LONG-TERM CARE DEPENDENCY IN THE CZECH REPUBLIC: A POPULATION-BASED MODEL FOR AN AGEING SOCIETY

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Abstract
Population ageing will increase long-term care needs in the Czech Republic, where support relies heavily on family caregiving and a public care allowance. Using administrative counts of allowance recipients (2014–2024, collected by Ministry of Labour and Social Affairs and available at Czech Statistical Office, 2025a) and the Czech Statistical Office population projection (2025–2080, Czech Statistical Office, 2024), we project age–sex patterns of care need with a mixed-effects multinomial logit model. For 2025–2040, prevalence rises in most groups, particularly at ages 85+.

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INTRODUCTION

Population ageing is increasingly understood not only as a macro-demographic shift but also as the cumulative outcome of life-course processes shaping health, functional capacity, and care needs. Care dependency in later life reflects accumulated (dis)advantage, cohort-specific exposures, and institutional contexts (*Barrett – Barbee,* 2022). Differences in education, labour-market trajectories, family formation, health behaviours, and access to care compound over the life span and become most visible at older ages, when functional limitations and the need for assistance are more prevalent.

Long-term care (LTC) dependency is a downstream outcome of life-course inequalities rather than a sudden event of 'old age'. Its timing, intensity, and duration are shaped by cohort replacement, gendered trajectories, and the organisation of health and social care. Formally recognised dependency does not directly mirror underlying need. It is mediated by assessment rules, benefit design, and service availability, which in turn influence how care is distributed between families and formal provision.

The Czech Republic provides an important and interesting case. Official statistics show a sustained rise in the proportion of the population aged 65 and over (from 17.8% in 2014 to 20.7% in 2024), and projections indicate further growth to around 27.2% by 2044 and 30.7% by 2059 (*Czech Statistical Office,* 2024 and

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2025b). This trend is driven by the ageing of large cohorts born in the 1940s and 1950s, as well as strong cohorts born in the 1970s. Czech scholarship has highlighted the implications for care provision and support for families (*Wija,* 2015). Internationally, there is extensive evidence of rising LTC needs in ageing societies (*Chen et al.,* 2016; *OECD,* 2020; *Kallestrup-Lamb et al.,* 2024) and an active debate on projections, sustainability, and the long-term commitments embedded in LTC entitlements (*Börsch-Supan et al.,* 2013; *Bahnsen et al.,* 2020; *Spitzer – Shaikh,* 2022; *Hu et al.,* 2025). Moreover, both the role of modelling assumptions in LTC projections and the importance of unpaid care in shaping future care arrangements (*Comas-Herrera et al.,* 2006; *Pickard,* 2015).

Ageing directly increases the number of care allowance recipients and thus the population formally recognised as care dependent. Prevalence rises steeply with age, implying further shifts towards older ages where severe limitations are concentrated. Growing dependency also heightens labour-market pressures—both via demand for formal care workers and through stronger work–care reconciliation constraints within families, particularly for the 'sandwich generation' (*Rubin – White-Means,* 2009).

This article focuses on the care allowance regulated by Act No. 108/2006 Coll. (*Czech Republic,* 2006), a key instrument for supporting individuals with reduced self-sufficiency. In the Czech policy and academic debate, projections have often relied on applying current prevalence rates to future population counts. What remains limited is a population-based projection that systematically integrates publicly available administrative information on care allowance recipients with official demographic projections, while distinguishing outcomes by age, sex, and degree of dependency in a transparent manner.

The objectives of this article are threefold: first, to develop a population-based projection model using publicly available data from the Ministry of Labour and Social Affairs and the Czech Statistical Office to quantify expected changes in the number of care allowance recipients under projected demographic ageing; second, to provide disaggregated projections by age, sex and dependency level that can inform planning and debate about the organisation of support; and third, to assess the feasibility of using publicly available administrative and demographic data to construct a reproducible projection framework for the Czech Republic.

CARE FOR PERSONS DEPENDENT ON ASSISTANCE AND THE ROLE OF INFORMAL CAREGIVERS

Long-term care for persons dependent on the assistence in a home setting affects family life and has material consequences for caregivers' economic circumstances and labour market participation, including decisions about early retirement when disability pension eligibility is not met. These effects concern both caregivers and care recipients of working age, and many caregivers therefore combine unpaid care with paid work or self-employment.

Svobodová (2010) characterises caregiving as 'labour of love' (a term used by several authors), a moral obligation and duty that may strain family relationships yet is considered a legitimate expectation of relatives. In the event of loss of self-sufficiency, most respondents would prefer to remain in their original homes with support from their children or, where necessary, professional institutions, but future home-based care is increasingly 'threatened' by a declining number of potential family caregivers.

A substantial literature addresses informal care, especially work–care reconciliation, often using survey and qualitative evidence (*Horrell et al.,* 2014). *Lilly et al.* (2007) conclude that labour-market withdrawal is more likely among intensive caregivers, while moderate caregiving may remain compatible with employment; recent longitudinal evidence similarly documents changes in work hours, labour-market exit and related outcomes for both men and women (*Josten et al.,* 2024).

The formal–informal care distinction is central (*Bauer – Sousa-Poza,* 2015; *Francová – Novotný,* 2008; *Mikanová,* 2018; *Triantafillou et al.,* 2010). Informal care imposes implicit costs, particularly foregone earnings, and caregivers are less likely to be employed and, when employed, tend to earn less than non-caregivers (*Carmichael – Charles,* 2003; *Raiber et al.,* 2022). Long-term caregiving may also generate wage penalties via statistical discrimination and reduced perceived reliability (*Heitmueller – Inglis,* 2007), and may disadvantage caregivers through skill loss, reduced work experience and confidence. In line with modern European concepts, residential services should primarily serve highly dependent persons (mainly levels III–IV), while levels I–II should form only a small share of institutional clients (*Zimmelová et al.,* 2010). A Czech-focused discussion is provided by *Kotrusová et al.* (2013).

For the Czech Republic, *Triantafillou et al.* (2010) report average family caregiving duration of about four to five years and that most care for older persons is provided by working-age women, many of whom are simultaneously employed; care is most often provided by adult children, followed by spouses, other relatives and friends, with women forming the majority of caregivers. *Holmerová* (2004) estimates 400,000–500,000 family caregivers. *Geissler* (2016) emphasises the long-term nature of caregiving, reporting average duration of 10.4 years (median six). Caregiving can therefore reduce labour supply among the working-age population (when not provided mainly by retirees) and generate broader social costs through reduced participation and low caregiver incomes, including reliance on allowances, pensions and other transfers. Work–care reconciliation remains difficult, and the institutional context includes recognition of caregiving in pension entitlements and care allowances; with increasing life expectancy, these issues are likely to grow in importance (*Geissler,* 2016).

Dependency concerns not only older persons but also individuals of working and pre-working age (*Ministry of Labour and Social Affairs of the Czech Republic,* 2025; *Czech Statistical Office,* 2025a). Publicly available Czech sources include the Statistical Yearbook of Labour and Social Affairs (*Ministry of Labour and Social Affairs of the Czech Republic,* 2025), the Structure of Care Allowance Recipients (*Czech Statistical Office,* 2025a) and Selected Data on Social Security (*Czech Statistical Office,* 2022). In international comparison, *Wija* (2012) reports that LTC recipients in the Czech Republic account for about 2.8% of the population (2.4% home-based, 0.4% institutional), and that roughly 70% of LTC recipients across comparable countries are supported at home, with the Czech Republic exceeding 80%.

The Ageing Report: Economic & Budgetary Projections for the EU Member States, 2022–2070 (*European Commission,* 2024) highlights increasing life expectancy at birth and at age 65 and emphasises that these trends will have substantial implications for LTC through growth in the number of older persons requiring assistance. Based on our own analysis of publicly available data (*Ministry of Labour and Social Affairs of the Czech Republic,* 2025 and Czech Statistical Office, 2025b), the share of persons dependent on care relative to the total population remained relatively stable between 2014 and 2023, despite increasing absolute numbers. Dependent persons can be grouped by care setting into formal (institutional) and informal (home/household) care. Formal care comprises residential social service facilities, while informal care is predominantly provided in private households by family or other non-professional caregivers. Using *Czech Statistical Office data* (2023) and our calculations, the share of dependent persons in formal residential facilities ranged from 18.3% (2020) to 19.9% (2022) during 2014–2023; these figures exclude persons hospitalised in LTC beds.

A comparison of 2014 with the current situation in 2024 (the most recent available period) reveals a stable yet strongly age and sexdifferentiated structure in the proportion of persons dependent on care. In the 0–17 age group, the proportion of caredependent individuals in 2014 amounted to 1.80% among men and 1.17% among women. In the current period, this share increased to approximately 2.05% among men, while reaching 1.19% among women. In the workingage population aged 18–64 years, the proportion among men rose from 1.28% in 2014 to approximately 1.40% in 2024, whereas among women it remains virtually stable (about 1.05% in 2014 compared with approximately 1.09% in the current period). In the younger oldage group aged 65–74 years, the proportion of caredependent persons in 2014 reached 4.29% among men and 4.20% among women; by 2024, it increased to approximately 4.64% among men, while slightly declining to 4.12% among women. From the age of 75 onwards, the sexspecific pattern reverses markedly: in the 75–84 age group, the proportion among men decreased from 11.24% in 2014 to 10.57% in 2024, while among women it declined from 18.98% to 15.13%. In the 85–94 age group, the proportion in 2014 amounted to 32.79% among men and 54.19% among women, decreasing by 2024 to approximately

30.30% among men and 49.13% among women. In the oldest age cohort aged 95 years and over, care dependency already reached extreme levels in 2014 (60.82% among men and 84.05% among women) and remained very high in 2024, at approximately 65.97% among men and 82.22% among women. A comparative analysis of 2014 and 2024 thus confirms that women consistently constitute the majority of caredependent persons in older age groups, reflecting their higher life expectancy and the cumulative burden of healthrelated and functional limitations at very advanced ages.

It can therefore be expected that population ageing reinforced by increasing life expectancy will raise the absolute number of dependent persons. International evidence is consistent: *Spitzer – Shaikh* (2022) discuss mechanisms linking behaviour and health misperceptions to later diagnosis and subsequent care needs; *Kallestrup-Lamb et al.* (2024) identify LTC as particularly expenditure-sensitive under rapid ageing; *Wittenberg et al.* (2018) project substantial growth in demand driven by age structure and prevalence profiles. The *European Commission* (2024) likewise concludes that growth of the 80+ population will be a principal determinant of future LTC needs, underscoring the need for reliable projections in the Czech context.

In summary, increasing life expectancy is a key determinant of care dependency, and the ageing of large cohorts implies a progressive rise in the number of persons requiring care at older ages. This process may be intensified if health status deteriorates, increasing both the intensity and scope of care needs.

DATA SOURCES AND METHODOLOGICAL APPROACH

This article draws on an analysis of publicly available administrative data on individuals dependent on LTC, aggregated for the Czech Republic. We link these data by age group, level of care dependency, and sex to demographic statistics published by the *Czech Statistical Office* (2024). We use demographic data (population stocks as of 31 December of the given year and population projections) and data on persons dependent on care (*Czech Statistical Office,* 2025a), likewise measured as of 31 December of the given year and disaggregated (in the publicly available form) into the following age groups: 0–17, 18–64, 65–74, 75–84, 85–94 and 95+ years.

We aggregate LTC allowance recipients by sex, age group, and level of dependency (Levels I–IV) for the period 2014–2024 at the regional level (regions and municipalities) and link them to the population projection released by the Czech Statistical Office in December 2024, categorised into the corresponding age groups.

Methodological limitations of the data

Our conclusions are subject to several limitations. First, the analysis relies on a specific reference date: in both data sources, observations refer to 31 December of the given year. This 'stock' approach does not capture seasonal fluctuations or within-year dynamics; however, it is consistent with the Czech Statistical Office population stocks and enables an unambiguous linkage between the two data sources.

Second, the administration of the LTC allowance agenda was technically unstable in 2012–2013, when repeated data migrations took place from the OK NOUZE information system to the new AIS system. These transitions may have resulted in inaccuracies, incompleteness, or duplicates. For this reason, we restrict the analysis to the period from 2014 onwards, when the Ministry of Labour and Social Affairs data are stably available and methodologically consistent.

Third, revisions in assigned dependency levels may affect year-to-year comparability. For example, an individual may be granted a given dependency level in December of a given year (e.g., Level II), and a backdated change may be made in January of the following year (e.g., to Level III). In such a case, the individual is recorded as Level II in the December report for the first year and appears as Level III in the December report for the subsequent year, assuming no further change or death occurs during the year. The same principle applies in the opposite direction when a higher dependency level recorded in December is subsequently reduced retroactively. Changes that occur in months other than December do not affect counts reported as of 31 December. Crucially, each care-dependent individual is counted only once in a given year.

We further note that the published Ministry of Labour and Social Affairs data include all individuals entitled to the LTC allowance in the given month, regardless of whether care is provided in home settings or in institutional facilities. The public data, therefore, capture the total number of care-dependent persons (across formal and informal care), but they are not explicitly disaggregated into these two groups.

Within the projection horizon, we acknowledge substantial uncertainty, especially beyond 2040. Long-term projections are inherently sensitive to assumptions about demographic developments and the institutional framework (benefit levels and eligibility rules, population health, and related factors). Similar to studies assessing the fiscal consequences of ageing in the EU (*Kluge et al.,* 2019), our results depend strongly on the demographic projection, which we treat as an exogenous input: we do not explicitly propagate the uncertainty of the population projection, but we discuss it in interpreting the results. In later parts of the projection, the model also operates with relatively small population groups (e.g., the oldest age groups), for which historical information is limited. This may increase the variability of estimates in these segments and calls for caution in interpretation. It is also one of the reasons why we divide the long-term projection into two periods.

Policy changes

The care allowance was repeatedly increased in nominal terms over the period 2014–2024. The development of the allowance's nominal and real value is analysed in detail by Vopátek (2025). It documents a long-term and substantial decline in the real value of the benefit. The most pronounced drop was identified among persons aged 18+ in dependency level I over the broader period 2007–2024, driven in particular by the reduction effective 1 January 2011 from CZK 2,000 to CZK 800 per month. Our analysed period (2014–2024) lies after this episode and focuses on care-dependent persons as captured in publicly available administrative data. Nominal increases of the care allowance also occurred during 2014–2024. At the same time, the benefit levels in dependency levels III and IV were differentiated during the period by the form of care provision (informal care and institutional care), and the corresponding rate changes were not monotonic.

Methodological note: In principle, differentiating the care allowance by the form of care provision could affect the composition of allowance recipients. However, the available administrative data do not allow recipients to be disaggregated by care setting, and this mechanism therefore cannot be analysed directly. We thus work with the aggregate total number of care allowance recipients without distinguishing the setting in which care is provided. Time-series patterns in recipient counts by dependency level, age, and sex do not indicate pronounced discontinuities or structural breaks in 2014–2024 that could be unambiguously attributed to changes in benefit levels or to differentiation by care setting. Trends (especially in grades III and IV) are smooth and consistent with the long-run demographic dynamics of population ageing. Given the data limitations, we cannot demonstrate that differentiation of benefit levels by care setting had a substantial impact on the distribution of recipients across dependency levels during the study period.

Comparison with existing projection approaches in the Czech Republic: the Průša (2018) model

In his second projection, *Průša* (2018) employs two approaches, static and dynamic, based on data from 2010–2016. The static (stationary) model holds the shares of LTC allowance recipients in each age and other category at the level observed in 2016. The dynamic model reflects the empirically observed trend over 2010–2016 insofar as it uses the average annual difference from that period for projection. Under these models, the number of LTC allowance recipients is expected to increase from 348,761 persons in 2016 to 469,115 (static) and 489,142 persons in 2030 (dynamic). The largest projected increase concerns dependency levels III and IV, and already in 2018, the author warned that service capacities would be insufficient by 2030.

A comparison with observed data for 2020 shows a natural and methodologically expected deviation: *Průša* (2018) projected 368,609 (static) and 377,334 (dynamic) persons, whereas the observed number was 359,518. The difference illustrates that projection uncertainty increases with horizon length and that projections are sensitive to policy changes and

changes in population health status, which the author explicitly notes.
Our approach differs from *Průša* (2018) in both the coverage of input data (we use the longer series 2014–2024) and the modelling framework. Rather than relying on scenario-based models built on aggregated shares, we apply a multinomial mixed-effects model that models the population distribution across dependency levels as a function of age, sex, and time. The longer time series (including the period after 2016) improves the stability of trend estimation, particularly for the early years of the projection horizon.

Comparison with existing projection approaches in the Czech Republic: the National Health Information Portal (2025) model

A second relevant benchmark is the model published on the National Health Information Portal (NZIP) (2025) within the project Data support for projecting needs for social and socio-health services. NZIP uses a different indicator definition: it counts persons who received the LTC allowance for at least one month in a given year and, when classifying by dependency level, records only the highest level attained by each person during that year. Under this definition, NZIP reports 425,778 persons for 2024, whereas the Ministry of Labour and Social Affairs records 374,127 persons in levels I–IV as of 31 December 2024. The approximately 13.8% difference, therefore, primarily stems from the differing definition of the outcome (annual incidence versus a stock measured as of 31 December).
NZIP fixes age-specific prevalence at the 2024 level and assumes it remains unchanged in the future. Values are then carried forward analogously to the static model in *Průša* (2018) by re-weighting according to the projected demographic structure. This static approach does not allow endogenous trend changes in the prevalence of dependency levels to be captured (e.g., effects of improving health status or, conversely, increasing multimorbidity). Consequently, the model does not exploit the full potential of available data and does not incorporate historical trends.
By contrast, our projection model estimates time trends in the prevalence of individual dependency levels using the full 2014–2024 series and extrapolates these trends into the future. In this respect, our approach is closer to international studies that combine demographic projections with statistical models of prevalence or care use (e.g., *Comas-Herrera et al.,* 2006 for LTC in Germany, Spain, Italy, and the United Kingdom; *Hu et al.,* 2025 for microsimulation models of LTC).

CONSTRUCTION OF THE PROJECTION MODEL

Data inputs and model cells

The projection model combines administrative data on LTC allowance recipients from the Ministry of Labour and Social Affairs available from *Czech Statistical Office* (2025a) with demographic data from the *Czech Statistical Office* (2024; 2025b), including the population projection by sex and age. The basic modelling unit ('cell') is defined by the combination of calendar year, sex, age group, and dependency level. For 2014–2024, we observe realised numbers of LTC allowance recipients (by dependency level) and the corresponding population stocks as of 31 December. For projections to 2080, we use the Czech Statistical Office population projection as an exogenous input. In this framework, demography determines the size of each year–sex–age group, while the statistical model determines the distribution of individuals across dependency levels (*cf. Kluge et al.,* 2019).
We aggregate counts of care-dependent persons by year–sex–age–dependency-level cells and, in parallel, aggregate population counts into year–sex–age cells. For each year–sex–age group, we then compute a 'no care' category as the difference between the total population and the sum of persons in dependency levels I–IV (with a non-negativity check and truncation at zero to prevent negative values). As a result, for each year–sex–age group, we obtain a five-category vector (no care, levels I–IV) whose sum equals the total population of that demographic group.

Mixed-effects multinomial model

For each future year and each age × sex group in the Czech Statistical Office population projection, we first compute predicted category probabilities from the multinomial model. We then obtain projected counts by multiplying these probabilities by the projected population size of the corresponding year and age × sex group. Because all categories are modelled jointly within a multinomial framework, predicted shares are bounded between 0 and 1 and sum to one in each cell, and projected counts therefore sum exactly to the projected population.

To model the five categories simultaneously (no care and dependency levels I–IV), we use a mixed-effects multinomial logistic model. Mixed-effects multinomial models are commonly used for multi-category outcomes in clustered and longitudinal settings (*Hartzel et al.,* 2001; *Hedeker,* 2003). Related approaches have also been applied to study older individuals' behaviour and health-related service use (*Spitzer – Shaikh,* 2022). For each demographic cell i (a combination of year, age group, and sex) and each care category $k \in \{$'I', 'II', 'III', 'IV', 0$\}$ (where '0' denotes the category with no provided care), we consider the random count vector $Y_i = (Y_{i,\mathrm{I}}, Y_{i,\mathrm{II}}, Y_{i,\mathrm{III}}, Y_{i,\mathrm{IV}}, Y_{i,0})$, which we model as multinomial with size N_i (the total population in the group) and probabilities $\pi_{i,\mathrm{I}}, \ldots, \pi_{i,0}$):

$$Y_i \sim \mathrm{Multinom}(N_i, \pi_i), \quad \sum_k \pi_{i,k} = 1, \quad \pi_{i,k} \in (0,1),$$

We select category 'I' as the reference category. For the remaining categories, we model log-odds ratios relative to this reference using a linear mixed model:

$$\log \frac{\pi_{i,k}}{\pi_{i,I}} = \beta_{0,k} + \beta_{1,k}\mathrm{year}_i + \gamma_k(\mathrm{group}_i) + b_{0,\mathrm{group}_i,k} + b_{1,\mathrm{group}_i,k}\mathrm{year}_i,$$

where year_i is the standardised year, $\gamma_k(\mathrm{group}_i)$ captures fixed differences across age–sex groups, and $b_{0,.,k}$ and $b_{1,.,k}$ are random intercepts and random time slopes for each age × sex combination ('group'). The dependent variable is the categorical care status with five mutually exclusive outcomes in each year–age–sex cell: no care allowance and dependency grades I–IV. Fixed effects thus include a linear time trend (standardised year) and a categorical factor for groups of age × sex combination. To allow for heterogeneity in baseline levels and trends across demographic groups, we include random intercepts and random time slopes for standardized years by groups of age × sex combination. Reference categories are care dependency level I and male × 0–17 years.

We estimate the model using the *mblogit()* function from the mclogit package, which implements multinomial logit models with random effects (*Elff,* 2025). Random effects are estimated via penalised quasi-likelihood (PQL) based on a Laplace approximation to the marginal likelihood, a common approximation in generalised linear mixed models (*Breslow – Clayton,* 1993).

A key feature of this approach is that we model the entire distribution of care categories in a single multinomial mixed effects regression rather than estimating each category separately. This ensures that the projected counts in dependency levels I–IV and in the 'no care' category sum exactly to the projected population in each demographic cell, and that no category can exceed 100% of the population. This is a major advantage over alternative approaches (e.g., Poisson generalized linear mixed models with a offset), where separately modelled categories may yield projected incidences whose sum exceeds the population size.

Beyond generalised regression approaches, one can consider microsimulation and Markov models of LTC (e.g., *Hu et al.,* 2020; *Vanella et al.,* 2022), which explicitly simulate transitions between dependency states using individual longitudinal data. However, these approaches require data sources that are not available in the Czech context when relying on aggregated administrative data from the Ministry of Labour and Social Affairs of the Czech Republic and the Czech Statistical Office. We therefore opt for a statistically robust and less data-sensitive mixed-effects multinomial model.

Projecting care needs by dependency level

The model is estimated on the 2014–2024 period, for which stable administrative time series from the Ministry of Labour and Social Affairs of the Czech Republic are available (*Czech Statistical Office,* 2025a). For each future year and demographic group (age–sex) from the *Czech Statistical Office* (2024) population projection, we compute the standardised year relative to the training period; the model then yields predicted probabilities for the 'no care' category and for dependency levels I–IV.

Projected counts in each dependency level are obtained by scaling with the projected group population:

$$\hat{Y}_{i,k} = \hat{\pi}_{i,k} \cdot N_i,$$

where N_i is the projected number of persons in the relevant year–age–sex group from the demographic data. This guarantees full consistency between the population projection and the projected number of persons in each dependency category.

RATIONALE FOR THE MODELLING CHOICE AND METHODOLOGICAL LIMITATIONS

The chosen mixed-effects multinomial model, implemented in R (*R Core Team,* 2025) using the mclogit package (*Elff,* 2025), offers several key advantages:

- *Consistency with demographic constraints:* Category shares in each cell always sum to the projected population and remain within (0,1).
- *Heterogeneity:* Random intercepts and time slopes by age–sex group allow partial pooling across groups while capturing group-specific trajectories, consistent with approaches used in international studies in the economics of ageing (*Kluge et al.,* 2019; *Spitzer – Shaikh,* 2022).
- *Replicability and transparency:* The model is implemented in open-source software with relatively simple syntax and can be replicated and extended using publicly available data.

At the same time, we acknowledge the following methodological limitations:

- PQL approximation: Penalised quasi-likelihood with a Laplace approximation may underestimate random-effects variances and the absolute magnitude of fixed effects for rare categories (*Breslow – Clayton,* 1993). In our case, we model relatively large age–sex groups at the national level, which reduces the risk of substantial bias. Nevertheless, we interpret results for extreme projection years with caution.
- *Linear time trend:* The model assumes linear changes in log-odds ratios over time (in standardised-year units). While this assumption is plausible for 2014–2024, it may idealise dynamics in the extended projection period (after 2040). For this reason, we distinguish between a baseline and an extended projection period in interpreting the results.
- *No explicit mortality or transition model:* We work with repeated cross-sections by age and sex rather than individual trajectories. Transitions between dependency levels and within-year mortality are therefore captured only implicitly through the historical data.
- *Exogenous demography and institutional stability:* The model assumes relative stability of the institutional framework governing the LTC allowance and treats the Czech Statistical Office population projection as given. Major policy reforms, changes in population health, or organisational shifts in LTC may lead to deviations between projected and realised outcomes, especially after 2040.

Despite these limitations, we consider the mixed-effects multinomial model a suitable tool for analysing and projecting the number of care-dependent persons in the Czech Republic using publicly available administrative and demographic data. It enables a detailed decomposition of future care dependency by age, sex, and dependency level while fully respecting the demographic structure of the population, thereby providing a quantitative basis for debates in social gerontology on the organisation of support, the division of care between families and services, and the planning of LTC.

Assumptions of the projection model

The projections presented in this paper are constructed under a ceteris paribus principle, assuming that other key determinants remain relatively stable over time. Similar to international projections of population ageing and LTC (*European Commission,* 2024; *Wittenberg et al.,* 2018), our approach implicitly assumes that the institutional framework does not change fundamentally over the projection horizon and that the demographic projection is an appropriate exogenous input. The core assumptions can be summarised as follows:

a) No legislative changes occur that would affect the eligibility for granting of, or withdrawal of, the LTC allowance.
b) The definition of care dependency and the assessment system for awarding the LTC allowance remain unchanged.
c) The financing arrangement of the LTC allowance system remains unchanged.
d) No major or extreme (rather, largely random) shocks occur to the population age structure.
e) Trends observed in the reference period remain valid, and demographic changes are broadly predictable.
f) The model incorporates the demographic trend of population ageing, reflected in rising numbers of

persons in selected age cohorts, in particular due to the gradual shift of large birth cohorts into older ages.

g) No major changes occur in the uptake and deployment of modern technologies (e.g., AI, robotics) that could reduce care needs among care-dependent persons.

These assumptions are central to projection robustness. Substantial violations may lead to deviations from projected values in either direction. Stability in the legislative framework and the definition of dependency are essential for the consistency of the input data. Demographic assumptions determine the baseline population structure, and technological change may, in the longer run, alter the relationship between age and dependency on assistance.

At the same time, the model (a) does not provide a deterministic 'forecast' of the future, (b) does not attempt to predict future policies or patterns of care provision, and (c) produces projections conditional on explicit assumptions about demographic trends and observed trends in the prevalence of care dependency.

DESCRIPTIVE ANALYSIS OF THE INPUT DATA

The descriptive characteristics of the input data provide a bridge between the methodological framework and the projection model. Their purpose is to make transparent the main empirical patterns that the model subsequently quantifies. In line with international work emphasising the need to link demographic trends to the prevalence of functional limitations and LTC (*Chen et al.,* 2016; *Kallestrup-Lamb et al.,* 2024), we summarise below the key findings from the 2014–2024 data.

Trends in the number of care-dependent persons (2014–2024)

According to official data from the Ministry of Labour and Social Affairs of the Czech Republic, the total number of persons dependent on care increased steadily over 2014–2024.

The distribution by dependency level indicates that the largest numbers of recipients draw the allowance in levels II and I, while the fastest growth is observed in levels IV and III, among those requiring the highest intensity of care. Higher dependency levels typically require more intensive and more costly forms of support. Recent international evidence also suggests that LTC systems can be sensitive to structural demand pressures and broader economic conditions, with implications for costs and the mix of care arrangements (*Geyer et al.,* 2025).

In 2024, within the 18–64 age group, 46,869 men were recorded compared with 35,202 women. The higher male occurrence may reflect differences in occupational exposures, risk-taking behaviour, and a higher incidence of injuries and disability. Among working-age adults, men are more often represented in the higher dependency levels (III and IV), suggesting a higher prevalence of severe limitations.

Whereas among older adults the key issue is high prevalence at very advanced ages, for younger cohorts, it is also necessary to consider the availability of rehabilitation, special education, and support services, as well as the need for gender-sensitive social policy.

Demographic trends in 2014–2024 and the projection to 2080

The 2024 Czech Statistical Office population projection constitutes the main exogenous input to our model. As in international projection studies (*European Commission,* 2024; *Hu et al.,* 2025), we assume that demography is the primary driver of the future number of persons experiencing loss of self-sufficiency. In the Czech Republic, this is particularly related to the gradual ageing of the large birth cohorts of the 1970s, which will enter age groups with the highest prevalence of care dependency in the coming decades.

Combining care-dependency data for 2014–2024 with the demographic projection through 2080 provides the core reference framework for the mixed-effects multinomial model. This enables the model to trace how future changes in population structure by age and sex translate into the prevalence of individual dependency levels.

PRESENTATION OF MODEL PARAMETERS

The full parameterisation of the mixed-effects multinomial model comprises several dozen coefficients. We provide in text only a concise summary for interpretation. Model coefficients are presented in Appendix in Tables A.7 and A.8. The fixed effects show the expected pattern: the relative odds of higher dependency levels increase markedly with age. The time component is positive in all equations, indicating a modest strengthening over time of the relative odds of higher dependency levels compared with level I. Consistent with international evidence (*Kallestrup-Lamb et al.*, 2024), the model indicates strong age gradients in LTC needs, with a pronounced concentration of higher dependency levels at advanced ages. *Wittenberg et al.* (2018) further show that demand for care among individuals with more severe limitations is expected to grow faster than among those with milder levels of dependency, which aligns with the projections produced by our model. More specifically:

- *Strong age gradient of dependency:* for example, the coefficient for the 95+ age group (women) reaches 1.67 relative to the reference age group 0–17 in the equation for level III versus level I, corresponding to an odds ratio of approximately 5.3; for men, the corresponding coefficient is 1.25 (odds ratio ≈ 3.5).
- *Positive time trend:* for higher dependency levels (e.g., 0.126 for level III versus level I), indicating a gradual strengthening of the relative prevalence of more severe dependency over time.
- *Pronounced sex differences:* in younger age groups (0–17 and 18–64), women exhibit lower probabilities across dependency levels, whereas at advanced ages, the coefficients for women aged 95+ are systematically higher than those for men.

Both random intercepts and random time slopes indicate substantial heterogeneity across age–sex groups. Given the breadth of the parameter structure, we focus on the most important differences and trends and proceed to the projected values for individual categories, including the graphical presentation for advanced age groups (see Figure 1).

PRESENTATION OF THE MODEL'S PROJECTION OUTPUTS

The projections are presented in two temporal blocks reflecting different degrees of predictive reliability and the availability of empirical data. Tabular summaries include observed values for 2014 (the first year of the series) and 2024 (the last year for which stable administrative data are available). The model is estimated on the full 2014–2024 series and combined with the Czech Statistical Office (2024) population projection through 2080. Outputs are therefore organised into two blocks:

1. *Baseline projection period 2025–2040*
   This interval is treated as methodologically more reliable, as it closely follows empirical patterns observed over 2014–2024 and does not extend beyond roughly one generation (see Appendix, Tables A.1, A.2, and A.3).
2. *Extended projection period 2041–2080*
   Estimates beyond 2040 are presented as an informative, no-surprises outlook only and are interpreted with considerable caution. They substantially exceed the observed time series and are more sensitive to structural population changes and potential institutional reforms; accordingly, they provide an illustrative, scenario-consistent trajectory rather than a forecast (see Appendix, Tables A.4, A.5, and A.6).

The tables are organised horizontally by calendar year and vertically by dependency level (I–IV), six age groups, and sex, and they also report aggregate totals. The 'no care' category represents the residual share required to sum to 100% and is contained in tables only implicitly. For each group, we report:

- *Relative prevalence of dependency (share of the respective age cohort).*
- *Corresponding absolute numbers.*

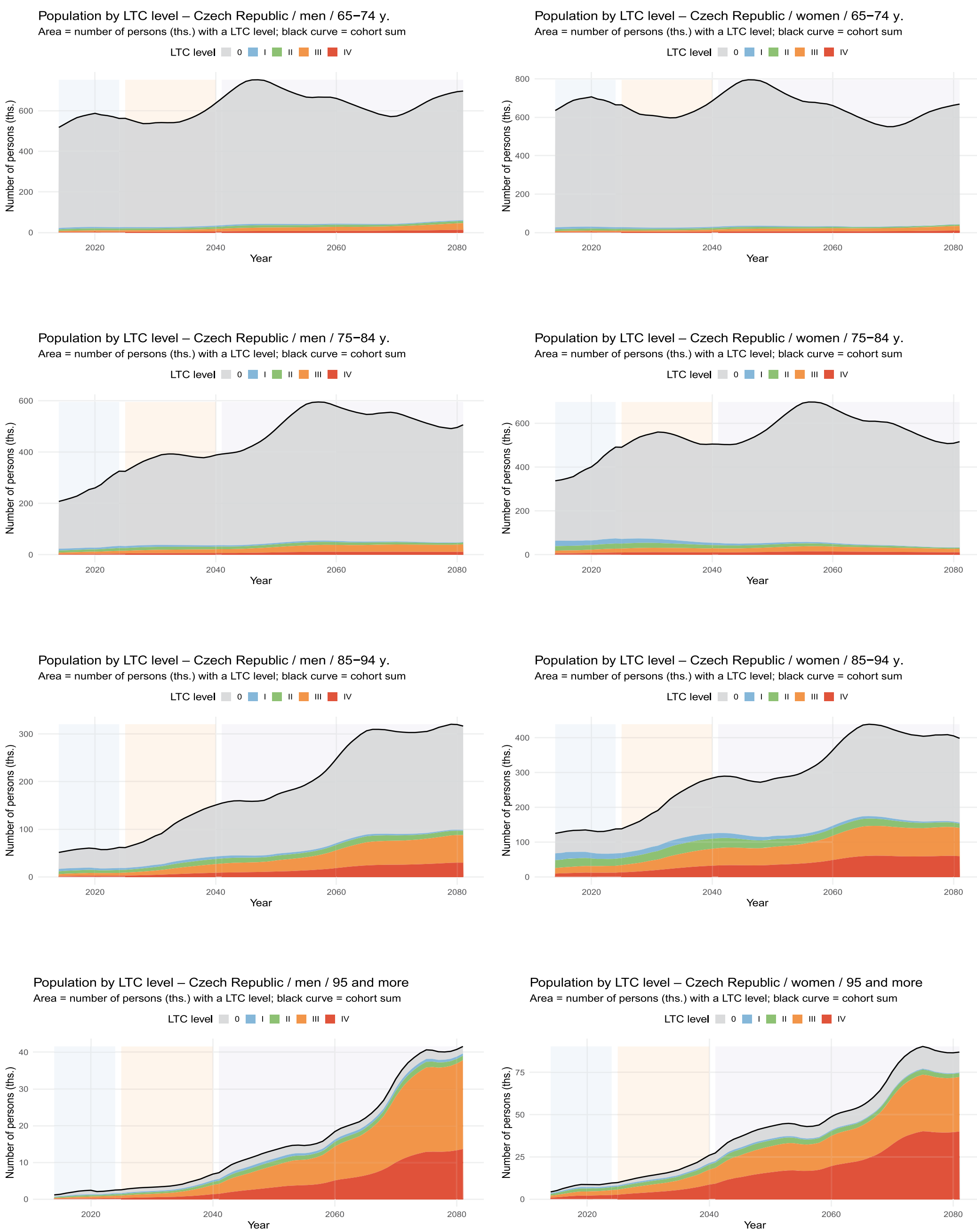
Internally consistent totals across all categories, whose sum equals the projected population in the respective cell (a property guaranteed by the construction of the multinomial model).

Men

Projections for the Czech Republic indicate a steady increase in the prevalence of care dependency among men across age groups, driven primarily by demographic ageing and cohort size. Over 2026–2040, the overall share of men dependent on care rises from 2.87% to 3.69%. The highest values are observed in the oldest age groups:

- 95+ years: an increase from 65.00% to 75.71%.
- 85–94 years: a slight decline in relative terms from 30.19% to 28.38%, alongside a substantial increase in absolute numbers.

Figure 1 **Trends in the number of LTC–dependent persons by dependency level, age group, and sex**



Note: Trends in the number of LTC–dependent persons by dependency level (different colours), age group (top to bottom), and sex (men on the left, women on the right). Background shading divides the timeline into three periods: observed data (2014–2024), the baseline projection period (2025–2040), and the extended projection period (2041–2080).

Source: Czech Statistical Office (2025a) for 2014–2024; authors' calculations for 2025–2080 (multinomial mixed-effects model output).

In the extended projection to 2080, these patterns intensify: the overall share of men dependent on care reaches 7.32%, while the 95+ group exceeds 95%, implying near-universal dependency at the very highest ages under the model assumptions. Trends for ages 65+ are shown in Figure 1; full results are reported in the Appendix (Tables A.1 and A.4).

Women

Among women, projections show the same overall direction, with particularly pronounced increases at the highest ages, consistent with higher life expectancy and the concentration of women in very old age. Over 2026–2040, the overall share of women dependent on care increases from 4.13% to 5.16%, with two notable features:

- 95+ years: persistently very high values (82% and above).
- A marked increase in prevalence above age 80 across all degrees of dependency.

By 2080, the extended projection indicates a further rise in the overall share of women dependent on care to 7.29%, while the 95+ group exceeds 86%. Trends for ages 65+ are shown in Figure 1; full results are reported in the Appendix (Tables A.2 and A.5).

Men and women combined

When both sexes are aggregated, projections again indicate rising care dependency across age groups. During 2026–2040, the total share of persons dependent on care increases from 3.51% to 4.43%, with the 95+ group reaching 78.79% to 81.00%.

In the extended projection to 2080, the overall share reaches 7.30%, while the 95+ group attains values of 88% and above. Full results are reported in the Appendix (Tables A.3 and A.6).

COMPARISON OF RESULTS WITH PREDICTIONS OF NZIP AND PRŮŠA MODELS

Tables 1 and 2 summarise selected predictions of the number of care allowance recipients from different sources varying in their methodological approach, input data, and interpretative framework. *Průša* (2018) uses a projection approach based either on the recipient structure observed in 2016 or on an extrapolation of trends observed over 2011–2016. By contrast, the *NZIP* (2025) figures represent an administrative prediction based on observed recipient data, where a ‘recipient’ is defined as any person who received the allowance for at least one month in a given year; when stratifying by dependency level, NZIP assigns each person the highest grade attained during the year. The results from both sources are compared with outputs of a multinomial mixed-effects model presented in this paper. This approach differs from the above sources both in the unit of observation and in how it captures changes in the distribution across dependency levels over time.

For these reasons, the reported projected values should not be interpreted as directly comparable across sources. Differences between estimates reflect not only different baseline data and time horizons, but above all distinct methodological and interpretative approaches to modelling the future number of care allowance recipients. Accordingly, the table is not intended to test agreement between estimates, but to illustrate that alternative analytical approaches and slightly different data sources from varying periods can yield materially different estimate of the future scale of demand for long-term care benefits. Further details are provided in the respective sources.

Let us denote, that the NZIP (2025) source does not report figures for 2025. For comparison, only the year 2030 is used. The figures are not fully comparable, as NZIP counts persons who received the care allowance for at least one month during the year and assigns each person the highest dependency grade attained in that year. Age breakdowns are not available. Total sums differ by one person.

DISCUSSION AND IMPLICATIONS FOR SOCIAL POLICY AND PUBLIC FINANCES

From a social gerontological perspective, the projected increase in LTC dependency reflects not only population ageing, but also the cumulative effects of socio-economic and health trajectories over the life span. Elevated care needs at older ages are shaped by accumulated disadvantage, cohort-specific exposures, and unequal access to resources across earlier stages of life. Educational attainment, employment histories, family trajectories, and health shocks interact over

Table 1 **Absolute number of care allowance recipients by age group**

Age group	Průša (2018)				NZIP (2025)	Mixed-effects mult. model (authors)	
	Projected number of care allowance recipients based on the 2016 status quo		Projected number of care allowance recipients based on trends observed in 2011–2016		Predicted number of care allowance recipients	Predicted number of care allowance recipients	
	2025	2030	2025	2030	2030	2025	2030
0–17	28,498	25,714	36,673	37,191	–	33,508	31,184
18–64	75,105	74,778	91,525	100,189	–	84,014	86,439
65–74	55,446	51,818	59,661	58,207	–	54,547	52,062
75–84	129,254	155,245	121,371	141,646	–	105,498	110,751
85+	123,281	161,561	118,831	151,909	–	96,895	125,303
Total	**411,584**	**469,116**	**428,061**	**489,142**	**493,990**	**374,462**	**405,739**

Sources: Průša (2018; Table 3, p. 56; for comparison, figures are available only for 2025 and 2030); NZIP (2025) and authors' calculations based on model output.

Table 2 **Absolute number of care allowance recipients by dependency level**

Dependency level	Průša (2018)				NZIP (2025)	Mixed-effects mult. model (authors)	
	Projected number of care allowance recipients based on the 2016 status quo		Projected number of care allowance recipients based on trends observed in 2011–2016		Predicted number of care allowance recipients	Predicted number of care allowance recipients	
	2025	2030	2025	2030	2030	2025	2030
Level I	127,827	144,937	105,300	98,675	123,478	96,136	91,035
Level II	134,322	153,510	143,949	167,705	147,395	114,726	118,417
Level III	94,814	108,563	116,800	147,236	136,309	102,576	122,402
Level IV	54,622	62,105	62,012	75,527	86,809	61,024	73,885
Total	**411,585**	**469,115**	**428,061**	**489,143**	**493,991**	**374,462**	**405,739**

Sources: Průša (2018; Table 3, p. 56; for comparison, figures are available only for 2025 and 2030); NZIP (2025) and authors' calculations based on model output.

time and influence both the timing and severity of care dependency in later life.

In this sense, the strong age gradient identified by the model can be read as more than a purely biological effect of ageing: it is consistent with long-term processes that sort individuals into different pathways of health and support. Life-course research highlights how discontinuous employment histories, prolonged caregiving responsibilities, and adverse health events during midlife increase the risk of functional limitations and care dependency in later life. The role of social networks and relationships is also crucial; observed age gradients in care dependency likely reflect cumulative exposure to health shocks and unequal access to social support (*Weiss et al.*, 2022). Gendered life trajectories may further amplify these patterns, as women are more likely to combine paid work with unpaid caregiving across the life course, and women are also concentrated at very advanced ages.

The Czech Republic illustrates how such processes operate within an institutional context characterised by strong reliance on informal care and relatively late transitions into formal LTC. This has direct relevance for debates about the organisation of support and the future balance between families and services. The future care trajectories depend not only on demand but also on the availability of unpaid care, which may not keep pace with rising needs (*Pickard,* 2015), and inequalities in LTC use and unmet need remain central to understanding who benefits from existing arrangements (*Hu et al.,* 2025). As large cohorts born in the 1970s move into older age, these institutional and social dynamics are likely to become more important, beyond what can be inferred from agestructure alone.

From a macro-structural perspective, the model:

- Indicates a positive time trend in the relative odds of higher dependency levels compared with level I.
- However, this trend is modest relative to the pronounced shifts implied by changes in the population age structure. Consequently, demographic development remains the primary driver of growth in the absolute number of care-dependent persons.
- This pattern is consistent with the international work suggesting that LTC demand is strongly shaped by demographic structure and is less tightly linked to short-run fluctuations in health status or economic conditions (*Wittenberg et al.,* 2018; *Kallestrup-Lamb et al.,* 2024; *European Commission,* 2024). In addition, the wider international evidence base emphasises that projections are conditional on assumptions about future institutional arrangements and care-mix dynamics (*Comas-Herrera et al.,* 2006).

The identified trends indicate that the Czech Republic is likely to face substantial and sustained pressures on LTC, with increasing demands on institutional capacity as well as on both informal and formal care provision. Beyond growth in the number of care-dependent individuals, the projections point to a changing profile of care needs, with an increasing concentration in the oldest age groups. These developments are closely linked to the rising share of the population aged 65 and over and increasing life expectancy, with women's longer survival than men and persistently low fertility shaping the age–sex composition of later life. From a policy perspective, LTC services will therefore need to respond to the higher representation of women among clients, particularly in institutional care, given that older women are more likely to live alone. In some years, the model also signals a decline in the relative share of care-dependent persons, which may reflect improvements in health status on the one hand and postponement of dependency to higher ages on the other.

Based on the model results, we identify four key implications:

1. F*inancial pressure:* A substantial increase in public expenditure on LTC can be expected. This underscores the need for a long-term indexation strategy for the care allowance and for linking benefit levels to the actual costs of care provision, including the costs associated with expanding social services (both residential and community-based). Financial protection against LTC costs remains a priority, as board and lodging in institutions can be several times higher than the cost of nursing care alone (*Colombo et al.,* 2011).
2. *Capacity pressure:* Rapid growth in the number of individuals aged 85+ and 95+ will require a significant expansion of care capacity, including pronounced development of home-based services, as existing institutional care capacities will be insufficient.
3. *Labour market:* Demand for care workers is likely to grow faster than the number of economically active individuals, which is expected to decline. Staffing availability is therefore likely to become a binding constraint.
4. *Active ageing policy:* Prevention of functional decline, education and training, assistive technologies, support for community-based services, and the digitalisation of care represent key factors that may help mitigate pressure on the system, as discussed in part by *Spitzer – Shaikh* (2022) and *Geyer et al.* (2025).

From a comparative European perspective, the Czech Republic represents a typical Central European ageing trajectory, making the results relevant beyond the national context. Without adequate policy responses, there is a risk that care needs will outstrip effective access to support, particularly because the number of individuals with care needs may exceed the number of recipients of the care allowance (as not all persons in need of care apply for, or receive, the benefit).

POSSIBLE DIRECTIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

The transparency and interpretability of the projection results could be strengthened by incorporating a formal scenario analysis. This would allow a systematic assessment of how projected numbers of individuals dependent on LTC respond to violations of individual model assumptions. In LTC, where projections often extend decades into the future, assessing robustness to changes in key parameters is particularly important (*Wittenberg et al.,* 2018; *European Commission,* 2024). Relevant areas include:

- *Legislative scenarios:* Changes in the definition of dependency, assessment procedures, or eligibility criteria.
- *Demographic variants:* Alternative rates of population ageing, including mortality and migration variants based on scenarios produced by the Czech Statistical Office.
- *Technological innovations:* Wider adoption of assistive technologies, telecare, robotic care, or digitalisation that may reduce the intensity of personal care needs.
- *Financial and institutional scenarios:* Alternative financing arrangements, changes in the availability of formal services, shifts in family caregiving behaviour, and adjustments in benefit levels across dependency levels (or, conversely, inadequate indexation).

The outcome should be an explicit characterisation of uncertainty and identification of parameters with the greatest influence on projections. Such sensitivity and scenario work is a standard component of LTC projection studies and supports strategic decision-making (*Wittenberg et al.*, 2018). At the same time, technological and policy uncertainty implies that distant-horizon projections are likely to be associated with wide uncertainty intervals, which is why we interpret the extended projection primarily as an informative trend under a 'no-surprises' assumption.

A comprehensive scenario analysis lies beyond the scope of the present paper, whose primary aim was to present a transparent, population-based projection model built on publicly available administrative data. It should therefore be addressed in a subsequent, dedicated study.

CONCLUSION

This paper presents a population-based projection of LTC dependency in the Czech Republic, disaggregated by age, sex, and degree of dependency, by integrating administrative data from the Ministry of Labour and Social Affairs with demographic projections from the Czech Statistical Office. To the best of our knowledge, multinomial mixed-effects modelling has not previously been applied for this purpose in Central and Eastern Europe. The results indicate that LTC needs will rise substantially in the coming decades, driven primarily by demographic ageing and growth in the older and very old population. In particular, strong increases are projected for dependency levels III and IV, which typically require the most intensive forms of care.

The projected growth in the number of care-dependent persons will place pressure on both pillars of the care system: informal care, which currently covers around 80% of needs (especially grades I and II), and formal care, where capacity is limited and primarily oriented towards grades III–IV. Informal care is also shaped by longer-term socio-demographic change, including smaller family sizes, higher geographic mobility, and increasing labour market participation of women, which reduces the pool of available family caregivers. As a result, demand for formal services is likely to grow faster than the supply of caregivers. This pattern is consistent with evidence reported for OECD countries more broadly (*OECD,* 2023; *Rocard – Llena-Nozal,* 2022; *Carrino et al.,* 2023).

From a social policy perspective, it will therefore be essential to expand formal LTC capacity while supporting the sustainability of informal care through measures that facilitate the reconciliation of work and care, strengthen caregiver training, develop community-based services, and deploy assistive technologies. Without such measures, unmet needs and declining access to care may increase. Our findings are consistent with *Průša* (2018), who argued that 'society is not prepared for the increase in the number of benefit recipients' and that strengthened financing of social services and support for home-based care will be necessary. We add that the projected growth in care dependency calls for strategic planning across social policy, healthcare, the pension system, and the labour market, with implications for the long-term sustainability of public finances.

More broadly, the findings underline that future care dependency is shaped by cumulative processes across the life span as well as by institutional arrangements that translate need into entitlement and support. The projected increase in care needs reflects not only demographic ageing, but also the long-term consequences of cohort-specific employment histories, health trajectories, and family arrangements shaped within a given institutional context. The results underline that policies aimed at LTC sustainability cannot be confined to old-age interventions alone, but should also address earlier life-course stages where inequalities in health, work, and caregiving responsibilities accumulate. Future work that links projection models to individual-level longitudinal data could provide a more detailed assessment of these mechanisms and their implications for inequality in ageing societies.

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APPENDIX

Table A1 **Baseline projection period (2025–2040, 16 years), share of men dependent on care in the total male population.**

Age group	Dependency level	Observed values		Baseline projection period (2025–2040)							
		2014	**2024**	**2026**	**2028**	**2030**	**2032**	**2034**	**2036**	**2038**	**2040**
0–17	I	0.71%	0.70%	0.68%	0.67%	0.66%	0.65%	0.64%	0.63%	0.63%	0.62%
	II	0.47%	0.60%	0.64%	0.67%	0.70%	0.73%	0.77%	0.80%	0.84%	0.87%
	III	0.33%	0.44%	0.46%	0.49%	0.52%	0.55%	0.59%	0.62%	0.66%	0.70%
	IV	0.29%	0.31%	0.30%	0.31%	0.31%	0.32%	0.32%	0.33%	0.33%	0.34%
	Total	**1.80%**	**2.05%**	**2.08%**	**2.14%**	**2.19%**	**2.25%**	**2.32%**	**2.38%**	**2.45%**	**2.53%**
Abs. num. of inhabitants – men		**960,722**	**1,062,349**	**1,030,908**	**976,245**	**943,168**	**916,877**	**888,526**	**858,958**	**833,562**	**812,098**
18–64	I	0.35%	0.36%	0.35%	0.35%	0.36%	0.36%	0.36%	0.36%	0.36%	0.36%
	II	0.43%	0.42%	0.42%	0.42%	0.41%	0.41%	0.41%	0.41%	0.40%	0.40%
	III	0.31%	0.37%	0.40%	0.41%	0.42%	0.44%	0.45%	0.47%	0.48%	0.50%
	IV	0.19%	0.26%	0.28%	0.30%	0.32%	0.34%	0.36%	0.38%	0.41%	0.43%
	Total	**1.28%**	**1.40%**	**1.45%**	**1.48%**	**1.51%**	**1.55%**	**1.58%**	**1.62%**	**1.66%**	**1.70%**
Abs. num. of inhabitants – men		**3,438,180**	**3,340,069**	**3,330,565**	**3,321,241**	**3,326,386**	**3,332,627**	**3,345,229**	**3,351,384**	**3,342,752**	**3,306,889**
65–74	I	1.32%	1.23%	1.17%	1.14%	1.12%	1.09%	1.07%	1.05%	1.02%	1.00%
	II	1.50%	1.55%	1.58%	1.58%	1.58%	1.58%	1.58%	1.58%	1.57%	1.57%
	III	1.02%	1.30%	1.41%	1.47%	1.54%	1.61%	1.68%	1.76%	1.84%	1.92%
	IV	0.44%	0.56%	0.60%	0.63%	0.66%	0.69%	0.72%	0.75%	0.78%	0.81%
	Total	**4.29%**	**4.64%**	**4.77%**	**4.83%**	**4.90%**	**4.97%**	**5.05%**	**5.13%**	**5.22%**	**5.31%**
Abs. num. of inhabitants – men		**517,837**	**562,084**	**553,251**	**536,407**	**540,751**	**540,990**	**544,584**	**565,705**	**595,583**	**637,140**
75–84	I	3.40%	2.59%	2.27%	2.14%	2.01%	1.89%	1.78%	1.67%	1.57%	1.47%
	II	3.81%	3.39%	3.23%	3.13%	3.03%	2.94%	2.85%	2.76%	2.68%	2.59%
	III	2.74%	3.14%	3.24%	3.31%	3.38%	3.46%	3.53%	3.61%	3.69%	3.77%
	IV	1.29%	1.45%	1.52%	1.54%	1.56%	1.59%	1.61%	1.64%	1.66%	1.69%
	Total	**11.24%**	**10.57%**	**10.25%**	**10.12%**	**9.99%**	**9.88%**	**9.77%**	**9.68%**	**9.60%**	**9.52%**
Abs. num. of inhabitants – men		**207,586**	**325,576**	**338,250**	**363,794**	**381,025**	**392,237**	**390,282**	**382,692**	**377,932**	**388,194**
85–94	I	9.80%	6.91%	6.10%	5.65%	5.23%	4.84%	4.47%	4.13%	3.81%	3.52%
	II	11.50%	9.82%	9.30%	8.96%	8.62%	8.29%	7.97%	7.66%	7.35%	7.06%
	III	7.89%	9.20%	10.03%	10.31%	10.59%	10.88%	11.16%	11.45%	11.74%	12.02%
	IV	3.60%	4.38%	4.75%	4.90%	5.05%	5.21%	5.36%	5.51%	5.67%	5.83%
	Total	**32.79%**	**30.30%**	**30.19%**	**29.83%**	**29.50%**	**29.21%**	**28.96%**	**28.75%**	**28.57%**	**28.43%**
Abs. num. of inhabitants – men		**51,438**	**62,009**	**65,564**	**73,811**	**86,241**	**100,266**	**117,985**	**130,467**	**142,176**	**150,905**
95+	I	11.60%	10.87%	9.73%	9.35%	8.97%	8.58%	8.18%	7.79%	7.39%	7.00%
	II	21.39%	17.54%	16.14%	15.63%	15.10%	14.54%	13.98%	13.40%	12.81%	12.22%
	III	18.13%	24.76%	25.50%	27.06%	28.64%	30.24%	31.84%	33.45%	35.05%	36.63%
	IV	9.71%	12.80%	13.63%	14.49%	15.37%	16.26%	17.15%	18.06%	18.96%	19.85%
	Total	**60.82%**	**65.97%**	**65.00%**	**66.53%**	**68.07%**	**69.62%**	**71.16%**	**72.69%**	**74.21%**	**75.71%**
Abs. num. of inhabitants – men		**1,164**	**2,492**	**2,801**	**3,097**	**3,251**	**3,441**	**3,797**	**4,587**	**5,503**	**6,828**
Total absolute population – men		**5,176,927**	**5,354,579**	**5,321,340**	**5,274,596**	**5,280,823**	**5,286,438**	**5,290,404**	**5,293,793**	**5,297,508**	**5,302,053**
Tot. num. of dependent on care – men of which in:		**2.40%**	**2.79%**	**2.87%**	**2.97%**	**3.09%**	**3.21%**	**3.33%**	**3.43%**	**3.55%**	**3.69%**
Level I		0.73%	0.73%	0.70%	0.70%	0.69%	0.69%	0.68%	0.67%	0.66%	0.66%
Level II		0.80%	0.87%	0.88%	0.90%	0.92%	0.93%	0.95%	0.95%	0.96%	0.98%
Level III		0.56%	0.76%	0.83%	0.89%	0.95%	1.02%	1.09%	1.16%	1.23%	1.32%
Level IV		0.31%	0.43%	0.46%	0.49%	0.53%	0.57%	0.61%	0.65%	0.69%	0.74%
Tot. num. of dependent on care – men (levels I–IV)		**124,308**	**149,592**	**152,489**	**156,833**	**163,191**	**169,460**	**175,929**	**181,546**	**187,823**	**195,479**

Source: Czech Statistical Office (2025a) for 2014–2024; authors' calculations for 2025–2040 (multinomial mixed-effects model output).

Table A2 **Baseline projection period (2025–2040, 16 years), share of women dependent on care in the total female population**

Age group	Dependency level	Observed values		Baseline projection period (2025–2040)							
		2014	**2024**	**2026**	**2028**	**2030**	**2032**	**2034**	**2036**	**2038**	**2040**
0–17	I	0.53%	0.48%	0.45%	0.44%	0.42%	0.41%	0.40%	0.39%	0.38%	0.37%
	II	0.26%	0.32%	0.33%	0.34%	0.36%	0.37%	0.38%	0.39%	0.40%	0.41%
	III	0.18%	0.21%	0.21%	0.21%	0.22%	0.23%	0.23%	0.24%	0.24%	0.25%
	IV	0.19%	0.18%	0.17%	0.17%	0.17%	0.17%	0.16%	0.16%	0.16%	0.16%
	Total	**1.17%**	**1.19%**	**1.16%**	**1.17%**	**1.17%**	**1.17%**	**1.17%**	**1.18%**	**1.18%**	**1.19%**
Abs. num. of inhabitants – women		**911,975**	**1,008,584**	**981,252**	**929,394**	**898,622**	**873,463**	**847,125**	**819,631**	**795,537**	**775,040**
18–64	I	0.31%	0.29%	0.29%	0.28%	0.28%	0.28%	0.27%	0.27%	0.26%	0.26%
	II	0.35%	0.33%	0.33%	0.33%	0.32%	0.32%	0.31%	0.31%	0.31%	0.30%
	III	0.24%	0.28%	0.30%	0.31%	0.31%	0.32%	0.33%	0.34%	0.35%	0.36%
	IV	0.15%	0.19%	0.20%	0.21%	0.22%	0.23%	0.25%	0.26%	0.27%	0.29%
	Total	**1.05%**	**1.09%**	**1.12%**	**1.13%**	**1.14%**	**1.15%**	**1.17%**	**1.18%**	**1.20%**	**1.21%**
Abs. num. of inhabitants – women		**3,346,992**	**3,242,611**	**3,220,927**	**3,176,285**	**3,169,043**	**3,164,546**	**3,166,553**	**3,162,557**	**3,145,120**	**3,101,896**
65–74	I	1.64%	1.31%	1.24%	1.18%	1.13%	1.07%	1.02%	0.97%	0.93%	0.88%
	II	1.40%	1.37%	1.38%	1.37%	1.35%	1.34%	1.32%	1.31%	1.30%	1.28%
	III	0.79%	0.98%	1.08%	1.13%	1.18%	1.23%	1.29%	1.35%	1.41%	1.47%
	IV	0.37%	0.46%	0.50%	0.52%	0.54%	0.56%	0.59%	0.61%	0.64%	0.66%
	Total	**4.20%**	**4.12%**	**4.20%**	**4.19%**	**4.20%**	**4.21%**	**4.22%**	**4.24%**	**4.27%**	**4.30%**
Abs. num. of inhabitants – women		**635,257**	**664,876**	**647,608**	**616,113**	**609,481**	**600,407**	**597,867**	**617,807**	**646,322**	**684,848**
75–84	I	7.35%	4.76%	4.14%	3.76%	3.41%	3.09%	2.80%	2.53%	2.29%	2.08%
	II	6.10%	4.76%	4.52%	4.28%	4.05%	3.83%	3.62%	3.42%	3.23%	3.05%
	III	3.61%	3.59%	3.63%	3.62%	3.61%	3.61%	3.60%	3.58%	3.57%	3.56%
	IV	1.92%	2.03%	2.05%	2.06%	2.07%	2.08%	2.09%	2.10%	2.11%	2.12%
	Total	**18.98%**	**15.13%**	**14.34%**	**13.72%**	**13.14%**	**12.61%**	**12.11%**	**11.64%**	**11.21%**	**10.80%**
Abs. num. of inhabitants – women		**337,627**	**491,411**	**507,248**	**537,687**	**553,007**	**558,492**	**545,455**	**523,625**	**504,857**	**505,161**
85–94	I	15.80%	11.15%	9.89%	9.11%	8.38%	7.70%	7.07%,	6.49%	5.94%	5.44%
	II	17.99%	14.87%	14.32%	13.67%	13.04%	12.43%	11.83%	11.25%	10.69%	10.14%
	III	12.63%	14.19%	15.12%	15.44%	15.75%	16.05%	16.34%	16.61%	16.87%	17.12%
	IV	7.77%	8.94%	9.72%	9.97%	10.22%	10.46%	10.70%	10.94%	11.16%	11.39%
	Total	**54.19%**	**49.13%**	**49.05%**	**48.20%**	**47.40%**	**46.65%**	**45.94%**	**45.28%**	**44.67%**	**44.09%**
Abs. num. of inhabitants – women		**125,195**	**137,862**	**145,391**	**160,045**	**182,140**	**206,866**	**235,610**	**255,660**	**273,562**	**283,831**
95+	I	12.02%	7.80%	7.15%	6.54%	5.97%	5.44%	4.95%	4.50%	4.09%	3,71%
	II	23.52%	18.60%	17.43%	16.48%	15.57%	14.68%	13.83%	13.01%	12.23%	11.48%
	III	27.17%	29.89%	30.42%	31.03%	31.61%	32.15%	32.66%	33.14%	33.59%	34.00%
	IV	21.34%	25.93%	27.39%	28.26%	29.13%	29.98%	30.81%	31.63%	32.43%	33.21%
	Total	**84.05%**	**82.22%**	**82.39%**	**82.32%**	**82.27%**	**82.25%**	**82.26%**	**82.28%**	**82.33%**	**82.40%**
Abs. num. of inhabitants – women		**4,302**	**9,577**	**10,733**	**12,375**	**13,755**	**14,929**	**16,393**	**18,848**	**21,725**	**25,977**
Total absolute population – women		**5,361,348**	**5,554,921**	**5,513,158**	**5,431,899**	**5,426,048**	**5,418,704**	**5,409,003**	**5,398,127**	**5,387,124**	**5,376,754**
Tot. num. of dependent on care – women of which in:		**3.88 %**	**4.04%**	**4.13%**	**4.30%**	**4.47%**	**4.63%**	**4.80%**	**4.92%**	**5.03%**	**5.16%**
Level I		1.32%	1.13%	1.05%	1.03%	1.00%	0.97%	0.94%	0.90%	0.85%	0.82%
Level II		1.25%	1.24%	1.24%	1.27%	1.29%	1.30%	1.31%	1.30%	1.29%	1.28%
Level III		0.82%	1.04%	1.13%	1.23%	1.33%	1.43%	1.55%	1.64%	1.74%	1.83%
Level IV		0.49%	0.64%	0.71%	0.77%	0.85%	0.92%	1.01%	1.08%	1.15%	1.23%
Tot. num. of dependent on care – women (levels I–IV)		**207,903**	**224,535**	**227,505**	**233,628**	**242,548**	**251,139**	**259,862**	**265,409**	**271,241**	**277,368**

Source: Czech Statistical Office (2025a) for 2014–2024; authors' calculations for 2025–2040 (multinomial mixed-effects model output).

Table A3 **Baseline projection period (2025–2040, 16 years), share of men and women dependent on care in the total population (male and female)**

Age group	Dependency level	Observed values		Baseline projection period (2025–2040)							
		2014	**2024**	**2026**	**2028**	**2030**	**2032**	**2034**	**2036**	**2038**	**2040**
0–17 y. persons dependent on care	I	0.62%	0.59%	0.57%	0.55%	0.54%	0.53%	0.52%	0.51%	0.51%	0.50%
	II	0.37%	0.46%	0.49%	0.51%	0.53%	0.55%	0.58%	0.60%	0.62%	0.65%
	III	0.26%	0.33%	0.34%	0.36%	0.37%	0.39%	0.41%	0.43%	0.46%	0.48%
	IV	0.24%	0.25%	0.24%	0.24%	0.24%	0.24%	0.24%	0.25%	0.25%	0.25%
	Total	**1.49%**	**1.63%**	**1.64%**	**1.66%**	**1.69%**	**1.72%**	**1.76%**	**1.79%**	**1.83%**	**1.87%**
Abs. num. of inhabitants – men and women		**1,872,697**	**2,070,933**	**2,012,160**	**1,905,639**	**1,841,790**	**1,790,340**	**1,735,651**	**1,678,589**	**1,629,099**	**1,587,138**
18–64 y. persons dependent on care	I	0.33%	0.33%	0.32%	0.32%	0.32%	0.32%	0.32%	0.31%	0.31%	0.31%
	II	0.39%	0.37%	0.38%	0.37%	0.37%	0.37%	0.36%	0.36%	0.36%	0.35%
	III	0.28%	0.32%	0.35%	0.36%	0.37%	0.38%	0.39%	0.41%	0.42%	0.43%
	IV	0.17%	0.22%	0.24%	0.26%	0.27%	0.29%	0.31%	0.32%	0.34%	0.36%
	Total	**1.16%**	**1.25%**	**1.29%**	**1.31%**	**1.33%**	**1.35%**	**1.38%**	**1.40%**	**1.43%**	**1.46%**
Abs. num. of inhabitants – men and women		**6,785,172**	**6,582,680**	**6,551,492**	**6,497,526**	**6,495,430**	**6,497,174**	**6,511,782**	**6,513,941**	**6,487,872**	**6,408,785**
65–74 y. persons dependent on care	I	1.50%	1.27%	1.21%	1.17%	1.12%	1.08%	1.05%	1.01%	0.97%	0.94%
	II	1.45%	1.45%	1.47%	1.47%	1.46%	1.45%	1.45%	1.44%	1.43%	1.42%
	III	0.89%	1.12%	1.23%	1.29%	1.35%	1.41%	1.48%	1.54%	1.62%	1.69%
	IV	0.40%	0.50%	0.55%	0.57%	0.60%	0.62%	0.65%	0.68%	0.70%	0.74%
	Total	**4.24%**	**4.36%**	**4.46%**	**4.49%**	**4.53%**	**4.57%**	**4.62%**	**4.67%**	**4.72%**	**4.79%**
Abs. num. of inhabitants – men and women		**1,153,094**	**1,226,960**	**1,200,859**	**1,152,520**	**1,150,232**	**1,141,397**	**1,142,450**	**1,183,512**	**1,241,905**	**1,321,988**
75–84 y. persons dependent on care	I	5.85%	3.90%	3.39%	3.10%	2.84%	2.59%	2.37%	2.17%	1.98%	1.81%
	II	5.23%	4.22%	4.00%	3.82%	3.63%	3.46%	3.30%	3.14%	2.99%	2.85%
	III	3.28%	3.41%	3.47%	3.49%	3.52%	3.54%	3.57%	3.59%	3.62%	3.65%
	IV	1.68%	1.80%	1.84%	1.85%	1.87%	1.88%	1.89%	1.91%	1.92%	1.93%
	Total	16.03%	13.32%	12.70%	12.27%	11.86%	11.48%	11.13%	10.81%	10.52%	10.25%
Abs. num. of inhabitants – men and women		**545,213**	**816,987**	**845,497**	**901,480**	**934,032**	**950,728**	**935,737**	**906,316**	**882,789**	**893,355**
85–94 y. persons dependent on care	I	14.05%	9.83%	8.71%	8.02%	7.37%	6.77%	6.20%	5.69%	5.22%	4.77%
	II	16.10%	13.30%	12.76%	12.19%	11.62%	11.08%	10.54%	10.04%	9.55%	9.07%
	III	11.25%	12.64%	13.54%	13.82%	14.09%	14.36%	14.61%	14.87%	15.12%	15.35%
	IV	6.55%	7.52%	8.17%	8.37%	8.56%	8.75%	8.92%	9.10%	9.29%	9.46%
	Total	**47.95%**	**43.29%**	**43.19%**	**42.40%**	**41.65%**	**40.96%**	**40.28%**	**39.70%**	**39.16%**	**38.66%**
Abs. num. of inhabitants – men and women		**176,633**	**199,871**	**210,955**	**233,856**	**268,382**	**307,132**	**353,595**	**386,127**	**415,738**	**434,736**
95+ y. persons dependent on care	I	11.93%	8.43%	7.68%	7.10%	6.54%	6.03%	5.56%	5.15%	4.76%	4.39%
	II	23.07%	18.38%	17.16%	16.31%	15.48%	14.66%	13.86%	13.09%	12.35%	11.63%
	III	25.25%	28.83%	29.40%	30.24%	31.04%	31.79%	32.51%	33.20%	33.88%	34.55%
	IV	18.86%	23.22%	24.54%	25.51%	26.50%	27.41%	28.24%	28.97%	29.70%	30.43%
	Total	**79.11%**	**78.86%**	**78.79%**	**79.16%**	**79.56%**	**79.89%**	**80.17%**	**80.41%**	**80.69%**	**81.00%**
Abs. num. of inhabitants – men and women		**5,466**	**12,069**	**13,534**	**15,473**	**17,006**	**18,371**	**20,191**	**23,434**	**27,228**	**32,805**
Total absolute population – men and women		**10,538,275**	**10,909,500**	**10,834,497**	**10,706,495**	**10,706,871**	**10,705,142**	**10,699,407**	**10,691,920**	**10,684,632**	**10,678,807**
Tot. num. of dependent on care – men and women of which in:		**3.15%**	**3.43%**	**3.51%**	**3.65%**	**3.79%**	**3.93%**	**4.07%**	**4.18%**	**4.30%**	**4.43%**
Level I		1.03%	0.93%	0.88%	0.87%	0.85%	0.83%	0.81%	0.78%	0.76%	0.74%
Level II		1.03%	1.06%	1.07%	1.09%	1.11%	1.12%	1.13%	1.13%	1.13%	1.13%
Level III		0.69%	0.90%	0.98%	1.06%	1.14%	1.23%	1.32%	1.40%	1.49%	1.58%
Level IV		0.40%	0.54%	0.58%	0.64%	0.69%	0.75%	0.81%	0.86%	0.92%	0.99%
Tot. num. of dependent on care – men and women (levels I–IV)		**332,211**	**374,127**	**379,994**	**390,461**	**405,739**	**420,599**	**435,791**	**446,955**	**459,065**	**472,847**

Source: Czech Statistical Office (2025a) for 2014–2024; authors' calculations for 2025–2040 (multinomial mixed-effects model output).

Table A4 **Extended projection period (2041–2080, 40 years), share of men dependent on care in the total male population**

Age group	Dependency level	Extended projection period (2041–2080) 2041	2045	2050	2055	2060	2065	2070	2075	2080
0–17 y. persons dependent on care	I	0.61%	0.60%	0.58%	0.56%	0.54%	0.53%	0.51%	0.49%	0.47%
	II	0.89%	0.98%	1.09%	1.21%	1.35%	1.51%	1.68%	1.87%	2.08%
	III	0.72%	0.81%	0.93%	1.08%	1.25%	1.44%	1.66%	1.91%	2.21%
	IV	0.34%	0.35%	0.36%	0.38%	0.39%	0.40%	0.42%	0.43%	0.45%
	Total	**2.57%**	**2.73%**	**2.96%**	**3.23%**	**3.53%**	**3.88%**	**4.27%**	**4.71%**	**5.21%**
Abs. num. of inhabitants – men		**807,275**	**826,480**	**852,404**	**857,239**	**830,894**	**790,046**	**758,289**	**749,577**	**758,244**
18–64 y. persons dependent on care	I	0.36%	0.36%	0.37%	0.37%	0.37%	0.38%	0.38%	0.38%	0.38%
	II	0.40%	0.39%	0.38%	0.37%	0.37%	0.36%	0.35%	0.34%	0.34%
	III	0.51%	0.55%	0.59%	0.65%	0.70%	0.77%	0.83%	0.90%	0.98%
	IV	0.45%	0.51%	0.59%	0.69%	0.81%	0.94%	1.10%	1.28%	1.49%
	Total	**1.72%**	**1.81%**	**1.94%**	**2.08%**	**2.25%**	**2.44%**	**2.66%**	**2.91%**	**3.19%**
Abs. num. of inhabitants – men		**3,282,281**	**3,163,585**	**3,076,974**	**3,007,565**	**2,960,143**	**2,976,803**	**2,972,604**	**2,900,835**	**2,821,651**
65–74 y. persons dependent on care	I	0.99%	0.94%	0.89%	0.84%	0.79%	0.75%	0.71%	0.66%	0.63%
	II	1.57%	1.57%	1.56%	1.55%	1.55%	1.54%	1.53%	1.52%	1.51%
	III	1.97%	2.15%	2.40%	2.68%	3.00%	3.34%	3.73%	4.16%	4.63%
	IV	0.83%	0.90%	1.00%	1.11%	1.23%	1.37%	1.52%	1.68%	1.86%
	Total	**5.36%**	**5.57%**	**5.86%**	**6.19%**	**6.57%**	**7.00%**	**7.48%**	**8.02%**	**8.62%**
Abs. num. of inhabitants – men		**660,788**	**744,711**	**724,491**	**667,179**	**660,666**	**604,771**	**573,558**	**644,936**	**693,770**
75–84 y. persons dependent on care	I	1.43%	1.26%	1.08%	0.92%	0.79%	0.67%	0.57%	0.49%	0.42%
	II	2.55%	2.40%	2.21%	2.04%	1.88%	1.73%	1.60%	1.47%	1.35%
	III	3.81%	3.97%	4.19%	4.41%	4.64%	4.88%	5.14%	5.40%	5.67%
	IV	1.70%	1.75%	1.82%	1.88%	1.95%	2.02%	2.09%	2.16%	2.24%
	Total	**9.49%**	**9.38%**	**9.29%**	**9.25%**	**9.26%**	**9.31%**	**9.40%**	**9.52%**	**9.68%**
Abs. num. of inhabitants – men		**392,272**	**412,310**	**490,443**	**586,484**	**578,614**	**546,585**	**551,719**	**512,043**	**495,752**
85–94 y. persons dependent on care	I	3.38%	2.88%	2.34%	1.90%	1.54%	1.25%	1.01%	0.81%	0.66%
	II	6.91%	6.35%	5.71%	5.12%	4.57%	4.08%	3.64%	3.24%	2.87%
	III	12.17%	12.75%	13.49%	14.23%	14.99%	15.76%	16.53%	17.31%	18.11%
	IV	5.91%	6.23%	6.65%	7.07%	7.50%	7.95%	8.41%	8.88%	9.36%
	Total	**28.37%**	**28.21%**	**28.18%**	**28.32%**	**28.61%**	**29.04%**	**29.59%**	**30.25%**	**31.00%**
Abs. num. of inhabitants – men		**154,848**	**158,982**	**172,085**	**194,296**	**248,707**	**306,736**	**304,900**	**305,362**	**319,812**
95+ y. persons dependent on care	I	6.81%	6.04%	5.14%	4.31%	3.57%	2.93%	2.38%	1.92%	1.54%
	II	11.92%	10.74%	9.30%	7.95%	6.70%	5.60%	4.63%	3.80%	3.10%
	III	37.42%	40.47%	44.06%	47.32%	50.19%	52.68%	54.77%	56.50%	57.91%
	IV	20.30%	22.04%	24.11%	26.03%	27.74%	29.26%	30.57%	31.70%	32.65%
	Total	**76.44%**	**79.30%**	**82.62%**	**85.60%**	**88.22%**	**90.46%**	**92.35%**	**93.92%**	**95.19%**
Abs. num. of inhabitants – men		**7,208**	**10,577**	**13,344**	**14,609**	**18,393**	**22,084**	**32,730**	**40,647**	**40,763**
Total absolute population – men		**5,304,673**	**5,316,646**	**5,329,742**	**5,327,373**	**5,297,417**	**5,247,025**	**5,193,801**	**5,153,401**	**5,129,991**
Tot. num. of dependent on care – men of which in:		**3.75%**	**4.01%**	**4.36%**	**4.76%**	**5.29%**	**5.82%**	**6.29%**	**6.80%**	**7.32%**
Level I		0.65%	0.64%	0.61%	0.59%	0.56%	0.53%	0.50%	0.48%	0.46%
Level II		0.98%	1.00%	1.02%	1.03%	1.05%	1.05%	1.03%	1.02%	1.03%
Level III		1.36%	1.52%	1.75%	2.01%	2.35%	2.69%	2.99%	3.32%	3.63%
Level IV		0.76%	0.85%	0.98%	1.13%	1.33%	1.55%	1.77%	1.98%	2.20%
Tot. num. of dependent on care – men (levels I–IV)		**199,154**	**213,145**	**232,396**	**253,457**	**280,345**	**305,557**	**326,596**	**350,680**	**375,359**

Source: Authors' calculations (multinomial mixed-effects model output).

Table A5 **Extended projection period (2041–2080, 40 years), share of women dependent on care in the total female population**

Age group	Dependency level	Extended projection period (2041–2080)								
		2041	**2045**	**2050**	**2055**	**2060**	**2065**	**2070**	**2075**	**2080**
0–17	I	0.36%	0.34%	0.32%	0.30%	0.27%	0.26%	0.24%	0.22%	0.21%
	II	0.42%	0.45%	0.48%	0.52%	0.56%	0.61%	0.65%	0.71%	0.76%
	III	0.25%	0.27%	0.28%	0.30%	0.32%	0.34%	0.37%	0.39%	0.42%
	IV	0.16%	0.15%	0.15%	0.14%	0.14%	0.13%	0.13%	0.13%	0.12%
	Total	**1.19%**	**1.21%**	**1.23%**	**1.26%**	**1.30%**	**1.34%**	**1.39%**	**1.45%**	**1.51%**
Abs. num. of inhabitants – women		**770,958**	**790,470**	**816,088**	**821,598**	**797,348**	**759,085**	**729,166**	**721,025**	**729,378**
18–64	I	0.26%	0.25%	0.24%	0.23%	0.22%	0.22%	0.21%	0.20%	0.19%
	II	0.30%	0.29%	0.28%	0.28%	0.27%	0.26%	0.25%	0.24%	0.23%
	III	0.37%	0.39%	0.42%	0.45%	0.48%	0.52%	0.56%	0.60%	0.64%
	IV	0.29%	0.32%	0.36%	0.41%	0.46%	0.52%	0.59%	0.67%	0.75%
	Total	**1.22%**	**1.26%**	**1.31%**	**1.37%**	**1.44%**	**1.52%**	**1.61%**	**1.71%**	**1.82%**
Abs. num. of inhabitants – women		**3,072,631**	**2,942,199**	**2,848,278**	**2,778,256**	**2,739,886**	**2,769,477**	**2,780,071**	**2,729,670**	**2,665,032**
65–74	I	0.86%	0.78%	0.69%	0.61%	0.54%	0.48%	0.42%	0.37%	0.33%
	II	1.28%	1.25%	1.22%	1.19%	1.16%	1.12%	1.09%	1.06%	1.03%
	III	1.50%	1.64%	1.83%	2.05%	2.28%	2.55%	2.84%	3.16%	3.52%
	IV	0.68%	0.74%	0.81%	0.90%	1.00%	1.10%	1.22%	1.35%	1.49%
	Total	**4.32%**	**4.41%**	**4.56%**	**4.75%**	**4.98%**	**5.25%**	**5.57%**	**5.94%**	**6.37%**
Abs. num. of inhabitants – women		**708,176**	**790,192**	**759,214**	**683,601**	**660,839**	**590,860**	**551,302**	**614,194**	**662,776**
75–84	I	1.97%	1.61%	1.25%	0.97%	0.75%	0.58%	0.45%	0.35%	0.27%
	II	2.96%	2.64%	2.28%	1.96%	1.69%	1.46%	1.25%	1.08%	0.92%
	III	3.55%	3.52%	3.47%	3.42%	3.37%	3.32%	3.26%	3.20%	3.14%
	IV	2.12%	2.13%	2.14%	2.15%	2.16%	2.16%	2.17%	2.17%	2.17%
	Total	**10.61%**	**9.90%**	**9.15%**	**8.51%**	**7.98%**	**7.52%**	**7.13%**	**6.80%**	**6.51%**
Abs. num. of inhabitants – women		**504,748**	**514,161**	**592,268**	**692,222**	**669,271**	**611,981**	**597,988**	**538,554**	**508,900**
85–94	I	5.20%	4.35%	3.46%	2.74%	2.16%	1.70%	1.34%	1.05%,	0.82%
	II	9.88%	8.87%	7.72%	6.70%	5.79%	4.99%	4.29%	3.68%	3.16%
	III	17.25%	17.71%	18.22%	18.69%	19.10%	19.47%	19.79%	20.09%	20.35%
	IV	11.49%	11.92%	12.42%	12.89%	13.34%	13.76%	14.17%	14.55%	14.93%
	Total	**43.82%**	**42.84%**	**41.82%**	**41.01%**	**40.39%**	**39.92%**	**39.59%**	**39.38%**	**39.26%**
Abs. num. of inhabitants – women		**288,074**	**281,631**	**280,916**	**300,520**	**364,940**	**436,462**	**423,349**	**404,212**	**405,318**
95+	I	3.53%	2.89%	2.25%	1.73%	1.33%	1.02%	0.78%	0.59%	0.45%
	II	11.11%	9.75%	8.24%	6.93%	5.80%	4.84%	4.02%	3.34%	2.76%
	III	34.19%	34.90%	35.61%	36.17%	36.58%	36.86%	37.03%	37.10%	37.09%
	IV	33.60%	35.10%	36.88%	38.56%	40.15%	41.65%	43.08%	44.44%	45.74%
	Total	**82.44%**	**82.64%**	**82.97%**	**83.39%**	**83.86%**	**84.37%**	**84.91%**	**85.47%**	**86.05%**
Abs. num. of inhabitants – women		**27,345**	**36,845**	**43,053**	**43,481**	**48,765**	**55,328**	**75,514**	**90,366**	**86,620**
Total absolute population – women		**5,371,933**	**5,355,497**	**5,339,817**	**5,319,678**	**5,281,049**	**5,223,192**	**5,157,389**	**5,098,021**	**5,058,023**
Tot. num. of dependent on care – women of which in:		**5.20%**	**5.29%**	**5.42%**	**5.63%**	**6.14%**	**6.70%**	**6.98%**	**7.19%**	**7.29%**
Level I		0.80%	0.71%	0.62%	0.54%	0.48%	0.43%	0.36%	0.31%	0.28%
Level II		1.27%	1.20%	1.12%	1.07%	1.04%	0.99%	0.90%	0.82%	0.76%
Level III		1.88%	2.00%	2.16%	2.34%	2.67%	3.02%	3.20%	3.34%	3.44%
Level IV		1.27%	1.38%	1.52%	1.68%,	1.95%	2.27%	2.51%	2.71%	2.81%
Tot. num. of dependent on care – women (levels I–IV)		**279,602**	**283,391**	**289,346**	**299,310**	**324,326**	**350,174**	**359,903**	**366,577**	**368,585**

Source: Authors' calculations (multinomial mixed-effects model output).

Table A6 **Extended projection period (2041–2080, 40 years), share of men and women dependent on care in the total population (male and female).**

Age group	Dependency level	Extended projection period (2041–2080)								
		2041	**2045**	**2050**	**2055**	**2060**	**2065**	**2070**	**2075**	**2080**
0–17	I	0.49%	0.47%	0.45%	0.43%	0.41%	0.39%	0.38%	0.36%	0.34%
	II	0.66%	0.72%	0.79%	0.87%	0.97%	1.07%	1.18%	1.30%	1.43%
	III	0.49%	0.54%	0.62%	0.70%	0.79%	0.90%	1.03%	1.17%	1.33%
	IV	0.25%	0.25%	0.26%	0.26%	0.27%	0.27%	0.28%	0.28%	0.29%
	Total	**1.90%**	**1.99%**	**2.12%**	**2.27%**	**2.44%**	**2.63%**	**2.86%**	**3.11%**	**3.39%**
Abs. num. of inhabitants – men and women		**1,578,233**	**1,616,950**	**1,668,492**	**1,678,836**	**1,628,242**	**1,549,131**	**1,487,455**	**1,470,602**	**1,487,622**
18–64	I	0.31%	0.31%	0.31%	0.30%	0.30%	0.30%	0.30%	0.29%	0.29%
	II	0.35%	0.34%	0.34%	0.33%	0.32%	0.31%	0.30%	0.29%	0.29%
	III	0.44%	0.47%	0.51%	0.55%	0.60%	0.65%	0.70%	0.76%	0.82%
	IV	0.37%	0.42%	0.48%	0.56%	0.64%	0.74%	0.85%	0.98%	1.13%
	Total	**1.48%**	**1.54%**	**1.63%**	**1.74%**	**1.86%**	**2.00%**	**2.15%**	**2.33%**	**2.53%**
Abs. num. of inhabitants – men and women		**6,354,912**	**6,105,784**	**5,925,251**	**5,785,821**	**5,700,028**	**5,746,280**	**5,752,675**	**5,630,505**	**5,486,682**
65–74	I	0.92%	0.86%	0.79%	0.73%	0.67%	0.61%	0.57%	0.52%	0.48%
	II	1.42%	1.40%	1.39%	1.37%	1.35%	1.33%	1.32%	1.30%	1.28%
	III	1.73%	1.89%	2.11%	2.36%	2.64%	2.95%	3.29%	3.67%	4.09%
	IV	0.75%	0.82%	0.91%	1.01%	1.12%	1.24%	1.37%	1.52%	1.68%
	Total	**4.82%**	**4.97%**	**5.19%**	**5.46%**	**5.77%**	**6.14%**	**6.55%**	**7.01%**	**7.52%**
Abs. num. of inhabitants – men and women		**1,368,964**	**1,534,903**	**1,483,705**	**1,350,780**	**1,321,505**	**1,195,631**	**1,124,859**	**1,259,130**	**1,356,547**
75–84	I	1.74%	1.46%	1.17%	0.95%	0.77%	0.63%	0.51%	0.42%	0.34%
	II	2.78%	2.53%	2.25%	2.00%	1.78%	1.59%	1.42%	1.27%	1.14%
	III	3.66%	3.72%	3.80%	3.87%	3.96%	4.06%	4.16%	4.27%	4.39%
	IV	1.94%	1.96%	2.00%	2.03%	2.06%	2.10%	2.13%	2.17%	2.20%
	Total	**10.12%**	**9.67%**	**9.21%**	**8.85%**	**8.57%**	**8.36%**	**8.22%**	**8.13%**	**8.08%**
Abs. num. of inhabitants – men and women		**897,021**	**926,471**	**1,082,711**	**1,278,706**	**1,247,885**	**1,158,566**	**1,149,707**	**1,050,597**	**1,004,651**
85–94	I	4.57%	3.82%	3.03%	2.41%	1.91%	1.52%	1.20%	0.95%	0.75%
	II	8.84%	7.96%	6.96%	6.08%	5.30%	4.62%	4.02%	3.49%	3.03%
	III	15.47%	15.92%	16.43%	16.94%	17.43%	17.93%	18.43%	18.90%	19.36%
	IV	9.54%	9.87%	10.23%	10.60%	10.97%	11.36%	11.76%	12.11%	12.47%
	Total	**38.42%**	**37.56%**	**36.64%**	**36.03%**	**35.62%**	**35.43%**	**35.40%**	**35.45%**	**35.62%**
Abs. num. of inhabitants – men and women		**442,922**	**440,613**	**453,002**	**494,817**	**613,647**	**743,198**	**728,249**	**709,575**	**725,129**
95+	I	4.21%	3.60%	2.93%	2.38%	1.95%	1.57%	1.26%	1.01%	0.80%
	II	11.28%	9.97%	8.49%	7.18%	6.05%	5.06%	4.21%	3.48%	2.87%
	III	34.87%	36.14%	37.61%	38.97%	40.31%	41.37%	42.39%	43.12%	43.75%
	IV	30.82%	32.18%	33.86%	35.41%	36.75%	38.12%	39.30%	40.49%	41.55%
	Total	**81.18%**	**81.89%**	**82.89%**	**83.94%**	**85.05%**	**86.11%**	**87.16%**	**88.09%**	**88.97%**
Abs. num. of inhabitants – men and women		**34,553**	**47,422**	**56,396**	**58,091**	**67,159**	**77,412**	**108,244**	**131,013**	**127,383**
Total absolute population – men and women		**10,676,606**	**10,672,143**	**10,669,558**	**10,647,051**	**10,578,466**	**10,470,218**	**10,351,190**	**10,251,422**	**10,188,014**
Tot. num. of dependent on care – men and women of which in:		**4.48%**	**4.65%**	**4.89%**	**5.19%**	**5.72%**	**6.26%**	**6.63%**	**7.00%**	**7.30%**
Level I		0.73%	0.67%	0.61%	0.56%	0.52%	0.48%	0.43%	0.40%	0.37%
Level II		1.13%	1.10%	1.07%	1.05%	1.04%	1.02%	0.96%	0.92%	0.90%
Level III		1.62%	1.76%	1.95%	2.18%	2.51%	2.85%	3.10%	3.33%	3.54%
Level IV		1.01%	1.12%	1.25%	1.40%	1.64%	1.91%	2.14%	2.34%	2.50%
Tot. num. of dependent on care – men and women (levels I–IV)		**478,755**	**496,537**	**521,742**	**552,767**	**604,671**	**655,731**	**686,499**	**717,257**	**743,944**

Source: Authors' calculations (multinomial mixed-effects model output).

Table A7 **Mixed-effects multinomial model fixed effects (reference category: dependency level I and male, 0–17 years)**

Panel: II vs I

Term	Estimate	Std. Error	z	P
intercept	–0.238***	0.007	–35.28	<0.001
year (std.)	0.047***	0.010	4.88	<0.001
male, 18–64	0.459***	0.008	55.17	<0.001
male, 65–74	0.467***	0.009	52.79	<0.001
male, 75–84	0.478***	0.009	54.19	<0.001
male, 85–94	0.518***	0.010	54.42	<0.001
male, 95+	0.713***	0.027	26.20	<0.001
female, 0–17	–0.256***	0.010	–24.87	<0.001
female, 18–64	0.374***	0.009	43.91	<0.001
female, 65–74	0.207***	0.009	24.02	<0.001
female, 75–84	0.174***	0.008	21.85	<0.001
female, 85–94	0.474***	0.008	58.99	<0.001
female, 95+	1.001***	0.015	64.67	<0.001

Panel: III vs I

Term	Estimate	Std. Error	z	P
intercept	–0.617***	0.007	–86.29	<0.001
year (std.)	0.126***	0.012	10.74	<0.001
male, 18–64	0.632***	0.008	76.42	<0.001
male, 65–74	0.569***	0.009	63.81	<0.001
male, 75–84	0.671***	0.009	75.90	<0.001
male, 85–94	0.742***	0.010	77.96	<0.001
male, 95+	1.251***	0.027	46.59	<0.001
female, 0–17	–0.344***	0.011	–31.16	<0.001
female, 18–64	0.501***	0.009	58.68	<0.001
female, 65–74	0.150***	0.009	17.15	<0.001
female, 75–84	0.136***	0.008	17.12	<0.001
female, 85–94	0.669***	0.008	84.11	<0.001
female, 95+	1.673***	0.015	110.67	<0.001

Panel: IV vs I

Term	Estimate	Std. Error	z	P
intercept	–0.906***	0.008	–116.45	<0.001
year (std.)	0.124***	0.015	8.44	<0.001
male, 18–64	0.490***	0.009	54.13	<0.001
male, 65–74	0.023*	0.010	2.27	0.023
male, 75–84	0.225***	0.010	22.51	<0.001
male, 85–94	0.273***	0.011	24.98	<0.001
male, 95+	0.904***	0.030	29.78	<0.001
female, 0–17	–0.117***	0.012	–10.07	<0.001
female, 18–64	0.347***	0.009	36.94	<0.001
female, 65–74	–0.327***	0.010	–32.22	<0.001
female, 75–84	–0.168***	0.009	–19.12	<0.001
female, 85–94	0.499***	0.009	57.52	<0.001
female, 95+	1.817***	0.016	116.55	<0.001

Panel: No care vs I

Term	Estimate	Std. Error	z	P
intercept	4.935***	0.005	986.94	<0.001
year (std.)	0.074***	0.018	4.11	<0.001
male, 18–64	0.727***	0.006	126.33	<0.001
male, 65–74	–0.608***	0.006	–97.74	<0.001
male, 75–84	–1.484***	0.006	–237.59	<0.001
male, 85–94	–2.793***	0.007	–403.98	<0.001
male, 95+	–3.633***	0.025	–148.26	<0.001
female, 0–17	0.357***	0.007	52.83	<0.001
female, 18–64	0.866***	0.006	147.06	<0.001
female, 65–74	–0.762***	0.006	–129.46	<0.001
female, 75–84	–2.279***	0.005	–420.37	<0.001
female, 85–94	–3.650***	0.006	–648.02	<0.001
female, 95+	–4.370***	0.015	–285.17	<0.001

Notes: Estimates are log-odds from mclogit::mblogit (PQL). Significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.
Source: Authors' calculations (multinomial mixed-effects model parameters).

Table A8 **Mixed-effects multinomial model random effects (reference category: dependency level I)**

Random effects: Variance–covariance matrix estimates

	II: intercept	**III: intercept**	**IV: intercept**	**no care: intercept**	**II: year(std.)**	**III: year(std.)**	**IV: year(std.)**	**no care: year(std.)**
II: intercept	$5.201 \cdot 10^{-5}$							
III: intercept	$3.113 \cdot 10^{-5}$	$8.251 \cdot 10^{-5}$						
IV: intercept	$2.348 \cdot 10^{-5}$	$7.882 \cdot 10^{-5}$	$9.304 \cdot 10^{-5}$					
no care: intercept	$3.151 \cdot 10^{-5}$	$6.245 \cdot 10^{-5}$	$7.545 \cdot 10^{-5}$	$7.255 \cdot 10^{-5}$				
II: year(std.)	$-4.504 \cdot 10^{-5}$	$1.547 \cdot 10^{-4}$	$2.397 \cdot 10^{-4}$	$1.880 \cdot 10^{-4}$	$1.059 \cdot 10^{-3}$			
III: year(std.)	$1.910 \cdot 10^{-4}$	$1.825 \cdot 10^{-4}$	$2.417 \cdot 10^{-4}$	$2.887 \cdot 10^{-4}$	$5.217 \cdot 10^{-4}$	$1.586 \cdot 10^{-3}$		
IV: year(std.)	$3.005 \cdot 10^{-4}$	$1.860 \cdot 10^{-4}$	$1.408 \cdot 10^{-4}$	$2.260 \cdot 10^{-4}$	$-2.659 \cdot 10^{-4}$	$1.533 \cdot 10^{-3}$	$2.526 \cdot 10^{-3}$	
no care: year(std.)	$2.299 \cdot 10^{-4}$	$5.126 \cdot 10^{-4}$	$4.976 \cdot 10^{-4}$	$4.406 \cdot 10^{-4}$	$9.596 \cdot 10^{-4}$	$1.723 \cdot 10^{-3}$	$2.007 \cdot 10^{-3}$	$3.817 \cdot 10^{-3}$

Source: Authors' calculations (multinomial mixed-effects model parameters).