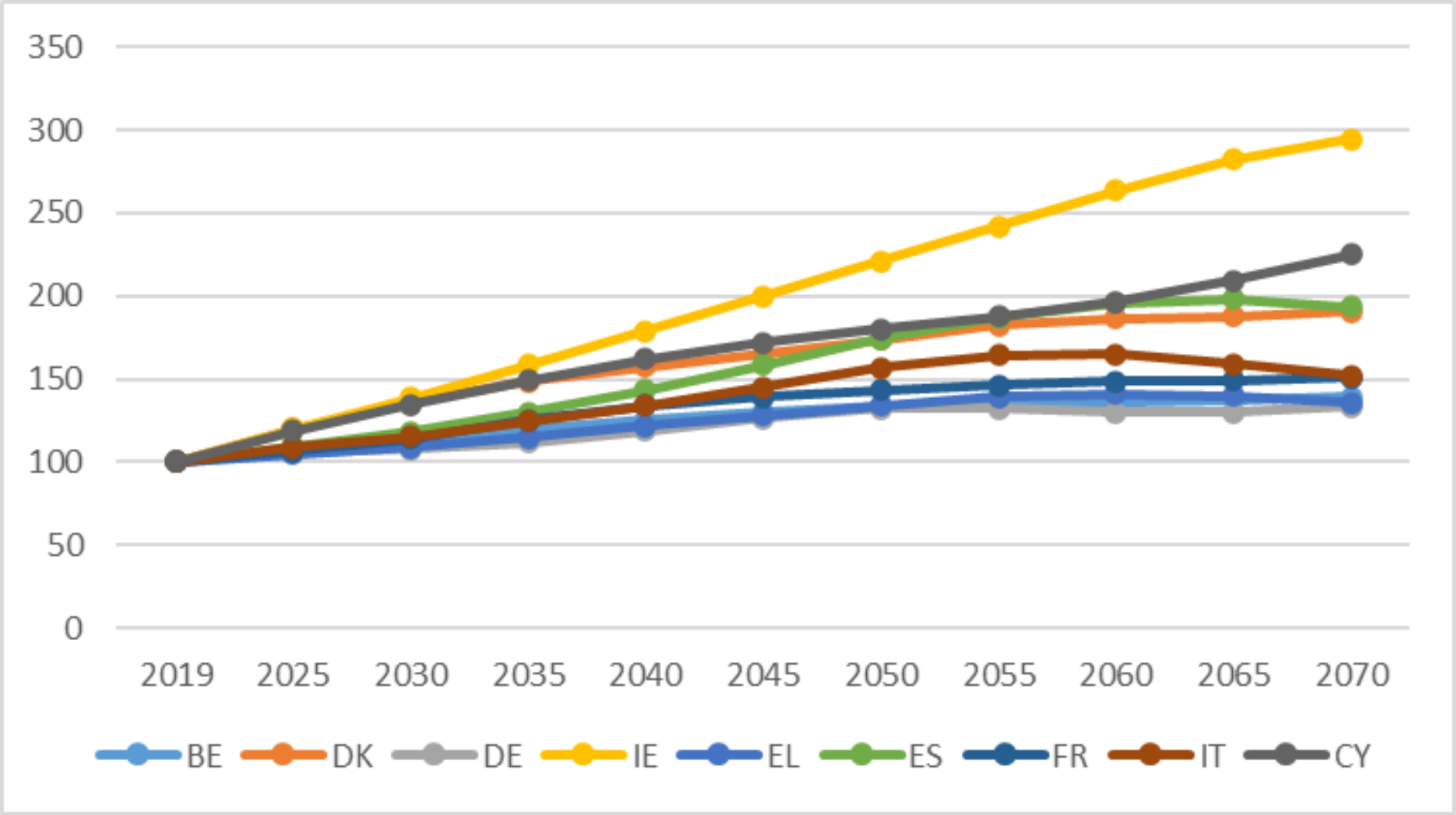

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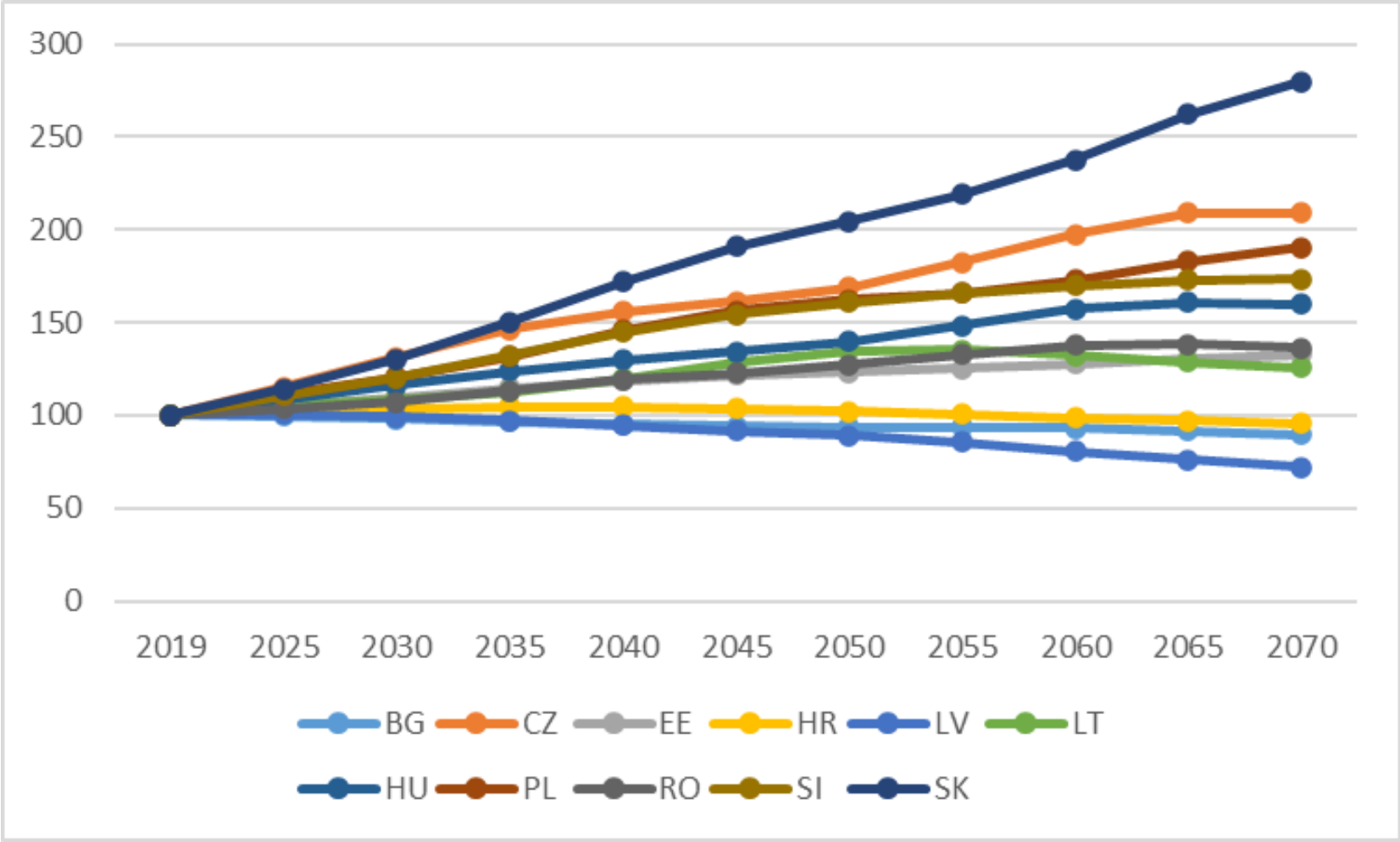
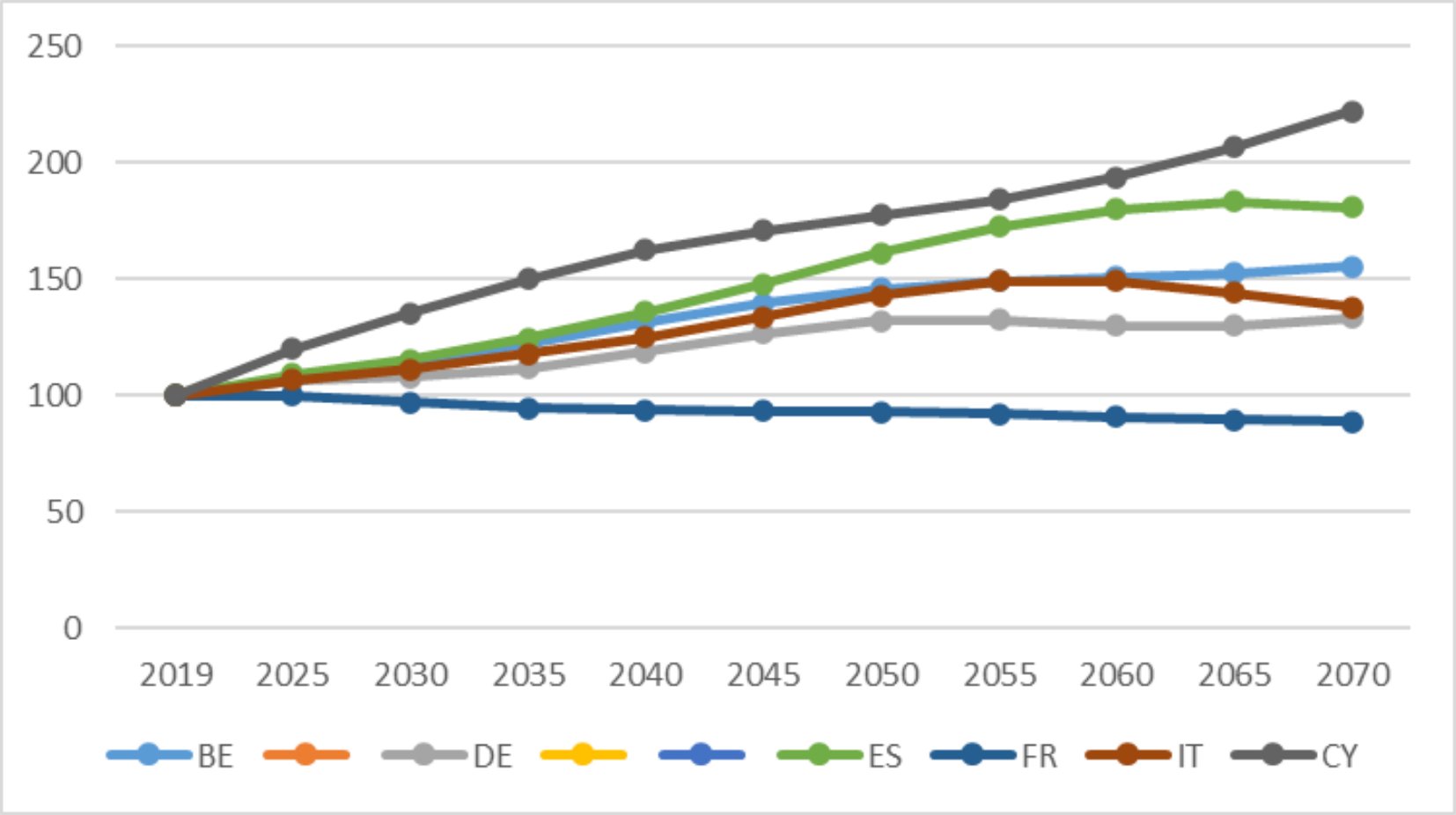


# Index of cash benefit recipients with base year 2019 (Source: The Ageing Report 2021, EC, 2021)



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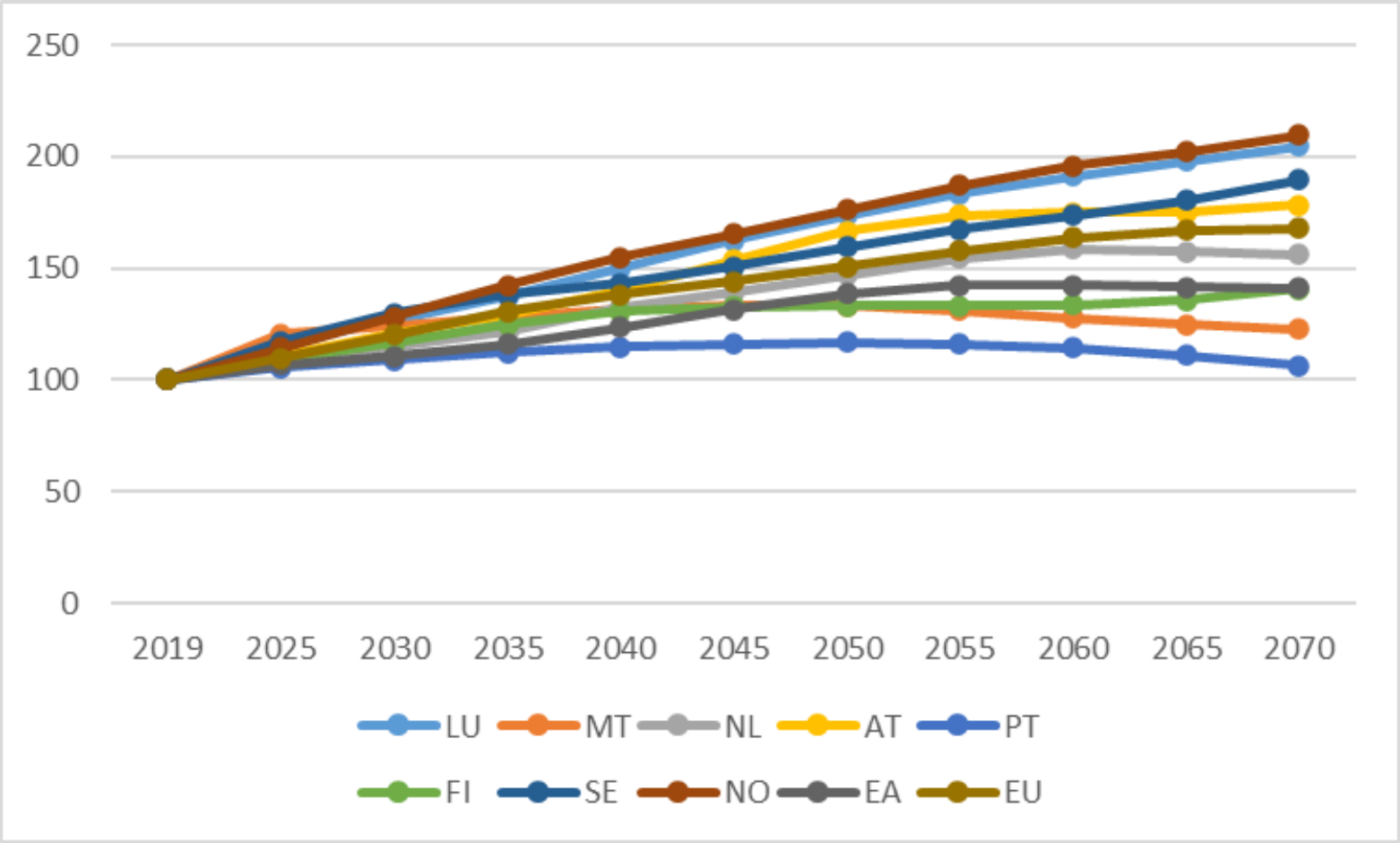

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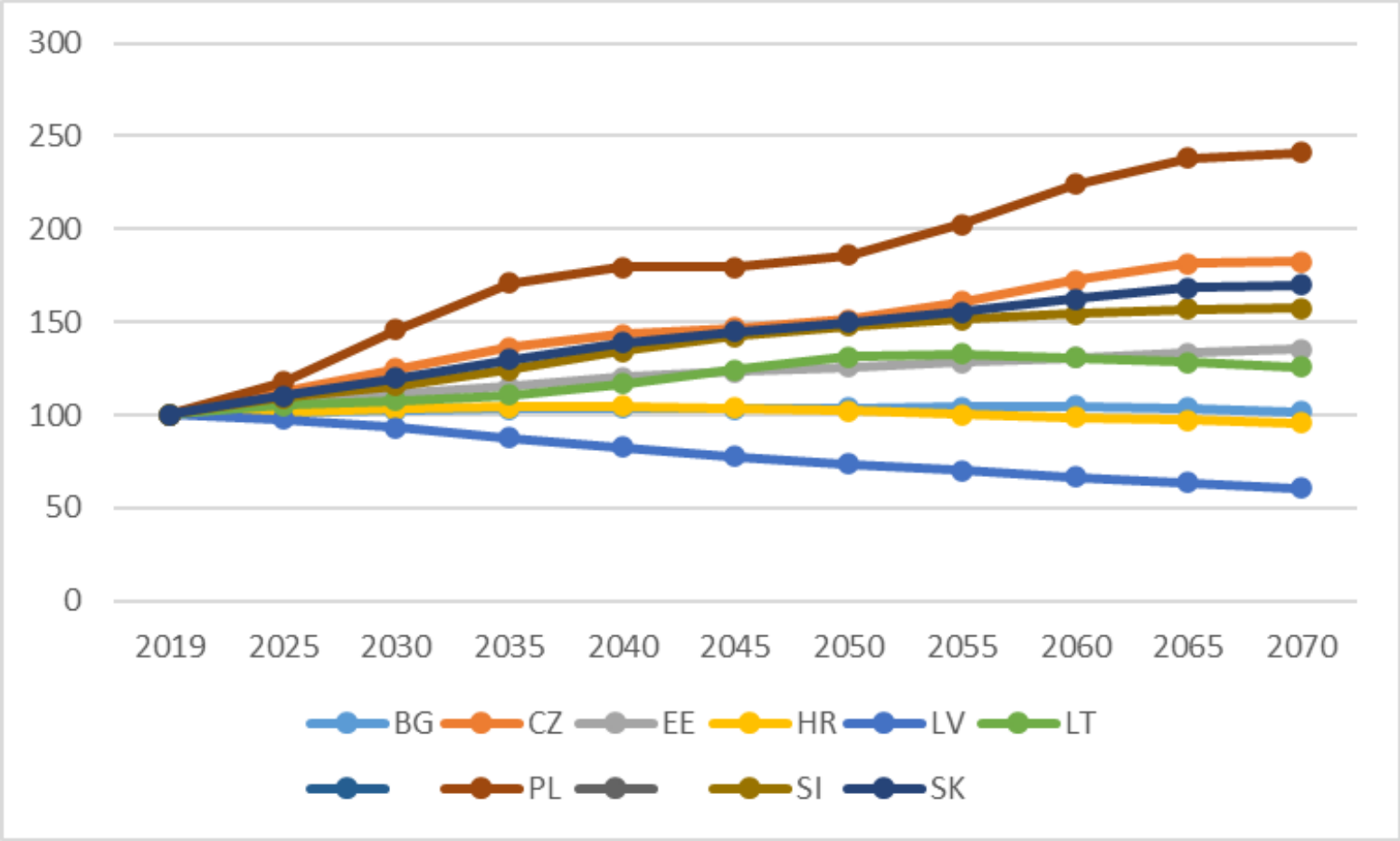
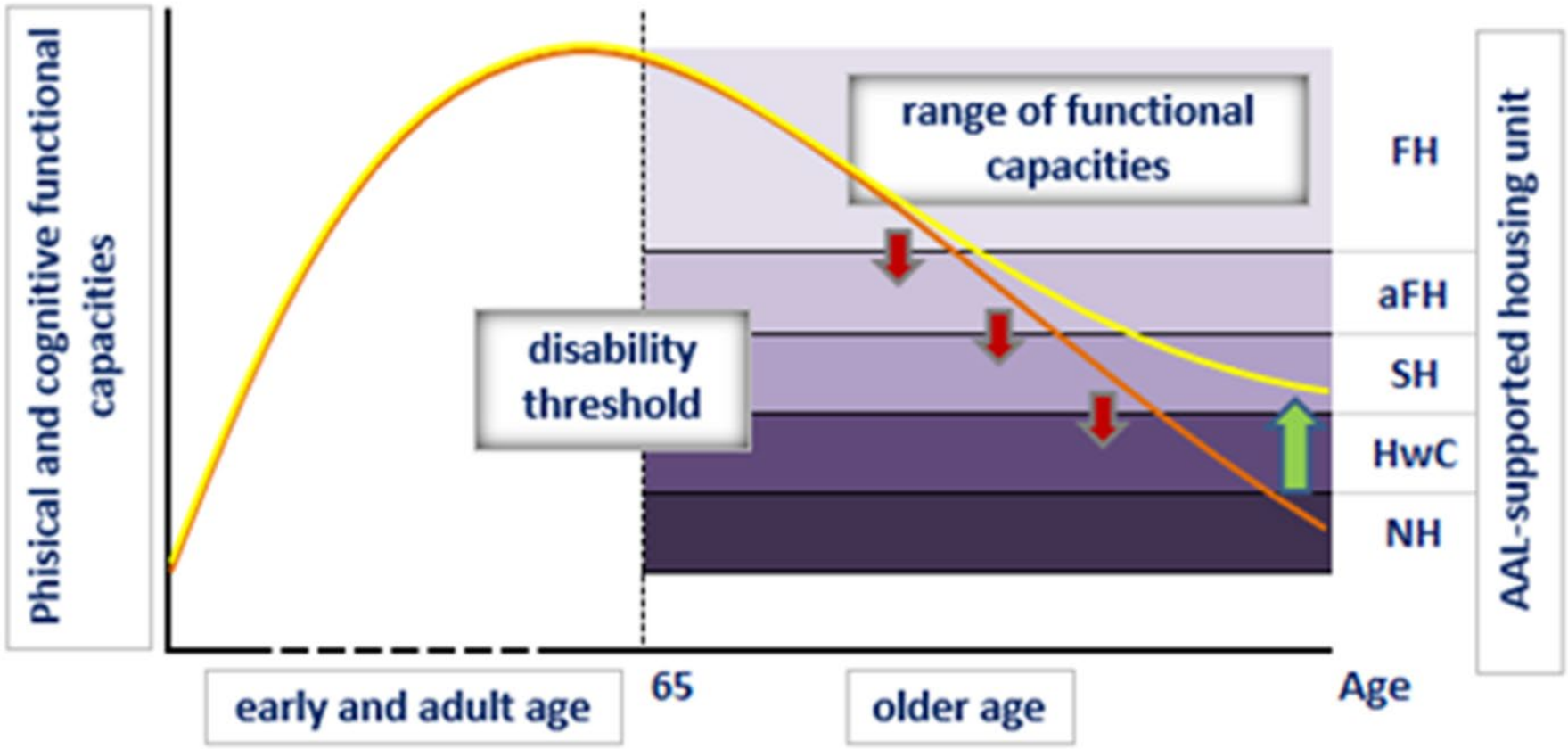


# Dynamics of functional capacities in life-cycle



# Actuaries can contribute to better projection metodology further research

Retirement villages can boost the longevity of women by as much as five years compared to the general population, according to a new Cass Business School report.

Analysing 100 years' worth of residents' records from the Whiteley Homes Trust, a retirement village in Surrey which opened in 1917 to provide housing and support for people of limited means, the study suggests that this type of lifestyle in retirement is capable of combating the negative effects on health and social well-being of low economic means and isolation.

# Long term care in and care settings

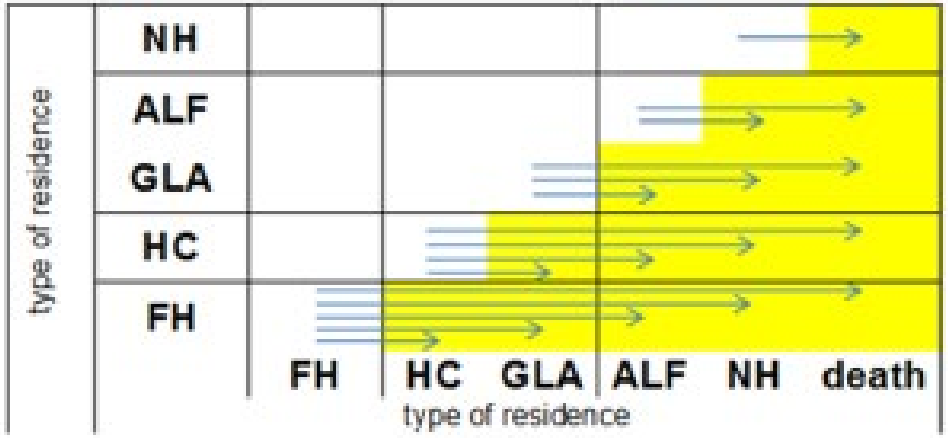
According to the **World Health Organisation** (WHO), **physical and social environments** are **key determinants** of whether people can remain

- **healthy,**
- **independent** and
- **autonomous**

long into their old age

# Possible transitions

Possible transitions among different types of housing units adapted to functional capacities of older residents with declining functional capacities in multiple decrement model ($i \rightarrow j$; $i \in H$, $j \in H$)




**Types of dwelling:**
**FH - Family Home (in existing home),**
**HC - Home care,**
**GLA - Ground Level Apartments,**
**ALF - Assistance Living Facilities,**
**NH - Nursing Home**

# Multiple Decrement Transition Matrix

$$\mathbf{P}_{x,\tau} = \begin{bmatrix} p_x^{(0)} & q_x^{(0,1)} & q_x^{(0,2)} & q_x^{(0,3)} & q_x^{(0,4)} & q_x^{(0,5)} \\ 0 & p_x^{(1)} & q_x^{(1,2)} & q_x^{(1,3)} & q_x^{(1,4)} & q_x^{(1,5)} \\ 0 & 0 & p_x^{(2)} & q_x^{(2,3)} & q_x^{(2,4)} & q_x^{(2,5)} \\ 0 & 0 & 0 & p_x^{(3)} & q_x^{(3,4)} & q_x^{(3,5)} \\ 0 & 0 & 0 & 0 & p_x^{(4)} & q_x^{(4)} \end{bmatrix}_\tau$$

# Numerical example

According to the general demographic data, mortality tables and data reported from nursing homes the transition matrix could be written. Let us say that structure of residents 80 years old by type of facility for each cohort (x years old; x=80) is written by the following vector $S_x$ as sum of internal reallocations and the net migrations of cohort:

$$S_x = \begin{bmatrix} S_x^{(0)} & S_x^{(1)} & S_x^{(2)} & S_x^{(3)} & S_x^{(4)} \end{bmatrix} = \begin{bmatrix} 21.510 & 390 & 230 & 436 & 71 \end{bmatrix} +$$

$$+ \begin{bmatrix} 20 & 19 & 13 & 102 & 60 \end{bmatrix} = \begin{bmatrix} 21.530 & 409 & 243 & 538 & 131 \end{bmatrix}$$

# Multiple decrement transition matrix

$$\mathbf{P}_{80}^{2015} = \begin{bmatrix} p_x^{(0,\tau)} & q_x^{(0,1)} & q_x^{(0,2)} & q_x^{(0,3)} & q_x^{(0,4)} & q_x^{(0,5)} \\ 0 & p_x^{(1,\tau)} & q_x^{(1,2)} & q_x^{(1,3)} & q_x^{(1,4)} & q_x^{(1,5)} \\ 0 & 0 & p_x^{(2,\tau)} & q_x^{(2,3)} & q_x^{(2,4)} & q_x^{(2,5)} \\ 0 & 0 & 0 & p_x^{(3,\tau)} & q_x^{(3,4)} & q_x^{(3,5)} \\ 0 & 0 & 0 & 0 & p_x^{(4,\tau)} & q_x^{(4,5)} \end{bmatrix}_{2015} = \qquad (1)$$

$$= \begin{bmatrix} 0,98164 & 0,00162 & 0,00167 & 0,00172 & 0,00176 & 0,01159 \\ 0 & 0,83415 & 0,04867 & 0,05111 & 0,05355 & 0,01252 \\ 0 & 0 & 0,9035 & 0,03993 & 0,04405 & 0,01252 \\ 0 & 0 & 0 & 0,76037 & 0,22711 & 0,01252 \\ 0 & 0 & 0 & 0 & 0,8344 & 0,16560 \end{bmatrix}$$

# Numerical example: Allocation of residents of age x+1 by type of dwelling in year τ+1

$$\mathbf{S}_{81}^{2019} = \mathbf{S}_{80}^{2018}\mathbf{P}_{80}^{2018} =$$

$$= \begin{bmatrix} 21.530 & 409 & 243 & 538 & 131 \end{bmatrix} \cdot$$

$$\begin{bmatrix} 0,98164 & 0,00162 & 0,00167 & 0,00172 & 0,00176 & 0,01159 \\ 0 & 0,83415 & 0,04867 & 0,05111 & 0,05355 & 0,01252 \\ 0 & 0 & 0,9035 & 0,03993 & 0,04405 & 0,01252 \\ 0 & 0 & 0 & 0,76037 & 0,22711 & 0,01252 \\ 0 & 0 & 0 & 0 & 0,8344 & 0,16560 \end{bmatrix} =$$

$$\begin{bmatrix} 21135 & 376 & 275 & 476 & 302 \end{bmatrix}$$

Allocation of residents by type of facility for studied cohort in the following year (when they are x+1 year old) we can calculate:

$$\mathbf{S}_{81}^{2015} = \mathbf{S}_{81}^{2015}\mathbf{P}_{81}^{2015} = \begin{bmatrix} S_{81}^{(0)} & S_{81}^{(1)} & S_{81}^{(2)} & S_{81}^{(3)} & S_{81}^{(4)} \end{bmatrix}_{2016}$$

Norms and standards of required human resources for elder care for each type of facilities is describe by vector H:

$$\mathbf{H} = \begin{bmatrix} H^0 & H^1 & H^2 & H^3 & H^4 \end{bmatrix}^T = \begin{bmatrix} 0 & 0.1 & 0.2 & 0.3 & 0.5 \end{bmatrix}^T$$

The require human resources for eldercare in studied urban area we calculate according following formula:

$$HR(80) = S_x.H = \begin{bmatrix} S_x^0 & S_x^1 & S_x^2 & S_x^3 & S_x^4 \end{bmatrix}_{\tau+1} \cdot H$$

$$= \begin{bmatrix} 21135 & 376 & 275 & 476 & 302 \end{bmatrix} \begin{bmatrix} 0 & 0.1 & 0.2 & 0.3 & 0.5 \end{bmatrix}^T = 387$$

It means that in such case 387 workers in EC will be needed for 80 years old inhabitants in the municipality. Summarizing the results for all age cohorts we can also calculate total number of required human resources for the next year and further gradually for all time horizon.

# Thank you for attention!

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