

Cost of illness and burden of disease – Alzheimer's disease

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Professional passions: Effectiveness and cost-effectiveness, budget impact, modelling and predictions, evidence creation, RWE solutions

Currently relevant positions, e.g.

- ◆ CoB, SHEOR Director, Founder / ESiOR Oy

Other relevant past experience, e.g.

- ◆ ~650 effectiveness projects, author for 75+ articles, and 220+ other public effectiveness references
- ◆ SPESiOR secure processing environment, Isaacus
- ◆ Permanent advisor / TEHDAS, Connecting the Dots
- ◆ Youngest chair of the scientific review board at the ISPOR European congress. Selected 2 times in row 1st time ever
- ◆ 4 times internationally awarded / 2 x ISPOR, ACR, IEEE
- ◆ Chairman of the board / Kuopio Health
- ◆ 2 times advisor / a Current Care guideline working group
- ◆ Multiple positions of responsibility



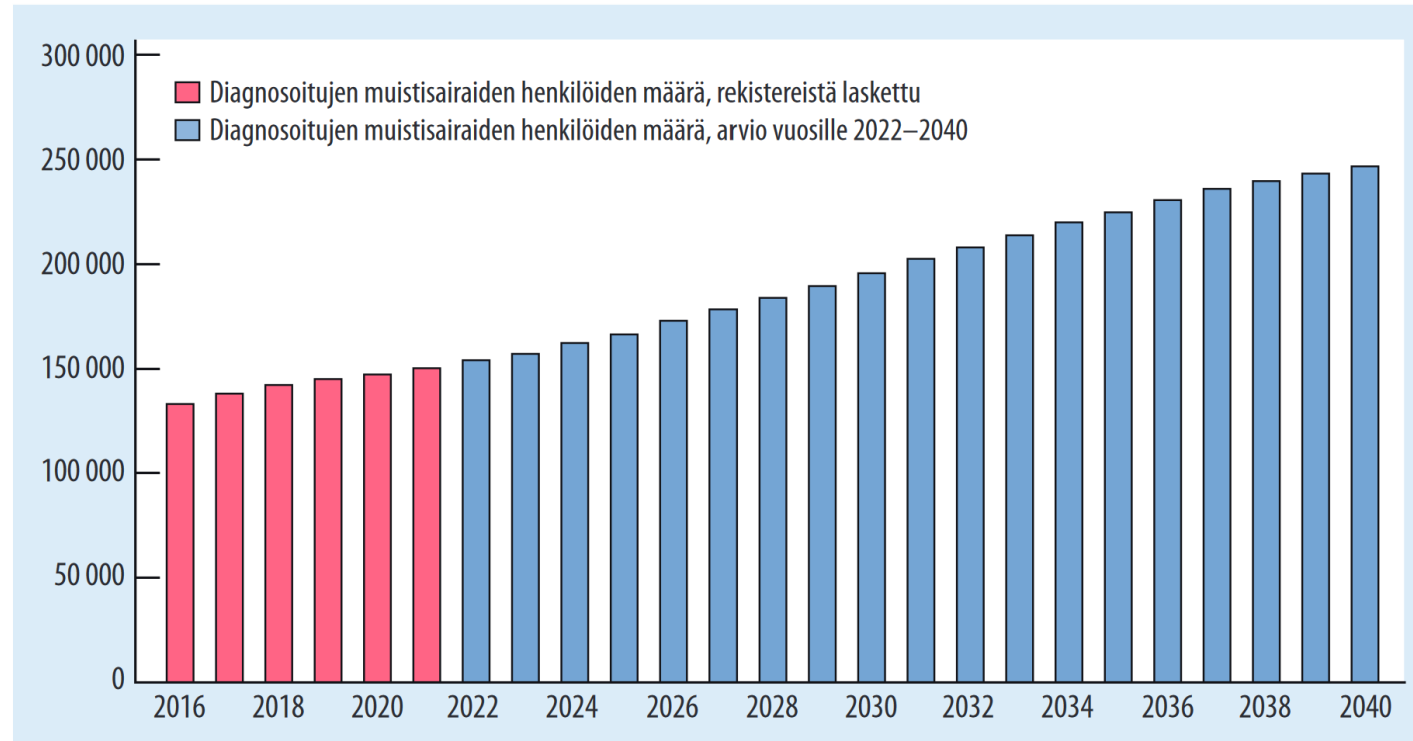
Memory diseases

- Memory diseases constitute a major challenge for health care and economy.
- In 2019, the global cost of memory diseases was 1.12 trillion euro and 50% of the memory disease costs resulted from informal care. [1]
- Alzheimer's disease is the leading cause of memory disease cases worldwide. [1]
- Resource use and cost due to Alzheimer's disease is related to its severity. [2]
- In many societies, the life expectancy and proportion of older age groups are increasing, which is expected to result to increasing Alzheimer's disease burden due to higher number of patients and more severe disease.
- **Proactive approaches are needed** in evaluation and decision making.
 - Cost of illness and burden of disease evaluations can help in **preparing for the future needs and setting priorities**, respectively.
 - Cost-effectiveness evaluations can help in decisions between technologies.

[1] World Health Organization- Dementia 2025. <https://www.who.int/news-room/fact-sheets/detail/dementia>.

[2] Aye et al. PharmacoEconomics 2025, 43, 153–169.

Memory diseases development and challenges in Finland



KUVA. Muistisairauksia sairastavien lukumäärä ja arvio vuosille 2016–2040 Suomessa.

Roitto et al. 2024

Challenges

- Late diagnoses
- Severity of disease

Discussions – in Finnish

- *Article and video* at MTV3 <https://www.mtvuutiset.fi/artikkeli/muistisairaudet-rajautamassa-kasiin-lahivuosina-laakari-kertoo-miksi-diagnoosi-pelottaa-monia/9357786>
- *Video* at MTV3 <https://www.mtv.fi/video/1bb534d3681def438992/jakso-79-kun-muisti-sairastuu-kestaako-sote-alzheimerin-taudin-vaikutukset-palveluihin-kustannuksiin-ja-paatoksentekoon>

Study

Cost of illness and burden of disease

Objective

- To estimate Alzheimer's disease-related cost of illness (Col) and burden of disease (BoD) during the next decade in Finland based on statistics, clinical information, and research papers.
- Special thanks to the authors Leena Haikonen-Salo, Tuomas Lundström, Mika Punkari, Henri Autio, Mats Ekelund, Laureanne Lorenzo, Iva Tadic, and Erkki Soini.
- Special thanks to the Sponsors BioArctic Finland Oy and Eisai AB.
- Finnish Pharmacy Days 2025.

Creating Insights with SPESIOR

Objective:
To estimate Alzheimer's disease (AD) related cost of illness (Col) and burden of disease (BoD) in Finland during 2025-35.

Knowledge gained:
The AD-related burden grows with increasing amount of AD patients and even more so with increasing unit costs.

Analysis:
Modelling based on the amount of AD patients, AD severity state related treatment costs (Col), and quality of life (BoD).

Key message:
Society will need new treatments and solutions to tackle the challenge of increasing AD-related costs and burden.

Monipuolinen farmasia

Cost of Alzheimer's disease is expected to increase by 35% over the next decade - Finnish cost of illness and burden of disease evaluation

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BACKGROUND

Memory diseases constitute a major challenge for public health care and the economy. Alzheimer's Disease (AD) is the cause of 60-70 % of the 57 million memory disease cases worldwide.¹ In 2021, there were almost 12 000 new patients with AD diagnosis in Finland.²

In many countries, the life expectancy and proportion of older age groups are expectedly increasing resulting in an increased AD burden. In Finland, the number of prevalent AD patients is expected to increase from 92 000 in 2021 to 137 000 in 2035, i.e., 49 % increase.²

OBJECTIVE

We estimated AD-related (1) cost of illness (Col) and (2) burden of disease (BoD) in Finland in 2025 and during the next decade.

METHODS

The expected development of memory disease patient count in Finland was used to estimate the number of AD patients (60.8 % of memory disease patients) during the next 10 years.² Disease severity distribution in prevalent AD patients was modelled as a function of the severity distribution at time of diagnosis^{3,4} (i.e., cohort entry) and natural AD disease progression⁵.

Direct treatment costs of AD were modelled according to AD severity state related resource use estimated from published Swedish register study⁶ and valued with Finnish unit costs⁷ using the micro costing method. Productivity costs were based on official Finnish statistics on age-related hourly wages and employment rates (50% and 100% of the patients' average working hours lost in mild cognitive impairment due to AD (MCI-AD) and more severe AD states, respectively). Productivity costs of the caregivers were modelled to be 15% of the patient's cost. 66% of the community dwelling AD patients were modelled to have an informal caregiver.⁸ All costs were conservatively indexed to year 2022 value, and no discounting was applied.

An additional scenario analysis of Col considered the expected increase in health care unit and productivity costs, by applying a conservative linear development of public price index for healthcare⁹ and index of wage and salary earnings¹⁰, respectively.

The BoD estimation considered also a conservative value of the health-related quality of life lost (HRQoL; 29.997 E/quality adjusted life year (QALY))^{11,12} due to AD from the patient and the caregiver. Conservatively, the effect of AD-related premature death was not included.

RESULTS

The Col of AD in 2025 is 3 417 M€ in year 2022 value, of which 46% are indirect costs. Total treatment costs of AD are 1 847 M€ (54% of total costs) which is 6.3% of operating costs of Finnish social and health care in 2024.¹³

Basecase

Additional scenario analysis

Relative change: 35%
Absolute change: 120 M€/year

Relative change: 63%
Absolute change: 227 M€/year

2025 2035 2025 2035

Col (M€)

3 417 M€
1 847 M€
1 570 M€

4 613 M€
2 063 M€
2 553 M€

5 893 M€
2 290 M€
3 603 M€

When including the value of QALYs lost due to AD, the burden of AD increases from 5 570 M€ in 2025 (33% treatment costs, 28% indirect costs, and 39% QALY loss) to 7 519 M€ in 2035.

CONCLUSIONS

The cost and burden of AD in Finland keeps increasing with increasing number of patients and can increase further with increasing unit costs of healthcare and production loss. Society will most likely need new treatments and solutions to tackle the challenge of increasing AD-related costs and burden.

Based on our results, even very conservatively valued quality of life loss due to AD seems to have more impact than direct or indirect costs alone, which highlights the importance of health loss and potential treatment benefits gained. As the cost of AD and quality of life loss due to AD are closely related to the AD severity, new disease-modifying treatments can alleviate the challenge of increasing cost and production loss as well as very impactful quality of life loss due to AD.

FUNDING STATEMENT

ESIOR Oy, Kuopio, Finland; BioArctic Finland Oy, Helsinki, Finland; BioArctic AB, Stockholm, Sweden; Eisai AB, Danderyd, Sweden.

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Methods

Cost of illness related to Alzheimer's disease was simulated

- **Direct treatment costs of health and social care** were estimated using micro costing method based on resource use in the different states of Alzheimer's disease [1] and Finnish unit costs [2,3].
- **Indirect costs** included the costs of informal care [4], and productivity losses of the patient and the caregiver [5,6,7].
- **Patients** were included using the estimated numbers Alzheimer's disease patients in Finland during the next ten years [7], their state at the time of diagnosis [8], and disease development over time [9].
- Cost of illness was presented in year 2022 €. Sensitivity analysis tested the impact of expected real values over the next decade. [10,11]

Burden of disease related to Alzheimer's disease was simulated

- The health-related quality of life impact of Alzheimer's disease to the patient and caregiver were included [12,13,14] and valuated with 29 997 € per quality-adjusted life year [15,16].

[1] Aye et al. Pharmacoeconomics 2025, 43, 153–69.

[2] Mäklin & Kokko. THL:n Työpaperi 21/2020.

[3] Helsinki University Hospital [HUS]: Palveluhinnasto 2024.

[4] Jetsonen et al. Age and Ageing, 2021, 50, 2116–22.

[5] StatFin (2025). <https://stat.fi/en>.

[6] Krüger et al.. Neurology 2024, 103, e209654.

[7] Roitto et al. Lääketieteellinen Aikakauskirja Duodecim, 2024, 140, 411–19.

[8] Alenius et al. Frontiers in Psychology 2022, 13, 901945.

[9] Potashman et al. Neurology and Therapy 2021,10, 941–953.

[10] Official Statistics of Finland: Price index of public expenditure. Accessed

September 2025. <https://stat.fi/en/statistics/jmhi>.

[11] Official Statistics of Finland: Index of wage and salary earnings. Accessed September 2025. <https://stat.fi/en/statistics/ati>.

[12] Clarity-AD-study data on file. Eisai 2024.

[13] Landeiro et al. Alzheimer's Research & Therapy 2020, 12, 154.

[14] Farina et al.. BMC Geriatrics, 2020, 20, 232

[15] Claxton et al.. Health Technology Assessment, 2015, 19, 1–504.

[16] OECD: Purchasing power parities. Accessed September 2025.

<https://www.oecd.org/en/data/indicators/purchasing-power-parities-ppp.html>.

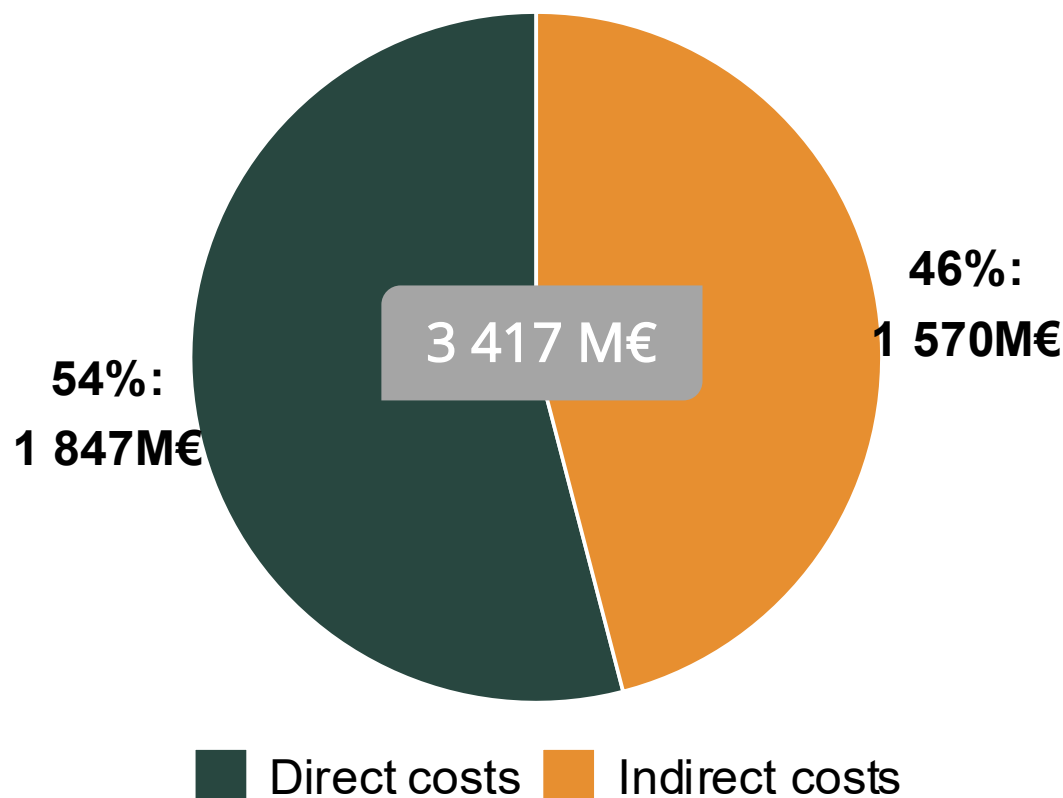
Results

Cost of illness

Direct and indirect cost of Alzheimer's disease in 2025

Direct social and health care costs were 1 847 M€ in 2025, which equals to 6.3 % of the gross operating costs of social and health care* in Finland in 2024 [1].

Results reported in 2022 value



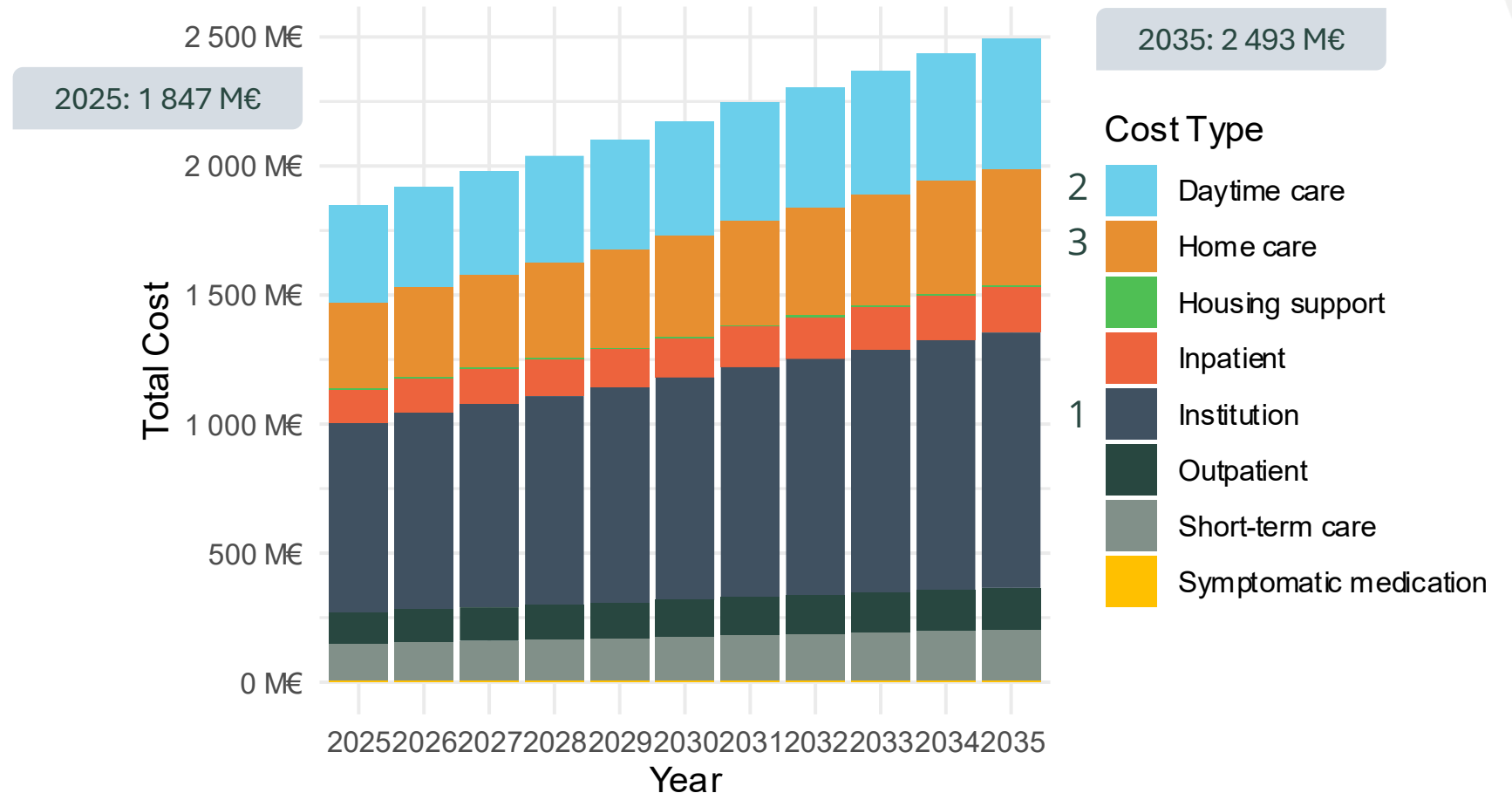
* 29 383 M€ in 2024. Gross operating costs include operating costs, depreciation and impairments as well as landslide costs without reducing operating income.

[1] THL. Accessed September 2025. <https://sampo.thl.fi/pivot/prod/fi/talous..>

Direct cost drivers of Alzheimer's disease in 2025–2035

Costs caused by the institutionalization of Alzheimer's disease patients were expected to increase by over 256 M€ over the next decade.

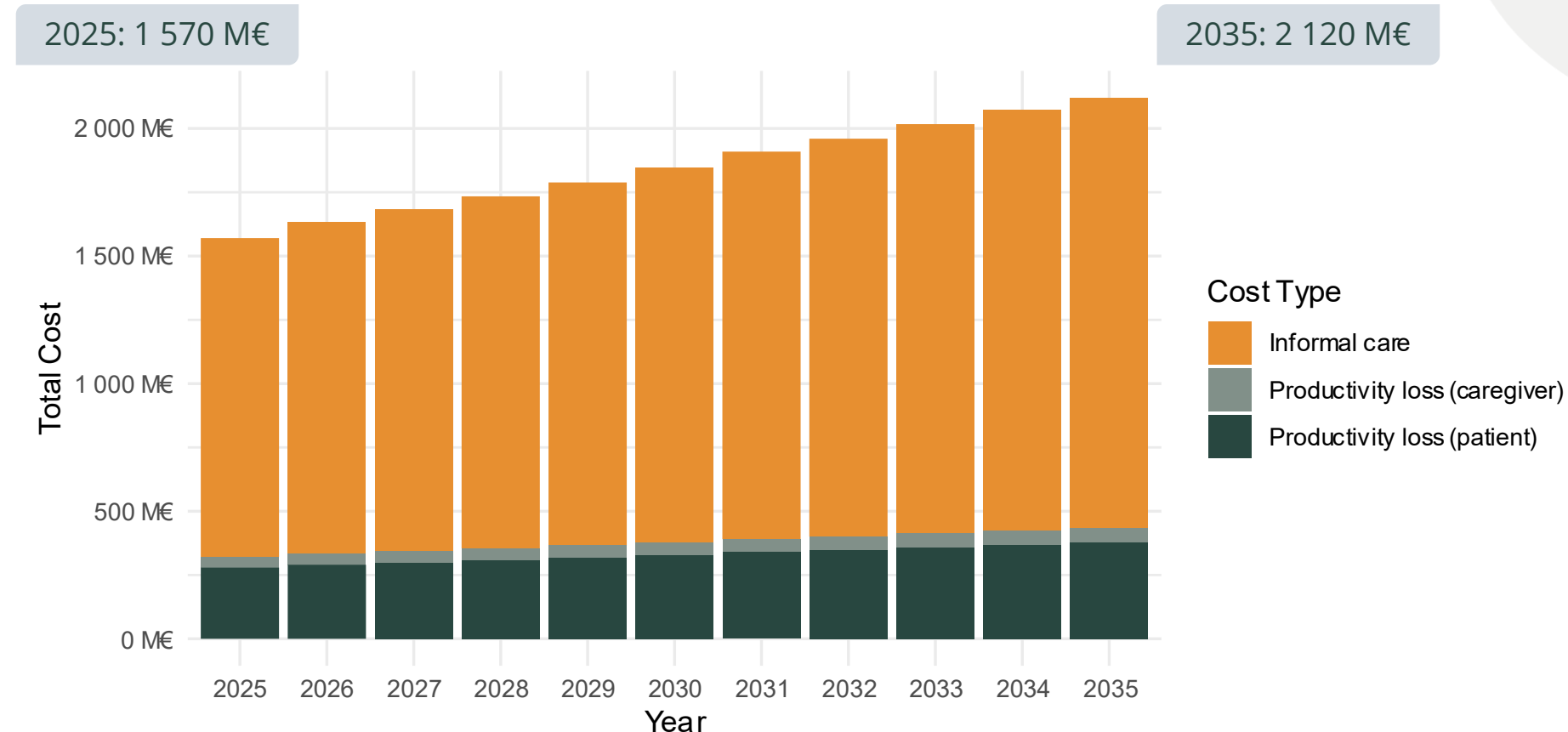
Results reported in 2022 value



Indirect cost drivers of Alzheimer's disease in 2025–2035

The total indirect Alzheimer's disease treatment costs were expected to surpass €2 billion in eight years.

Results reported in 2022 value



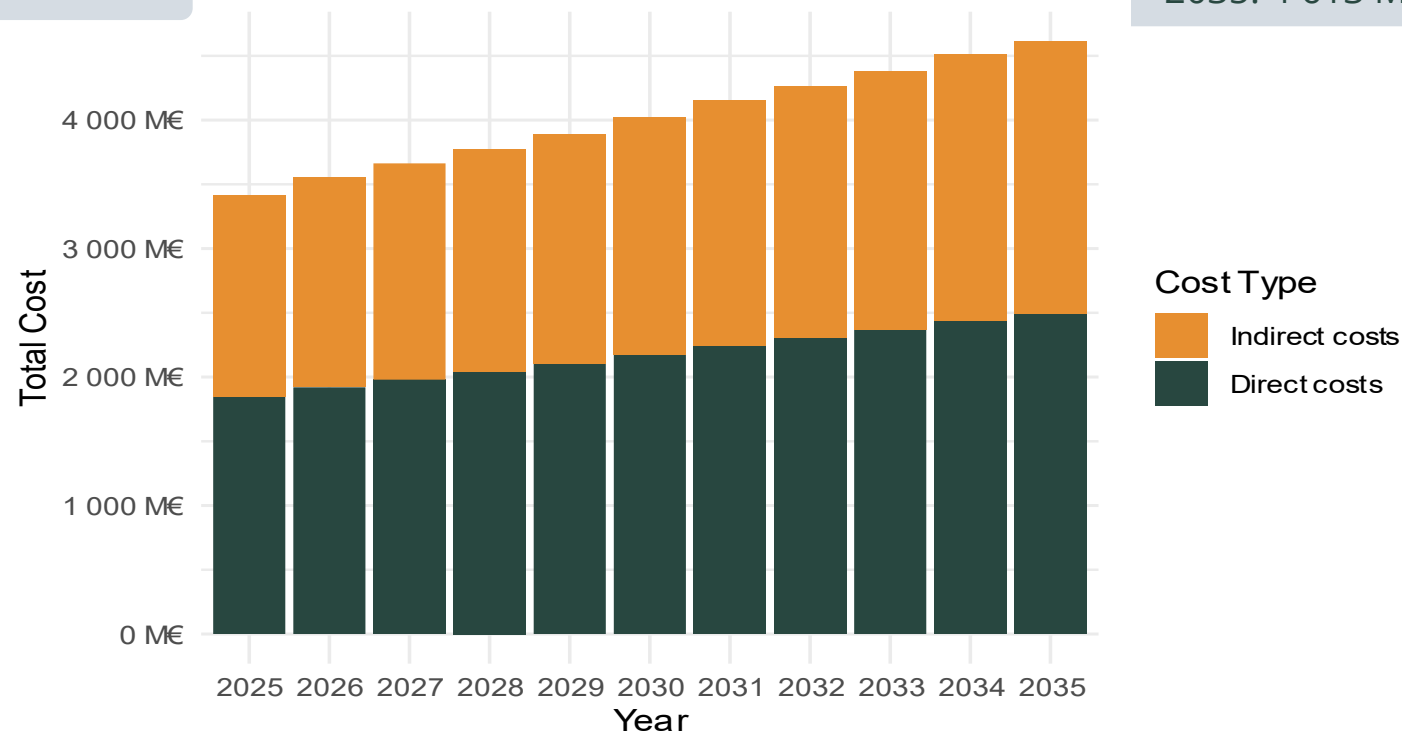
Direct and indirect cost of Alzheimer's disease in 2025-2035

Alzheimer's disease-related total costs to society were estimated to increase by **3.1 % per year**, i.e., annually 120 M€ on average.

Results reported in 2022 value

2025: 3 417 M€

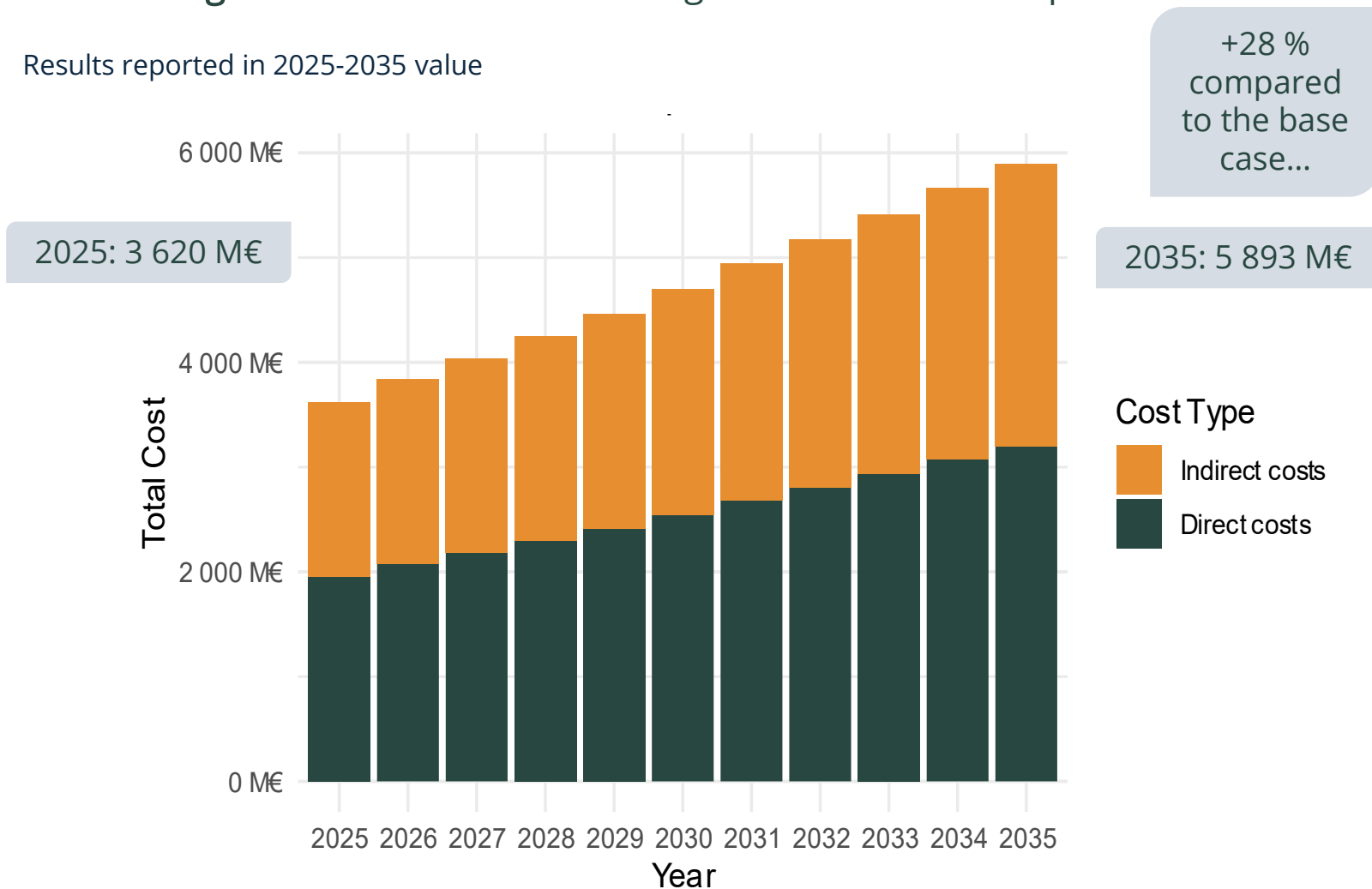
2035: 4 613 M€



Sensitivity analysis including the changes in the unit costs

Alzheimer's disease-related costs to the society were estimated to increase by 63 % during the next decade if including the unit cost development.

Results reported in 2025-2035 value

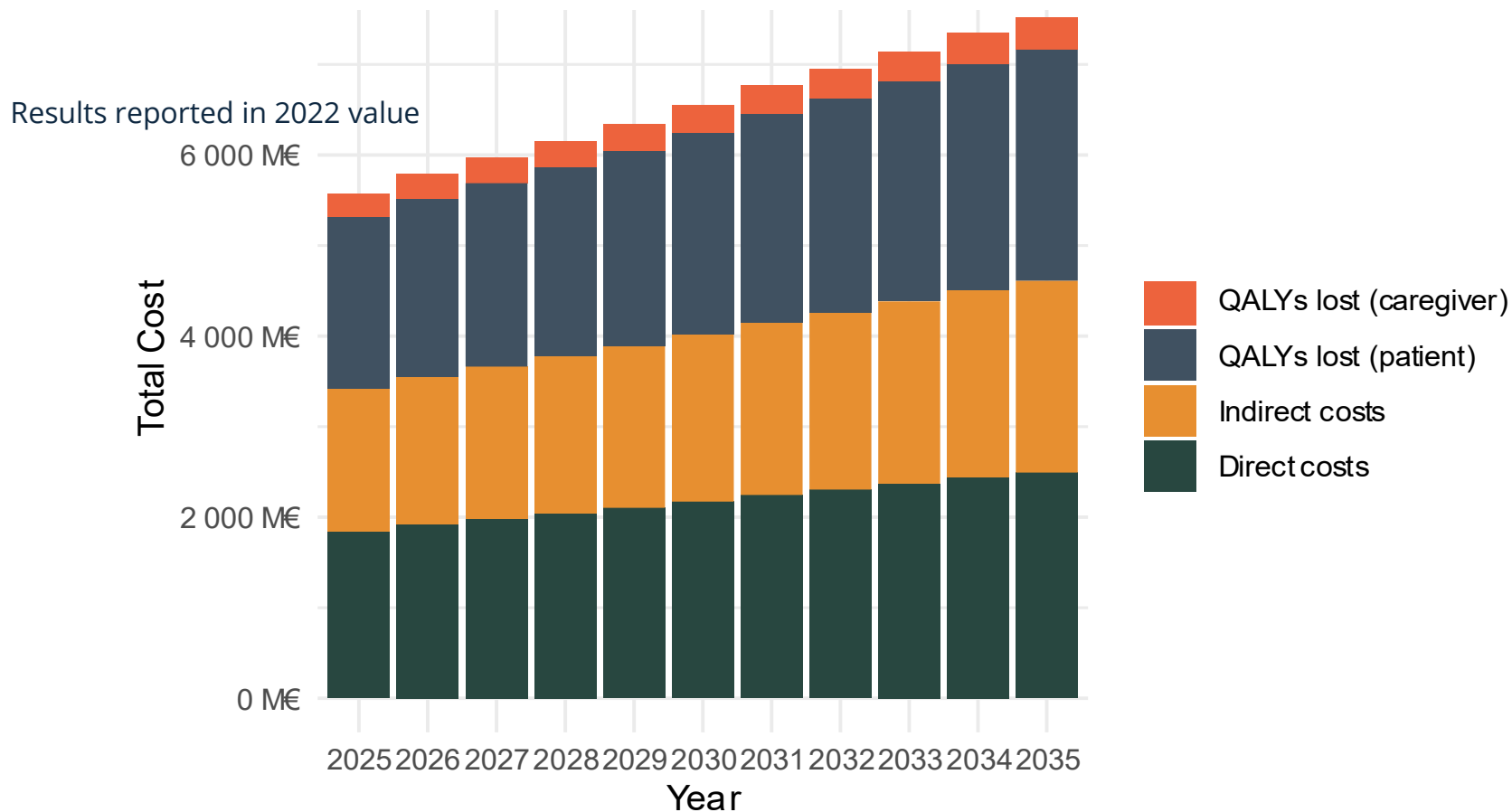


Results

Burden of disease

Burden due to Alzheimer's disease in 2025-2035

Burden due to health loss is warranted...



Yet, even conservative health loss has more impact than direct or indirect costs alone, which highlights the importance of health loss and potential treatment benefits gained.

Cost of illness and burden of disease – next steps are coming

A more comprehensive approach has been built to estimate the burden of disease. Information has been updated. Follow-up is expected...

Cost of Illness, economic burden	Burden of Disease, health burden
Mortality includes the number of premature deaths in a population, life lost. Morbidity includes the prevalence of diseases and severity.	
Direct medical costs includes visit, hospital stay, drug, home healthcare, illness benefit and rehabilitation costs, direct co-payments.	Years of life lost – YLL – is the total number of years lost due to premature death.
Direct non-medical costs includes transportation, household, relocating, informal care costs, and property losses.	Years lived with disability – YLD – is the total number of years lived with a disease, including severity.
Indirect costs can include lost production including absenteeism, presenteeism, and early retirement as well as unpaid assistance from close ones.	Disability-adjusted life years – DALY – includes both years lost due to and lived with disability.
Intangible costs may include directly unmeasurable economic burden such as fear, pain, and suffering.	Loss by the caregiver and close ones.
Total burden estimate	

DATA SCIENCE & EVIDENCE GENERATION



Reviews – what is known
relevant evidence found, reviewed, extracted, synthesized & communicated



Synthesis – relative effects
using all relevant evidence & enabling direct & indirect comparisons



RWD – access and use
single or multi-controller extraction, data collection, analysis & reporting



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To create better benefits

- More efficient use of resources
- Freed capacity, lower burden
- Improved cost-effectiveness
- Better acceptance and price
- Stronger competitiveness
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