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Data-driven Dementia Prevention



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Foreword to the Statement Data-driven Dementia Prevention

Dementia is already presenting us as a society with major challenges: the burdens on those affected and their families are heavy, expenditure on the healthcare system and on care is high and the direct and indirect costs for the economy are enormous. There is as yet no causal treatment or cure for dementia but preventive measures have immense potential for alleviating the burden of the disease. The research findings are unequivocal: many cases of dementia are attributable to modifiable risk factors. Reducing these factors lowers both the risk of developing dementia and its severity. Some indicators can point to an increased risk of dementia as long as 20 to 30 years before onset of the condition.

This statement summarises the current state of our knowledge about the prevention of dementia. A data-driven approach will in future make it possible to make fuller use of the potential of prevention, while putting technology and data to better use will enable both individualised behavioural prevention and a social framework configured to promote health (structural prevention). The statement offers some approaches to putting this into practice, addressing, among other things, not only the crucial part played by data availability but also open research questions. Effective prevention measures require an updated policy framework, in particular long-term funding and greater inter-ministerial cooperation. Dementia prevention must be seen as part of an overall strategy for disease prevention and health promotion.

The Academies would like to stimulate societal discussion because the existing challenges, which will only grow in future, demand swift action from all involved, not least courageous decisions by policy makers. We would like to express our sincere thanks to all the scientists in the working group, in particular its lead, Prof. Dr. Dr. Svenja Caspers.

Munich, Halle (Saale), and Berlin, March 2026



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Summary

Starting point

The burden caused by dementia is already causing great suffering for those living with it and their relatives, as well as placing enormous stresses on society, the healthcare system and the economy. Unless action is taken to alleviate the impact of dementia, these stresses will only continue to increase in the future.

Despite some recent major research breakthroughs, there is currently no cure or effective treatment for dementia on the horizon for many parts of the population. Prevention by avoiding or reducing modifiable risk factors is currently the best way of effectively alleviating the burden of the disease.

Making good use of technology and data is the cornerstone for targeted behavioural prevention and for deriving effective structural prevention measures. Optimising dementia prevention means answers must be provided for some unresolved issues around data availability. There is also a need for improvements to the evidence base and policy framework.

Results

A wealth of knowledge is already available about risk factors and indicators for dementia and this knowledge makes it possible to detect indications of an increased risk of dementia long before the onset of the condition and to modify this risk. However, enough is not yet known about how to optimally tailor individualised dementia prevention, so further research is required in this area. The possibilities of

dementia-specific behavioural and structural prevention have hardly begun to be fully explored. However, dementia prevention can already be significantly improved by using individualised risk profiles, there being a particular need to address vulnerable population groups.

Two-stage dementia risk screening provides a framework for integrating individualised risk profiles into everyday care as a tool for prevention. The first step is to identify people with an increased risk of dementia using an inexpensive, widely applicable method. The second step is to use more specific methods to observe the identified individuals for relevant dementia-related pathological changes.

If dementia prevention is actually to contribute to reducing the burden of the disease, relevant risk profile information must be communicated to those at increased risk and translated into appropriate measures. A number of initial steps have been taken in this direction, but some significant basic research is still lacking for effective individualised risk factor management, personalised approaches to dementia prevention and suitable structural prevention measures.

Approaches to promoting data-driven dementia prevention

In the short term, better use must be made of existing data and the scope of data collection and utilisation for research must be widened in order to enhance its

potential in dementia prevention. This means that existing data infrastructure should be further developed and a research data ecosystem established. In the medium term, any findings need to be translated into care, including through dementia risk screening, increased scientific communication on dementia prevention and the development of national research and prevention apps as part of the research data ecosystem.

Germany's National Dementia Strategy should be carried on beyond 2026 as a decade for brain health and moved further towards data-driven prevention. The introduction of a unique identifier (UID) in the healthcare sector is also key to providing a joined up overview of individual health data from different sources. This UID is a unique personal identification number that will allow secure and simple linkage of data records from different sources. A national research data ecosystem including one or more research and prevention apps for the general public is proposed as part of the ecosystem for driving dementia prevention forward.

Research topics that should be addressed for improved data-driven demen-

tia prevention include studies on modelling to gain a mechanistic understanding of the condition, possibilities for using digital biomarkers in prevention, gaining a better understanding of the design and effectiveness of individualised prevention measures and research into the effective implementation of prevention measures. Making greater use of data can also help to uncover insights which will allow conclusions to be drawn about the molecular and cellular bases of dementia.

Effective dementia prevention also requires an improved framework for promoting healthy lifestyles. Data-driven dementia prevention should in future also include the development of structural prevention measures using an expanded pool of data and with the participation of people at increased risk of dementia. The goal should also be to ensure greater participation in dementia-specific structural prevention measures by vulnerable population groups which have previously been unsuccessfully targeted. However, over and above dementia-specific goals, targeted structural prevention can simultaneously reduce risk factors for a variety of conditions and should therefore be planned holistically as part of an overall prevention strategy.

1 Dementia as a societal challenge in Germany

Dementia is one of the greatest societal challenges of our times and will only become even more significant in future. In 2023, there were around 1.8 million people living with dementia in Germany.^{1, 2} Extrapolations would suggest that this number will rise to some 2.74 million by 2050.³ Dementia is already placing a major burden on society, the healthcare system and the economy.

According to World Health Organization (WHO) statistics, the various forms of dementia were already imposing the ninth highest disease burden on society in Germany in 2021⁴ and were also the group of conditions with the greatest increase in burden compared with 2016 (up 26 per cent).⁵ According to federal health reporting data, dementia was also responsible for 6.8 per cent of deaths in Germany in 2023,⁶ a percentage that has been increasing for years.⁷ Last but not least, dementia is associated with a great deal of personal and family suffering.

Apart from the impact on those directly affected, dementia also has other negative effects: according to data from healthcare funding providers, dementia was already causing medical costs of around 20 billion euro in the German healthcare system in 2020.⁸ However,

since only around 40 per cent of people with dementia receive a diagnosis, these costs are probably an underestimate.

There are also other indirect costs: a large proportion of people with dementia receive “informal” care from relatives. Caregiving relatives therefore play a major role in care provision; however, the burden of care often results in these relatives reducing their working hours and sometimes even taking early retirement. According to estimates for 2020, the overall social costs of dementia in Germany therefore amount to around 83 billion euro and these costs could rise as high as 141 billion euro by 2040.⁹

► *The burden caused by dementia is already causing great suffering for those living with it and their relatives, as well as placing enormous stresses on society, the healthcare system and the economy. Unless action is taken to alleviate the impact of dementia, these stresses will only continue to increase in the future.*

The various forms of dementia are a group of conditions whose aetiology, i.e. causation, is still not fully understood. Only in around five per cent of cases are the causes known and in principle remediable, for instance in the case of autoimmune diseases, vitamin deficiencies, infections, hereditary metabolic diseases (sometimes with an onset as early as in childhood or adolescence) or hydrocephalus.¹⁰

1 See Deutsche Alzheimer Gesellschaft e. V. 2024.

2 See Blotenberg *et al.* 2023.

3 See Alzheimer Europe 2019.

4 Disease burden is measured in what are known as disability-adjusted life years (DALYs). DALYs quantify the total years of life lost or impaired due to premature death and disability caused by illness.

5 See WHO 2024.

6 See GBE 2025.

7 See Destatis 2025a.

8 See Destatis 2025b.

9 See Michalowsky *et al.* 2019.

10 Hydrocephalus is a congenital or acquired complex of symptoms that is associated, among other things,

Even for the commonest and previously best-studied form of dementia, Alzheimer's disease-associated dementia, the mechanisms underlying the onset of the condition are not yet fully understood. Nevertheless, approved drugs are already available, particularly for Alzheimer's disease-associated dementia. However, these medicines have so far only provided symptomatic relief or slowed progression in the early stages of Alzheimer's disease. In addition, they can only be used for certain subgroups of those affected. While intense research activity does mean that causal treatments may indeed become available in the long term, it is likely, as in the case of other chronic non-communicable diseases, that these will have to be combined with various prevention measures.

The impact of such drugs on future medical costs for the dementia spectrum is currently still unclear: although a reduction in direct and indirect costs as a result of milder disease progression is possible, the amount ultimately also depends on the price and possible additional costs of the corresponding treatment.¹¹ Additional costs relate, for example, to the diagnostic effort involved in identifying suitable, amyloid-positive patients or the accompanying imaging during treatment. According to estimates based on the US price for lecanemab, an antibody for treating Alzheimer's disease, the direct reimbursement costs alone for such a drug could be as high as 133 billion euro per year if used on a large scale in the European Union (EU).¹²

- ▶ *Despite some recent major research breakthroughs, there is currently no cure or effective treatment for dementia on the horizon for many parts of the population.*

with a pathologically increased accumulation of cerebrospinal fluid and can lead to various functional limitations.

11 See Zhang *et al.* 2024.

12 See Jönsson *et al.* 2023.

Prevention has great potential for reducing the burden of disease thanks to the technical possibilities that are now available. This relates, on the one hand, to the avoidance of dementia, in particular "secondary dementia", which can be prevented or regressed if diagnosed in good time. On the other hand, targeted prevention can also enable those with more advanced or irreversible dementia to participate more in society by mitigating or slowing the progression of the condition. Prevention plays an even more important role in dementia compared with other non-communicable diseases, as no reparative treatment options are currently available. Major pathological changes that occur in the course of dementia remain irreversible.

However, the potential for dementia prevention has not yet been fully exploited in Germany. There are now numerous studies which suggest that targeted control of various modifiable risk factors has a positive impact on the risk of becoming ill and the course of the disease. Risk factors which it might be modifiable to a certain extent include hearing loss, a low level of education, social isolation, depression, smoking and high blood pressure. Almost half of all cases of dementia could possibly be avoided if the 14 currently best-studied risk factors were eliminated or at least significantly reduced. In addition, there are already indications of other relevant risk factors.¹³

However, there are still few interventional prospective studies which provide solid evidence for this. Moreover, the available data mainly relate to living conditions in countries with high average incomes, which complicates generalisation. In addition, study designs usually assume an absolute elimination of the respective risk factor, rather than a quantitative reduction, which explains why forecasts of the possible reduction in the incidence of

13 See Livingston *et al.* 2024.

disease due to prevention remain uncertain at present.

For Germany, estimates from 2023 based on the eleven best-studied risk factors at the time showed that 38 per cent of all dementia is attributable to these modifiable risk factors. Even a reduction of just 15 per cent in the prevalence of these risk factors through individual behavioural and public structural prevention measures could reduce case numbers by up to 138,000, i.e. by seven per cent, by 2033.¹⁴

- ▶ *Prevention by avoiding or reducing modifiable risk factors is currently the best way of effectively alleviating the burden of disease.*

Underlying rationale and objectives of the statement

This statement by the Academies is based on assumptions and values that are less medical than social, political and ethical in nature. These need to be made transparent as part of the consultation process and stated at this point:

1. Ageing with dignity should be enabled. However, living with dementia can make it difficult to age with dignity.
2. This suggests that it makes sense and is worthwhile to pursue intensified dementia prevention measures, especially since there are currently no widely available medical treatment options for dementia.
3. Expanded use of health data in research and care improves opportunities for dementia prevention.
4. Dementia prevention requires a combination of behavioural and structural prevention but success is

dependent on behavioural changes and a willingness on the part of individuals to actively participate in healthy living.

The current state of research on the topic, which addresses not only the factors influencing the risk of dementia and the collection of relevant health data, but also risk screening and specific strategies for reducing the risk of dementia will be discussed below. The insights gained from this discussion can then ultimately lead to various approaches which can contribute to fundamentally strengthening dementia prevention in Germany, making expanded use of primary and secondary health data in particular and implementing effective prevention concepts in this country.

Data-driven dementia prevention as the vision

An increasingly data-driven prevention concept lies at the heart of this statement. This is because the existing findings on dementia prevention are themselves based on a cumulative evaluation of a large volume of data. However, most of these data were collected at group level in countries with a high average income. No or only limited account was taken of individual circumstances and the differing importance of specific factors for an individual, which explains why only general recommendations for risk reduction have previously been possible.

Large segments of the population remain sceptical about non-specific health promotion and prevention measures, which limits their acceptance and implementation regardless of the disease in question.¹⁵ For dementia in particular, there is also evidence that additional value is gained from personalised prevention,

¹⁴ See Blotenberg *et al.* 2023.

¹⁵ See ExpertInnenrat "Gesundheit und Resilienz" 2024a.

the influence of risk factors accordingly changing over a person's lifetime and also being dependent on their gender. In addition, comparable pathological changes result in differences in disease progression, for instance due to individual variation in the brain's reserves and resilience to external influences.

Under certain conditions, the combination of new technologies and methods such as artificial intelligence, digital twins and wearables are now making such personalised prevention possible: combined with corresponding data, it is thus possible to make individualised predictions and suggest specific interventions using a personalised approach while always taking account of ethical and legal considerations in terms of data protection, voluntary participation and the right to self-determination. The focus of these considerations is therefore on data which have been and are being collected in line with the existing legal framework and the current expectations of the relevant German research ethics committees.

Without ignoring the ethical and social controversy around the use of individual health data, the focus of this statement is both on the medical opportunities afforded by expanded data use for dementia prevention and on the technical, organisational and regulatory obstacles to it. The principle of voluntary participation should be upheld, which is why the focus here is on approaches to promoting voluntary data sharing by the general population.

Personalising prevention measures is potentially a valuable lever for promoting prevention by enabling better coverage and care for all population groups. The creation of individualised risk profiles as a key tool in data-driven dementia prevention is something that needs to be discussed below. Such profiles are the basis for quantifiable statements about

individuals over time in order to enable a better understanding of the significance of individual risk and ensure it becomes more widely acknowledged that individual prevention makes sense and is possible.

Risk profiles might in future be used in personalised models for determining an individual's risk of developing dementia or for simulating associated changes in the brain and memory and so allowing a better assessment of the relevance of particular risk factors for the individual in question. Intervention studies from various medical specialisms have shown that prevention measures are better accepted when they are tailored to an individual's needs, health goals and preferences.¹⁶

In addition to new possibilities for behavioural prevention¹⁷, individualised risk profiles also offer a better basis for decision-making for effective structural prevention.¹⁸ The two types of preventive healthcare should always be considered together because the interaction between behavioural and structural prevention measures strengthens not only an individual's resilience and self-efficacy but also the resilience of the healthcare system and of other areas of society that are of relevance to health.¹⁹

► *Making good use of technology and data is the cornerstone for targeted behavioural prevention and for deriving effective structural prevention measures.*

16 See ExpertInnenrat "Gesundheit und Resilienz" 2024a.

17 Behavioural prevention refers to preventive measures and strategies aimed at changing individual lifestyles in order to promote personal health and avoid an individual's disease burden.

18 Structural prevention refers to preventive measures and strategies aimed at creating healthy living conditions for the population in order to avoid the burden of disease on individuals and society.

19 See ExpertInnenrat "Gesundheit und Resilienz" 2024a.

Current dementia prevention situation in Germany

Back in 2019, in its Guidelines for Risk Reduction of Cognitive Decline and Dementia, the World Health Organization explicitly called on member states, of which Germany is one, to implement multisectoral prevention strategies.²⁰ And indeed, several countries have already launched corresponding initiatives for the behavioural and structural prevention of dementia. One example is Luxembourg, where a national prevention programme (Programme Démence Prévention – PDP) has been in place for a number of years, under which general practitioners or specialists can refer people with subjective or mild cognitive disorders for risk assessment, advice and referral to regional healthcare providers. Germany does not as yet have a comparable programme. However, study results have shown that prevention measures should not simply be “cut-and-pasted”, but should always be country-specific, as the effectiveness of the measures is also dependent on the socio-cultural context.²¹

In Germany, issues relating to dementia prevention are mainly located at the intersection of health, family and social policy, which is why they are primarily handled by the Federal Ministry of Health (BMG) and the Federal Ministry for Education, Family Affairs, Senior Citizens, Women and Youth (BMBFSFJ). However, due to the enormous need for research into dementia prevention, modelling and individualised data evaluation and given that the implementation of prevention measures will in future increasingly be technology-driven, the Federal Ministry of Research, Technology and Space (BMFT) should also be mentioned in this context.

In 2020, under the leadership of the Ministry for Family Affairs and the Ministry of Health, the federal government presented a corresponding framework concept, the *National Dementia Strategy*, which is to be implemented through concrete measures and projects across all ministries by 2026.²² The key aim of the government’s strategy is “to improve the circumstances of people with dementia and their relatives”²³ and to create sustainable support structures for the future. Specifically, the strategy is divided into four action areas primarily focusing on people with dementia: (1) developing and establishing structures to enable people with dementia to participate in society, (2) supporting people with dementia and their relatives, (3) advancing health and long-term care services for people with dementia and (4) promoting excellent research on dementia. Dementia prevention, on the other hand, plays only a subordinate role in the current version of the strategy.²⁴

It is therefore hoped that this statement will provide impetus to further develop the National Dementia Strategy to also include data-driven dementia prevention.

Prerequisites for data-driven dementia prevention

If the potential for individualised dementia prevention and risk profiling is to be fully exploited, Germany must significantly improve the availability and processing of its health data. However, there are currently legal and technical difficulties, especially when it comes to linking personal data across different data centres and study settings: only rarely is there explicit consent for comprehensively merging personal data. In addition, the healthcare system

²⁰ See WHO 2019.

²¹ See Livingston *et al.* 2024.

²² See DZA 2025.

²³ BMFSFJ/BMG 2020, p. 23.

²⁴ BMFSFJ/BMG 2020, p. 3 ff.

still lacks a unique identifier (UID)²⁵ for patient data, despite such a tool being key to achieving such linking as well as providing a future-proof framework for other digital health policy purposes beyond the issue of dementia prevention.

In addition, there are diverging positions within society regarding the scope of and conditions for use of health data, as well as ethical considerations resulting from the fact that, especially in the case of dementia, the individual's right not to know is of central importance when merging and evaluating personal health data. This also applies to wearables which record user data pragmatically, i.e. in daily life, and could thus ascertain and display a realistic assessment of an individual's dementia risk.

According to scientific methodology, large, population-based cohort studies in principle have the greatest potential for improving the understanding of risk constellations and the effectiveness of

therapeutic or preventive measures. For this purpose, targeted hypotheses are formulated and tested in specific groups in accordance with certain implementation specifications. At present, however, there are hardly any studies which are collecting the volume of data required for evidence-based dementia prevention, which would require imaging data, lifestyle indicators and physiological data, among other things. Nevertheless, the incidence of dementia and its consequential costs for society as a whole show that investment in long-term risk and prevention research is worthwhile because such studies help to reduce not only the prevalence and individual burden of disease but also the financial and social burden on the health-care system.

- ▶ *Optimising dementia prevention means answers must be provided for some unresolved issues around data availability. There is also a need for improvements to the evidence base and policy framework.*

²⁵ A unique identifier (UID) is a unique, personal ID number which enables secure and simple linkage of different data records. For example, Germany's tax identification number has been in existence as a UID for tax purposes since 2007.

2 Forms of dementia and dementia prevention

The medical term dementia does not refer to a specific disease, but to a complex of specific symptoms which manifest as impairments of a person's thinking and behaviour and so also limit their ability to carry out everyday activities. Cognitive abilities are often lost gradually, starting with memory or orientation problems and progressing to impairment of everyday competence and personality decline.

In most cases, dementia is primarily due to pathological changes in the brain arising from the accumulation and aggregation of misfolded proteins, for example amyloid-beta plaques and neurofibrillary tangles of tau protein in Alzheimer's disease, or to cerebrovascular disease processes. While specialist knowledge of the precise functional mechanisms of dementia has developed steadily over the years, there are still considerable gaps in our understanding of both the neuropathological relationships and the complex mechanisms of causation. For instance, the precise influence of amyloid-beta or tau protein on the onset and progression of certain types of dementia remains scientifically controversial.

The diverse causes and mechanisms involved in the dementia spectrum result in numerous diseases which are known under the umbrella term dementia and can be differentiated primarily by the type of pathological changes in the brain and sometimes also by symptoms.

Types of dementia

The International Statistical Classification of Diseases and Related Health Problems (ICD-10) currently recognises 63 types of dementia.²⁶ With regard to the pathogenesis of the particular disease, i. e. the physical mechanisms involved in its development and progression, the most common forms of dementia can in turn be divided into two groups: degenerative dementia and vascular dementia. These two groups constitute what is known as primary dementia. Degenerative dementia primarily refers to dementia caused by Alzheimer's disease-associated dementia, frontotemporal dementia and Lewy body dementia. Vascular dementia, on the other hand, refers to forms of dementia caused by circulatory disorders in the brain, for example strokes and diseases of the smallest vessels, although there are also mixed forms of degenerative-vascular dementia. Changes in the small blood vessels, known as cerebral microangiopathies, are common in old age and in many cases also contribute to the development of Alzheimer's disease-associated dementia.

The precise distribution of dementia cases by type and group depends on study setting and population region. Overall, the two groups of primary dementia account for around 80 to 90 per cent of all cases of dementia. The remaining 10 to 20 per cent are made up of mixed forms, young-onset forms of dementia and secondary dementia as a result of other conditions. Conditions which can lead to dementia include various autoimmune diseases, brain tumours, infections, hereditary metabolic diseases and alcoholism.²⁷

Drugs are now available for certain forms and stages of dementia, but they can only treat symptoms or slow down the progression of the disease. For instance,

²⁶ See Allan *et al.* 2019.

²⁷ See Antwerpes *et al.* 2025.

cholinesterase inhibitors and the active ingredient memantine, both of which reduce cognitive impairment, are approved for mild and moderate cases of Alzheimer's disease-associated dementia and for Lewy body dementia. Antibody therapies which can reduce the accumulation of amyloid-beta plaques in the brain and thus delay disease progression are also available for mild Alzheimer's disease, i. e. mild cognitive impairment due to Alzheimer's disease with mild Alzheimer's disease-associated dementia.²⁸ However, even if such antibody therapies completely clear beta-amyloid from the brain, loss of cognitive performance has been observed to continue, indicating that there are still gaps in our understanding of the disease.

Dementia epidemiology in Germany

Reliable data on the epidemiological distribution of the various types of dementia in Germany are difficult to obtain, as not all cases are statistically recorded. This is partly due to the widespread fear of a dementia diagnosis, stigmatisation and the lack of a cure. Other reasons for diagnostic gaps are misinterpretation of dementia symptoms as normal consequences of old age, lack of knowledge and socio-cultural barriers to seeking medical help.²⁹

The official cause of death statistics for deaths due to dementia resulted in the following picture for Germany in 2023: 14.5 per cent Alzheimer's disease-associated dementia, 8.1 per cent vascular dementia and 77.4 per cent unspecified dementia.³⁰

Similarly to other Western countries, the percentage prevalence of dementia has been falling in Germany for a number of years, by 1.2 percentage points per year over the 2009–2012 period

according to one study.³¹ The reasons for this remain unclear but one possibility is the recent improvement in the treatment and prevention of cardiovascular disease in Western countries, which also reduces the risk of dementia.³² However, due to the increasing prevalence of other risk factors such as obesity and diabetes in Germany, this trend could reverse in the foreseeable future.³³ Moreover, as a result of demographic changes towards an increasingly elderly population, it is also to be expected that the absolute number of people affected will increase in the future. This is because the likelihood of dementia increases with age.

Accordingly, on the basis of the statistically recorded rate of disease in Germany in 2023, the average prevalence of dementia was 0.21 per cent in the 40–59 age group, 8.46 per cent in the over-65 age group and 36.32 per cent in the over-90 age group. A similar distribution can be observed in incidence by age group. Evaluations from 2015 for Western Europe reveal that five per 1,000 inhabitants between 65 to 69 years of age develop dementia every year, while the figure is as high as 122 per 1,000 among the over 90s.³⁴

Age is therefore the greatest risk factor for dementia, but dementia does not have to be an inevitable consequence of ageing. Rather, a combination of age-related changes in the brain and other risk factors that occur more frequently in older age contributes significantly to the overall risk.³⁵ Pathological changes in the brain which lead to dementia can, however, often be detected 20 or even 30 years before the first significant symptoms are identified.^{36, 37}

28 See Livingston *et al.* 2024.

29 See Aldus *et al.* 2020.

30 See GBE 2025.

31 See Blotenberg *et al.* 2023.

32 See Satizabal 2016.

33 See Blotenberg *et al.* 2023.

34 See Deutsche Alzheimer Gesellschaft e. V. 2024.

35 See Alzheimer's Research UK 2025.

36 See Caselli *et al.* 2021.

37 See Johnson *et al.* 2023.

Dimensions and strategies of health prevention

Prevention in the medical sense includes all activities which are carried out with the aim of avoiding or delaying diseases or making their occurrence less likely. A distinction can be drawn between various kinds of prevention, depending on when and how these activities begin.

Primary, secondary and tertiary prevention

Prevention measures can be put in place before the onset of a disease, in the preliminary stages or even once a disease has already manifested clinically. It is possible to distinguish between three different dimensions on the basis of this staging scheme:

- **primary prevention:** measures to maintain health before the manifestation of risk factors or disease, for example through education, changes in individual risk behaviour and lifestyle, or changes in social conditions;
- **secondary prevention:** measures for the early detection, timely treatment or containment of diseases in their early stages, for example through the development of individual risk profiles, screening measures, preventive investigations, medication or vaccinations;
- **tertiary prevention:** measures to prevent disease progression or complications in an already manifest disease, for example through rehabilitation or remedial treatment measures.

In terms of the dementia spectrum, primary prevention is thus directed at people who have no cognitive impairment and in whom no dementia-specific biomarkers such as certain proteins can be detected. Secondary prevention measures in turn take effect when positive biomarkers indicate the onset of dementia. Finally, tertiary prevention begins once the disease has already manifested and the person

affected has, for example, (subjective) cognitive impairment.³⁸

Behavioural and structural prevention

In addition to differentiation by clinical stage, medical prevention measures are also differentiated according to the precise target of the measure: the person's individual behaviour or their overall living conditions:³⁹

- **behavioural prevention:** measures to positively influence an individual's knowledge, attitudes and behaviour in a way that promotes health, for example through dietary changes, smoking cessation, exercise and physical activity, different consumer choices or promoting resilience to avoid mental illness;
- **structural prevention:** measures to shape societal living and working conditions in a way that promotes health, for example through awareness campaigns, by adjusting taxes and duties as well as legal bans, restrictions or mandatory labelling requirements for certain risk factors, legislative interventions for health promotion and the provision of health-promoting infrastructure for the population.⁴⁰

This statement focuses both on the two subject-specific dementia prevention strategies (behavioural and structural) and on their three stage-specific dimensions (primary, secondary and tertiary), as effective treatment for the entire population is neither available nor foreseeable. In the long term, primary and secondary prevention offer the greatest leverage for reducing the burden of disease on individuals and society. However, primary and secondary prevention is no longer appropriate for patients who already have advanced dementia, which is

³⁸ See Düzel/Thyrian 2023.

³⁹ See Dadczynski/Paulus 2018.

⁴⁰ See Walsh et al. 2024a.

why the foreseeable high rate of disease will also result in particularly high costs in the short and medium term. Therefore, if tertiary prevention measures can be developed and implemented at this point, this would alleviate the suffering of those affected and their relatives and reduce cost pressures on the healthcare system, so creating substantial added value for society and the healthcare system.

Scientific insights from recent years offer some hope that dementia-specific primary and secondary prevention by medical measures such as vaccinations (in particular against shingles) or drug therapies for diabetes and obesity (in particular GLP-1 receptor agonists) might be able to slow the progression of clinical symptoms in people at increased risk of dementia. It can firstly be concluded from this that it will be absolutely essential to have access to health data from other specialisms to enable targeted development of dementia-specific prevention measures. Secondly, however, the technical conditions to enable successful, data-driven dementia prevention in Germany must also be met because broad-based long-term clinical research to develop and test prevention measures requires platform studies with strong digital and data foundations.

Although individual risk profiles for dementia are the starting point for the prevention strategy outlined here, this must not give the impression that dementia prevention is achievable solely by behavioural approaches. Even if risk factors do typically play a part in personal behaviour, this is usually the result of behavioural and structural factors, because societal living conditions can influence, facilitate or even prevent individual behaviour. Behavioural and structural prevention must accordingly always be considered together, with structural prevention typically denoting indirect measures which are intended to modify personal behaviours⁴¹ and aim to structure the environment in which people live and work in such a way as to encourage a health-promoting lifestyle. For instance, it encompasses urban planning and environmental protection measures such as creating green spaces and recreational areas, reducing noise levels and mitigating atmospheric and environmental pollution, expanding cycleways and footpaths and providing leisure and sporting facilities. However, other aspects of public service provision, such as access to medical care or to public transport, in particular in rural areas, also fall within the spectrum of medical structural prevention.

41 See Walsh et al. 2023.

3 Building blocks of data-driven dementia prevention in Germany

3.1 Individualised risk profiles

The last few years have seen numerous research efforts which have greatly widened our knowledge about factors which modify an individual's dementia risk and have allowed conclusions to be drawn regarding disease state or pathological changes. The current research situation will be presented below, and will, at the same time, constitute the basis for the subsequent discussion, which will focus on the concept of an individualised risk profile as the core element of data-driven dementia prevention.

Dementia risk factors

According to the epidemiological evidence base, various modifiable risk factors play a major role in the occurrence of dementia. A 2024 report by the Lancet Standing Commission on Dementia Prevention, Intervention, and Care came to the conclusion that up to 45 per cent of all dementia cases worldwide are theoretically preventable, if 14 modifiable risk factors were eliminated: low level of education, hearing loss, high LDL cholesterol, depression, traumatic brain injury, physical inactivity, diabetes, smoking, high blood pressure, obesity, excessive alcohol consumption, social isolation, air pollution and vision loss.⁴²

The data available so far also suggest that the relevance of the stated risk factors varies depending on the stage of life at which they occur. For instance, early on the highest risk factor is low level of education, while in midlife it is hearing loss, with social isolation being the highest risk

factor late in life. These findings are based on international data sets, which is why the weighting of individual risk factors may differ from country to country.

In addition to the stated risk factors, the evidence base also provides pointers, albeit less clearly and comprehensively, to further factors which appear to have a positive or negative influence on dementia risk. These include anxiety disorders, low income, contact with solvents, consumption of ultraprocessed food, air pollution in an individual's living environment, chronic kidney disease, poor sleep quality and circadian rhythm disorders.⁴³ In addition, what are known as iatrogenic risk factors, i.e. those related to medical treatment, need to be taken into account. For instance, there is some evidence that patients over 65 may experience accelerated cognitive decline after an operation under anaesthesia.^{44, 45}

Conversely, reducing or avoiding most of the factors mentioned here may lower dementia risk, for example maintaining hearing for life, avoiding tobacco consumption or effectively treating depression. Other factors which can have a positive effect on dementia risk include medical interventions, spending time in nature, meditation and cognitively demanding hobbies such as playing a musical instrument.^{46, 47}

Alongside the multitude of influencing factors, the complexity of effective dementia prevention is further increased by the fact that some of the stated risk factors overlap, are dependent on one another and can have a mutually strengthening or weakening effect.

⁴³ See Rosenau *et al.* 2023.

⁴⁴ See Banerjee *et al.* 2024.

⁴⁵ See Vanderweyde *et al.* 2010.

⁴⁶ See Seminer *et al.* 2025.

⁴⁷ See Rodriguez *et al.* 2025a.

⁴² See Livingston *et al.* 2024.

It is difficult to prove a clear causal relationship for the risk factors. To do so would require randomised, controlled studies, which, in the case of dementia research, would have to run for long periods, something which would greatly limit the number of willing test subjects. The results relating to the influence of the 14 most-investigated risk factors are thus based above all on meta-analyses and on international prevalence data from high-income countries.⁴⁸

In addition to the epidemiological data, however, there are also pointers to specific mechanisms in the brain for these 14 factors which might modify dementia risk. These include the effect on vascular damage, immune responses, dementia-associated neuropathology, stress and inflammation responses and impaired “cognitive reserve”, i.e. the ability to maintain fundamental cognitive functions despite disease-related damage or age-related breakdown of neural tissue. However, experimental research has not yet succeeded in demonstrating a direct causal link between risk factors and the pathophysiological mechanisms of dementia, there being a need for successful intervention studies if this is to be achieved.

Cognitive reserve varies between individuals and is responsible for the fact that similar pathological changes in brain tissue can lead to very different levels of impairment.⁴⁹ Since individual cognitive reserve cannot be directly measured, a number of proxy indicators are used to define its extent: length of an individual’s formal education, the complexity of their job and their leisure activities, their parents’ educational level, multilingualism and IQ test results.⁵⁰

In the majority of cases, dementia is not an inherited condition, but there are

genetic factors with a significant influence on dementia risk. The best-studied genetic risk factors for dementia are associated with Alzheimer’s disease: the presenilin genes, the APP gene, as well as the APOE gene and trisomy 21. The relevant variants of these genes affect dementia risk or disease progression. Certain gene variants are also responsible for the rare cases of clearly hereditary dementia.^{51, 52} There are numerous further relevant genes which modify an individual’s dementia risk; in one study, for example, 83 mutually independent gene variants associated with dementia were identified, in addition to the APOE gene. This multitude of genetic influencing factors may be combined to provide a “polygenic risk score” (PRS)^{53, 54} The PRS is an additional factor in identifying individuals at increased risk of dementia, alongside an analysis of existing risk factors and information about the status of the above-mentioned genes.⁵⁵

Genetic risk factors in turn interact with life-style risk factors, meaning that most people can reduce a possibly genetically determined dementia risk by reducing or avoiding the modifiable risk factors. However, it remains unclear whether this holds true for high-risk groups for example in relation to APOE status.⁵⁶ In any case, epigenetic processes could be a meaningful explanation for how genetic predisposition to dementia and dementia risk as a whole can be modified by environmental factors and behavioural changes. Nonetheless there is still a lack of clarity about specific influencing mechanisms.⁵⁷ The various influencing factors and their interaction lead, moreover, to a wide variation in disease progression,

51 See Livingston *et al.* 2024.

52 See Dementia & Alzheimer’s Australia 2024.

53 The Polygenic Risk Score is a statistical measure which evaluates a person’s genetic predisposition to a specific disease by combining the effects of a large number of genetic variants.

54 See Yu *et al.* 2024.

55 See de Rojas *et al.* 2021.

56 See Licher *et al.* 2019.

57 See Koulouri/Zannas 2024.

48 See Livingston *et al.* 2024.

49 See Stern 2009.

50 See Pinto *et al.* 2022.

meaning that clinical manifestation may be absent despite certain risk factors being strongly pronounced.

There are already various models and scoring systems for recording and describing an individual's dementia risk, and these make differing use of the influencing factors outlined here.⁵⁸ The CAIDE (Cardiovascular Risk Factors, Ageing and Dementia) risk score, for instance, was developed to estimate the risk of dementia within the next 20 years based on midlife risk factors. The factors considered in obtaining a CAIDE risk score are a person's age, educational level, gender, blood pressure, body mass index, total blood cholesterol, physical activity and APOE status. Other examples of such systems are the LIBRA (Lifestyle for Brain Health) score and the ANU-AD risk index (Australia National University Alzheimer Disease Risk Index), which looks at additional influencing variables. In the context of vascular prevention, risk scores from other fields may be used, for example Life's Essential 8, an individual score for estimating cardiovascular risk.⁵⁹

The scoring systems outlined here are already used for research purposes, for example in the selection of male and female test subjects in clinical studies or for measuring the effects of preventive interventions. Such scoring systems also open up significant opportunities for dementia prevention: early identification of individuals at increased risk, improved risk perception amongst those affected and support for medical staff implementing targeted prevention measures. However, the models have so far mostly only been tested on a relatively small scale. In addition, cultural differences, for example regarding dietary habits and substance abuse, have not previously been taken into account. Finally, these models need to be

continuously reviewed and broadened where appropriate on the basis of the ever-growing knowledge of dementia risk factors.⁶⁰

Risk indicators for dementia

In addition to risk factors, "risk indicators" are now also used to determine an individual's risk of developing dementia more accurately. Such indicators are already used in diagnosing dementia, but some of them can point to an increased risk long before the onset of the condition. A positive finding of a risk indicator thus does not mean that the individual affected will inevitably develop dementia, but rather merely that the condition might develop or that there is an increased risk of its doing so. Indicators differ in significance and in the effort required for data collection, and can be broadly divided into three categories: biomarkers, digital biomarkers and cognitive status assessments.

The term biomarker denotes objectively measurable biological features which may point to a pathological process in the body. Biomarkers for dementia have so far primarily been investigated in connection with Alzheimer's disease. They are typically collected by image-based diagnostics (e.g. computed tomography and magnetic resonance imaging) and by cerebrospinal fluid or blood analyses.

Image-based methods primarily allow the detection of protein aggregation (e.g. amyloid plaques or tau fibrils) and of changes to cerebral volume or cerebral blood flow. These biomarkers are directly associated with specific dementia symptoms, but collecting them is costly and requires special equipment and trained personnel. In addition, the variance between individuals and thus the relevance of individual cerebral changes to the actual observable extent of dementia symptoms are not yet fully understood. The same is

⁵⁸ See Lloyd-Jones *et al.* 2022.

⁵⁹ See *ibid.*

⁶⁰ See Anstey *et al.* 2022.

also true of biomarkers in the cerebrospinal fluid, the analysis of which requires a lumbar puncture, i.e. the sampling of cerebrospinal fluid from an individual's spinal canal. Here too, the markers indicate specific proteins which point to pathological aggregation in the brain.

Such image-based and laboratory diagnostic biomarkers can be used to detect pathological changes which lead to Alzheimer's disease-associated dementia decades before the onset of the condition. In one study, amyloid beta level abnormalities were identified in this way a full 18 years before the onset of Alzheimer's disease.⁶¹ In a further study, two proteins involved in the formation of amyloid plaques provided pointers to the later occurrence of Alzheimer's almost 30 years before diagnosis.⁶² For some years now, the European Union's *Horizon 2020* research project *AI-Mind* has, moreover, been developing AI-based tools for predicting dementia risk based on electroencephalography (EEG), blood tests and cognitive tests.⁶³

Like markers found in cerebrospinal fluid, blood-based biomarkers are based on proteins which are associated with pathological changes, and their predictiveness is typically validated by comparison with image-based diagnostics. Blood biomarkers are also generally cheaper and easier to detect than those requiring diagnostics based on imaging and cerebrospinal fluid analysis. The informative value of markers in the blood as a surrogate⁶⁴ for complex image-based methods is also constantly improving. May 2025 saw the US Food and

Drug Administration (FDA) for the first time approving a blood test for diagnosing Alzheimer's disease.⁶⁵ However, it remains unclear how informative blood-based markers can be when it comes to predicting dementia risk.⁶⁶

As an extension of the conventional biomarkers, "digital biomarkers" are also in use today, these being collected by sensors, wearables, implants or image analysis. They record, for example, an individual's physical activity and sleep behaviour, from which conclusions can be drawn as to individual dementia risk.⁶⁷ Further examples involve voice, eye movement, and fine motor skills analyses during smartphone use and functional testing of the autonomic nervous system or the observation of neuropsychiatric behavioural abnormalities and symptoms in connection with depression and anxiety disorders.⁶⁸

Unlike conventional biomarkers, digital biomarkers do not require a clinical setting for collection purposes, but rather can be continuously collected in all population groups. However, the informative value of digital biomarkers in terms of individual dementia risk has not as yet been fully investigated, and there is a shortage of data about the interrelationship between causally proven biomarkers and digital biomarkers as possibly more readily accessible surrogate markers.

A large number of devices are currently available for mobile collection of digital biomarkers, ranging from consumer articles such as fitness trackers to medical devices requiring approval, such as the Apple Watch. Moreover, some systems make exclusive use of mobile telephones while others need supplementary wearables. Body sensors (Body Area Networks) can also be used, these being worn on or in

61 See Jia *et al.* 2024.

62 See Johnson *et al.* 2023.

63 See Haraldsen *et al.* 2024.

64 The term "surrogate marker" is used in the context of clinical studies for metrics which are collected when the actual target variables cannot readily be operationalised, can be measured only poorly or with major effort, or occur only after a long latency. Examples are an increased heart rate as a surrogate marker for anxiety states or the measurement of a blood lipid value in a clinical study of fat-reducing medicaments instead of survival rate (lipid-reducing agents are designed to extend life).

65 See FDA 2025.

66 See Livingston *et al.* 2024.

67 See Shi *et al.* 2022.

68 See Kourtis *et al.* 2019.

the body where they collect analytical data. Such systems differ in how they are used: some models are simply worn on the body, while others regularly prompt users to perform an action.

While, in principle, more wearables and interactions improve data availability, where use is complex and troublesome, people become less willing to participate consistently. It is not clear, as yet, what costs and level of effort are acceptable in order to make mobile dementia risk assessment sufficiently selective and specific.

Another option for diagnosing dementia and determining risk is to investigate a person's cognitive status. In the course of an interview, various cognitive capabilities are tested using paper-based or digital methods, such capabilities including short- and long-term memory, concentration and attention span, language and communication skills and awareness of time and place.⁶⁹ Examples of such standardised screening procedures are the Mini-Mental State Examination (MMSE), the Montreal Cognitive Assessment (MoCA) and the DemTect dementia detection test. Studies have shown that existing tools such as DemTect were able to confirm a dementia diagnosis in around 50 per cent of individuals who screened positively.⁷⁰ Self-testing, for example using various apps, has been known to achieve comparable results.⁷¹ However, given the current prevalence of dementia in the population as a whole, widespread dementia risk screening brings with it an increased risk of false-positive results, which could cause stigmatisation or mental stress for patients and their relatives and an explosion in costs due to expensive follow-up investigations.⁷²

The scientific evidence suggests that cognitive status assessments can also

be used for dementia-specific risk assessment.⁷³ Such status assessments are carried out by medical staff in the context of guideline-based dementia diagnosis and include major neuropsychological test batteries, for example the test battery developed for the Consortium to Establish a Registry for Alzheimer's Disease (CERAD-NP).

- ▶ *A wealth of knowledge is already available about risk factors and indicators for dementia and this knowledge makes it possible to detect indications of an increased risk of dementia long before the onset of the condition and to modify this risk. However, enough is not yet known about how to optimally tailor individualised dementia prevention, so further research is required in this area.*

Individualised risk profiles as a tool in dementia prevention

Individualised risk profiles are one possible tool for developing tailored prevention measures. Such profiles ideally include all the relevant data relating to a person's existing risk factors and risk indicators. Specifically, these data cover lifestyle factors, genetic factors, medical history and cognitive and physiological status. These risk profiles also need to be regularly updated to reflect changes in circumstances and individual risk factors.

Full risk profiles are not as yet available for dementia prevention at population level. Furthermore, the individual interplay between different risk factors has not yet been sufficiently researched. However, current evidence would suggest that even rudimentary individualised risk profiles could enable initial prevention recommendations to be developed and measures to be planned and implemented. Moreover, such profiles can also provide

69 See NHS 2023.

70 See Eichler *et al.* 2015.

71 See Nicosai *et al.* 2023.

72 See Chambers *et al.* 2017.

73 See Borland *et al.* 2024.

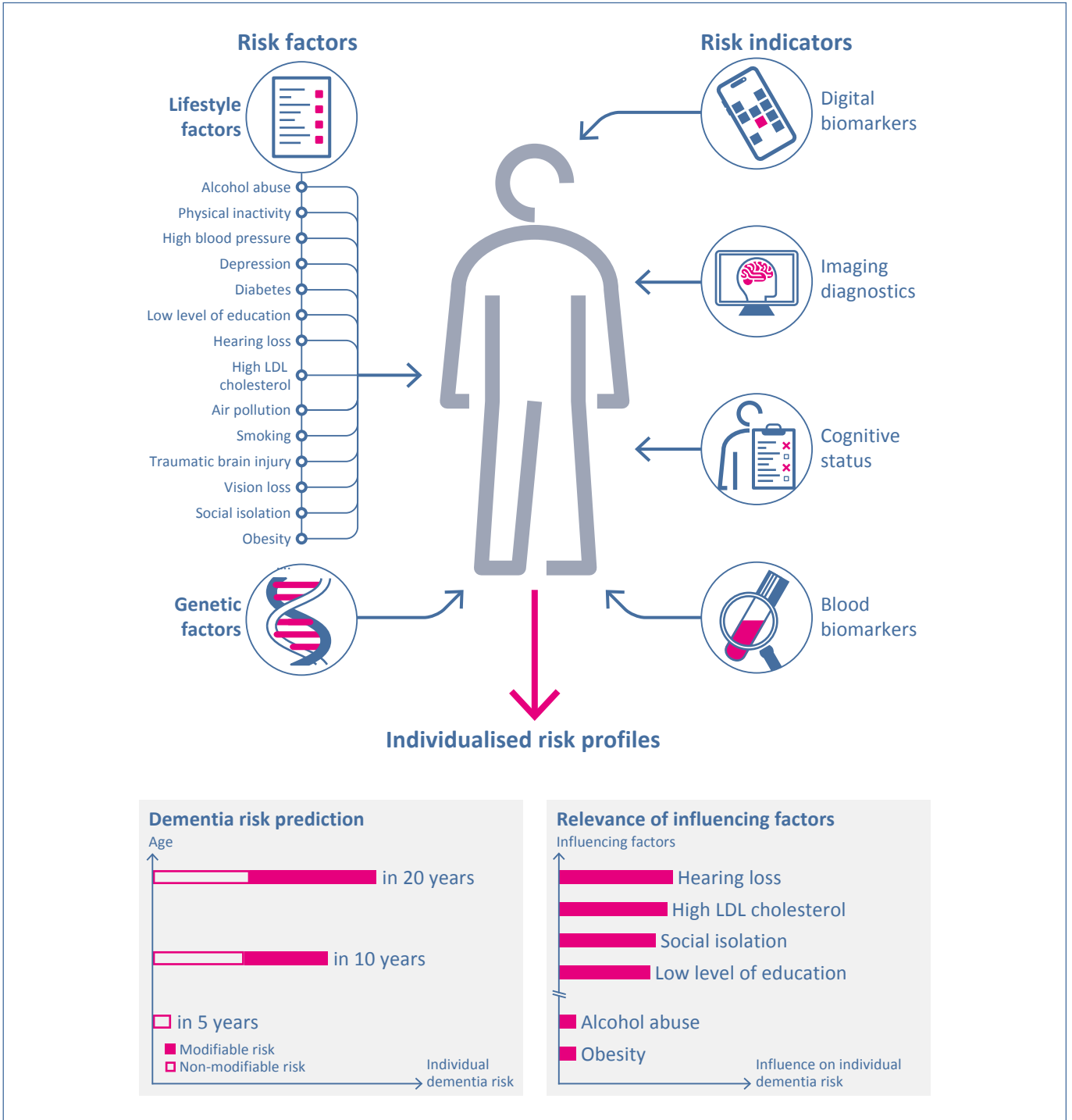


Figure 1: Concept of the individualised risk profile as a tool for dementia prevention (source: own presentation)

a basis for predicting and simulating disease progression in different scenarios.

Collecting key parameters for individualised risk profiles is already technically possible today. Various procedures are already under discussion with regard to risk indicators, while lifestyle-specific risk factors can be collected using

questionnaires, some of which are already available in validated and standardised form. However, these questionnaires have so far rarely been used outside studies. Where factors relevant to individualised risk profiles are collected as part of studies, such collection has so far tended to be selective, meaning that it has seldom been possible to draw up general risk profiles.

More fully exploiting the potential of individualised risk profiles beyond what is currently possible would, however, entail filling gaps in the research relating to the individual effects of risk factors on the brain and cognition and to the varying effectiveness of prevention measures between individuals. This would require population-based observational studies and controlled interventional prevention studies, as well as the technical infrastructure for collecting, storing and processing the necessary data. The current availability of such infrastructure in Germany is limited, especially when considering the inclusion of digital markers. The main shortcomings here mainly concern interoperability between different data sources, restricted research access to individual data sources in protected networks and a lack of metadata catalogues for making existing data records visible for prevention research and product development.

Another problem is the lack of dementia-specific data from high risk groups such as socio-economically and culturally disadvantaged population groups who very rarely or never consult a doctor or take part in studies. Prognoses derived from data records from other population groups may not apply in the same way to these vulnerable groups. In future, they should therefore be specifically included in dementia research and care projects, for which purpose it may be necessary to find innovative ways of finding participants. In addition, apps and wearables could offer low-threshold access for the general population.

- ▶ *The possibilities of dementia-specific behavioural and structural prevention have hardly begun to be fully explored. However, dementia prevention can already be significantly improved by using individualised risk profiles, there being a particular need to address vulnerable population groups.*

For other types of disease, such as cardiovascular disease, risk assessment is long-established, and the communication of cardiovascular risk is ideally adapted to the individual.⁷⁴ Arriba is one example of a digital tool for cardiovascular risk prediction which is already used in Germany in care provision among other things for cardiovascular disease. The tool serves as a decision-making aid for use during doctor-patient consultations to plan treatment and prevention measures.⁷⁵

Right to know or not to know

While for many people a risk-based prognosis or early diagnosis can be helpful in preparing to deal with dementia and putting the necessary plans into place for one's own life, other people refuse such measures. It is widely acknowledged that, in addition to a person having a right to know about their own state of health, they also have a right to remain in ignorance.⁷⁶ People should accordingly be neither forced nor required for social or economic reasons to address the possible or definite occurrence of a disease before they have to. This is particularly the case if there is no effective remedial treatment for the disease in question but, even if a curative treatment option does exist, it is still up to the individual how they deal with the subject of illness.

The situation may be different if a decision not to undergo predictive or diagnostic measures may adversely affect third parties. In such cases, conflicting rights and entitlements have to be weighed up. As a rule, however, predictive or diagnostic measures are not suited to averting acute risks to third parties and therefore the affected person's right to self-determination carries more weight than a third party's entitlement to protection.

⁷⁴ See Visseren et al. 2021.

⁷⁵ See Angelow et al. 2022.

⁷⁶ See Chadwick et al. 2014.

Difficult questions also arise in this connection when it comes to making data available for research purposes. Such data can in some cases be collected without violating an individual's right not to know. Nonetheless, the right to informational self-determination is a major obstacle. There is no strong duty of solidarity to donate personal data which might outweigh the right to self-determination. It is therefore a question of persuading people to provide their data for dementia-specific research, so as in this way to make a significant contribution to reducing the burden of disease on society.

3.2 Dementia risk screening

Individual risk profiles are a risk stratification tool, i.e. a tool for assigning individual risk to a clearly defined risk category. In a medical context, such risk categories simplify the development of individualised prevention measures. However, achieving this stratification means that a way must be found to apply this tool in an everyday care setting. Systematic screening constitutes a methodological starting point for risk profile stratification. However, Germany does not carry out systematic screening for determining dementia risk, though a trial run of a risk factor checklist is being carried out at the moment in GP practices. It has already become clear that doctors need additional and more specific information materials if they are to be able to provide affected individuals with effective information and care.

The effects of dementia risk screening have so far only been investigated by a small number of studies of limited duration and with mostly older participants. The informative value of such screening in terms of determining dementia risk increases as the number of influencing factors included grows.⁷⁷ Predictive values

are a crucial starting point in assessing the effectiveness of a specific screening measure: a positive predictive screening value describes the proportion of people with a positive test result who later go on to actually develop dementia, while a negative predictive value describes the proportion of people with a negative test result who do not develop dementia. Both values depend firstly on the sensitivity and specificity of the diagnostic method used and secondly on the prevalence of the condition in the investigated group.

The question of who pays is a difficult one, because health insurance providers do not generally fund screening if no effective therapy is available and the only likely result is that the number of patients for whom they have to bear healthcare costs will increase. However, despite the financial cost, screening has the potential to provide major savings for funding providers in the long term – especially in relation to dementia-associated care costs – if early intervention reduces the number of people developing dementia or results in milder or slower progression of the disease. This is because a positive effect of suitable dementia risk screening in the population would be the possibility of providing those affected with timely and targeted, broad-based support.⁷⁸ Assessing the realistically possible added value requires health economics-based cost-benefit analyses, together with clear evaluation criteria such as the “number needed to screen” (NNS), i.e. the number of individuals who need to be screened to prevent one case of dementia or to delay onset of the disease.

There are two stages involved in designing effective screening for dementia prevention.:

1. A general, cost-effective, widely applicable procedure is needed for identifying people at increased risk.

⁷⁷ See Stephan *et al.* 2010.

⁷⁸ See Livingston *et al.* 2024.

2. More specific screening is needed for individuals at increased dementia risk in order to detect and observe relevant pathological changes.

The focus of the first step is individual risk factors, cognitive status assessment and digital biomarkers. The first screening stage could therefore be based on questionnaires together with explanatory consultations with a doctor. An app could also be used for asking questions and for providing information and explanatory documentation, an approach which would greatly lower the threshold for participation while enabling multilingualism and sociocultural sensitivity. In addition, apps, especially if linked with wearables, offer an ever increasing number of ways of collecting data of relevance to dementia risk analysis. These include the sleep-wake cycle, for example, as well as movement patterns and various voice parameters.

There are already over 150 such apps which have grown out of research projects or were developed by start-ups. However, most of these collect only a small proportion of the relevant markers and influencing factors. In addition, validation details and expert involvement are often lacking in the development process.⁷⁹ To date, moreover, apps have been personalised only to a minor degree or not at all, are often based on very selective samples and barely make use of AI technology, for instance for personalising behavioural recommendations.⁸⁰ A screening and research app should therefore be developed for Germany which combines the various elements of the screening procedure and also makes the data obtained usable for research purposes within the bounds of European rules and regulations.

The low threshold for access provided by using an app would bring with it

significant advantages, including a much larger pool of participants and thus also a much greater volume of data relevant to research, which would be beneficial for prevention. App-assisted screening would thus increase the preventive effect, since the quality of the risk prognoses would increase, the more data became available on different population groups.

In the second screening step, additional biomarker-based data would be collected for those at increased risk, so enabling more specific individual risk profiles to be drawn up and personalised measures planned. However, there remains a need for research into the individual effectiveness of different interventions, for which reason data relevant to risk profiles would need to be made available for research purposes. Data hubs which enable decentralised collection and merging of such data for further analysis are ideal for this purpose. Given the large number of dementia-relevant influencing factors, wearable and other available study data (e.g. brain imaging data from cohort studies) should also be collected and linked, unlike current practice in medical registries. Doing so would improve healthcare for those affected, while also accelerating research into the individual effects of risk factors on the brain and the pathophysiological understanding of dementia by improving modelling. This is technically already possible, but implementation and funding would prove challenging within current healthcare structures, not least because there is still no unique identifier for health data and technical linking is thus difficult.

Under the umbrella of Germany's National Research Data Infrastructure (NFDI), federal and state governments have already started an initiative for developing the technical prerequisites for such a project. The *Medical Informatics Initiative Germany* provides a structure for exchanging medical research data, in

⁷⁹ See Polk *et al.* 2025.

⁸⁰ See Zeiler *et al.* 2023.

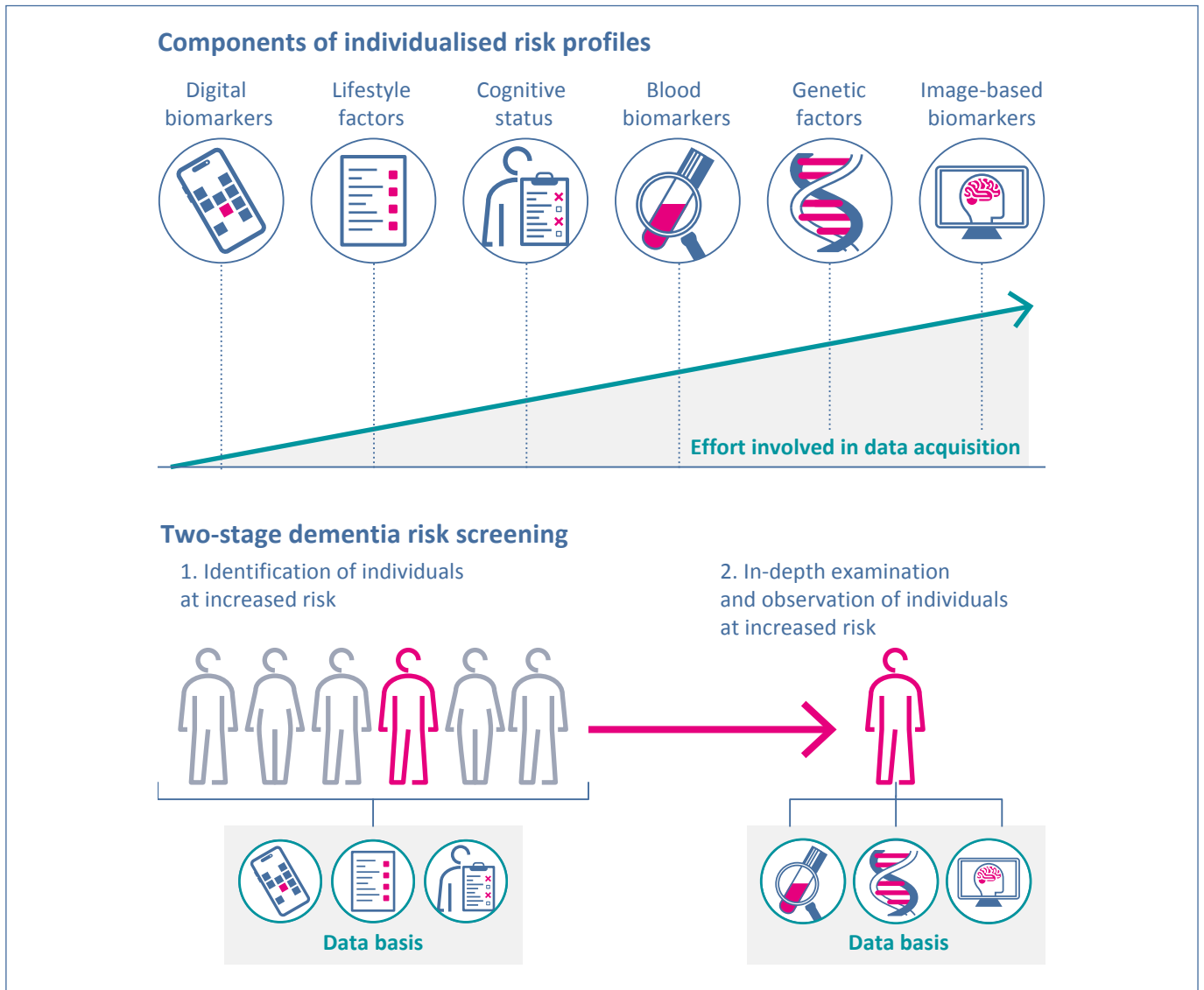


Figure 2: Concept of two-stage dementia risk screening (source: own presentation)

the form of the German Portal for Medical Research Data (FDPG). At European level, the European Health Data Space Regulation, published on 5 March 2025, provides a legal framework for the extended use and linkage of health data.⁸¹ Key technical and legal prerequisites for individualised dementia prevention are therefore in place.

Since certain factors have an influence on dementia risk even in the early and middle stages of life and the first pathological changes can be detected 20 years before the condition manifests, screening from the age of 45 or even earlier would be sensible in light of the increase in the

incidence of dementia in the over-65s. The key to the success of primary dementia prevention will thus be to convince young people of the value of such risk screening long before the condition poses a real danger for them.

However, a retrospective evaluation of a European cohort study suggests that most cases of dementia occur in individuals who are classified as being at normal risk during initial screening, not in those classified as being at increased risk. In other words, early one-off investigations and subsequent reduction efforts based on targeted high-risk approaches would probably not reduce the burden of disease at the population level. What is needed

81 See European Commission 2025.

instead for screening to have a preventive effect is follow-up investigations to identify those people whose risk index only rises significantly after the initial investigation.⁸²

Moreover, reducing dementia incidence at population level means that screening results relating to the distribution of risk factors among the population also need to be converted into structural prevention measures. The primary goal of such screening would then be to drive measures for individual intervention and structural prevention, and to raise awareness among the population of personal dementia risk and of the possible ways of modifying outcomes. Increased awareness of personal dementia risk and of the possible ways of modifying it could potentially also reduce the stigma associated with dementia. Targeted medical care for individuals at increased risk could reduce the psychological burden associated with knowing one has an increased risk of developing dementia.

- ▶ *Two-stage dementia risk screening provides a framework for integrating individualised risk profiles into everyday care as a tool for prevention. The first step is to identify people with an increased risk of dementia using an inexpensive, widely applicable method. The second step is to use more specific methods to observe the identified individuals for relevant dementia-related pathological changes.*

Germany already has successful screening programmes for other health conditions, such as mammograms for early identification of breast cancer in women aged between 50 and 75, skin cancer screening from the age of 35 and bowel cancer checks from the age of 50. However, in most cases, there are also effective

treatment options for these diseases. Germany also offers a *General Health Check-up* from the age of 35. This involves taking a detailed medical history and carrying out investigations to identify individual risk factors for common diseases and giving preventive advice where appropriate. Its focus has so far been on cardiovascular conditions, diabetes and kidney disease.⁸³ An analysis of dementia risk factors could in future be integrated into the general practice health check-up, especially since there are some overlapping risk factors.

3.3 Interventions for risk groups

Individualised risk profiles are not only helpful in determining personal dementia risk but also provide starting points for specific prevention measures. If prevention is actually to contribute to reducing disease burden, information from risk profiles has thus also to be communicated to the individuals involved and translated into suitable interventions.

It is particularly important, for effective dementia prevention, not to lose sight of the individuals involved and their living environment. Developing prevention measures or recommendations based on a clinically controlled study with selective random samples right through to their application within the living environment of the individuals involved can be a long and complex process. The effectiveness of prevention depends on various factors: the engagement and involvement of participants in the prevention programme, the willingness of different stakeholders to work together and communicate, financial and personnel resources and how well suited the individual programme is to the participants.⁸⁴ The educational level of participants can also play a role and

82 See Walsh *et al.* 2024b.

83 See BMG 2025.

84 See Felmingham *et al.* 2023.

should be considered when designing prevention measures.

The framework for dementia care and prevention in community settings drawn up by the Lancet Commission stresses that, for dementia prevention to be successful, it has to be applied in three strategic areas of healthcare: (1) in the community environment, including relevant policy, (2) in the context of an innovative, low-threshold prevention programme and (3) across all stages of the condition. In each of these three areas, prevention measures should be directed at a range of aspects: an individual's basic needs and built environment, access to services and offerings, local healthcare, local community life, mental health, available technologies, palliative care, cultural considerations and available resources and policy.⁸⁵

It is not as yet clear, however, how the individual building blocks outlined here are to be combined. The particular challenge of dementia prevention consists above all in specific behavioural changes. Results from qualitative studies show that many participants consider themselves to have little influence on their health and perceive that they have little self-efficacy to change their behaviour. The participants also valued the benefits of a healthy lifestyle less highly than the "benefits" of their current unhealthy behaviour. It is often the onset of acute disease that prompts behavioural change and the social network plays an important part in behavioural choice.⁸⁶

Previous attempts to develop models for interventional dementia prevention have focused on multimodal healthcare programmes for people with increased dementia risk: the preventive offering provided by the Finnish Geriatric

Intervention Study (FINGER)⁸⁷ consisted of exercise, nutritional guidance, cognitive training and management of cardiovascular risk factors.⁸⁸ The German *AgeWell* study offered nutritional advice, physical activity, cognitive training, recommendations for social activities, optimised medication planning, cardiovascular management and targeted handling of depression. Although it did prove possible to reduce the risk score of the participants in the *AgeWell* study as a whole, it was not possible to achieve the desired improvement in their cognitive abilities.⁸⁹ The American Study to Protect Brain Health Through Lifestyle Intervention to Reduce Risk (U.S. POINTER), on the other hand, did succeed in identifying clear indications of a slowing of cognitive degeneration for its more than 2,000 participants aged 60 to 79 after intensive structured lifestyle interventions, even in individuals with the adverse APOE4 genotype.⁹⁰

Just how difficult effective risk reduction is in fundamentally preventable diseases is clear from the experience with treating tobacco and alcohol dependency or in tackling obesity, three health issues that also constitute dementia-specific risk factors.⁹¹ Individualised approaches have nonetheless proven to be the most effective levers in effecting behavioural change. In addition to individual goal setting and behaviour planning, major drivers of behavioural change are in particular social support, visual stimuli to prompt behaviour, rewards for positive behaviour and role models.⁹²

87 The FINGER study is one of the biggest investigations to date into dementia prevention. A total of 1260 Finnish men and women aged between 60 and 77 took part. The study was the first to demonstrate that combined interventions in various areas of life can improve brain health and prevent cognitive decline.

88 See Kivipelto *et al.* 2013.

89 See Zülke *et al.* 2024.

90 See Baker *et al.* 2025.

91 See Livingston *et al.* 2024.

92 See Dodds *et al.* 2025.

85 See Gan *et al.* 2024.

86 See Eggink *et al.* 2022.

The necessary basic research for effective individualised risk factor management and looking into treatment approaches in dementia prevention has so far been lacking, though the first steps have already been taken. By way of example, the German Center for Neurodegenerative Diseases (DZNE) and the Cologne Alzheimer's Prevention Center already carry out individualised risk factor and biomarker collection for dementia. Initial observations regarding how this might bring about behavioural change are expected in the next few years.

Insights from implementation research⁹³ can also be used in the transfer of research results from dementia prevention to healthcare practice and in the development of specific healthcare offerings. There are already numerous models for systemising, carrying out and assessing implementation strategies: examples of taxonomic systems are the Cochrane Effective Practice and Organization of Care Group (EPOC) or Expert Recommendations for Implementing Change (ERIC). These systems allow a breakdown of implementation strategies depending on the intervention approach, this then being used as a basis for a selection of strategies targeted to the respective setting.⁹⁴

Process frameworks such as Exploration, Preparation, Implementation, Sustainment (EPIS) have been developed for the implementation of measures, while models also exist for classifying influencing factors of relevance to the implementation process, such as Promotion Action on Research Implementation in Health Services (PARIHS). There are also already models for evaluating implementation

measures, such as the Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation – Policy, Regulatory and Organizational Constructs in Educational and Environmental Development (PRECEDE-PROCEED) framework and the Reach, Effectiveness, Adoption, Implementation, Maintenance (RE-AIM) framework.

There are already initial scientific studies investigating these models and frameworks in the specific context of dementia prevention^{95, 96, 97} but as yet no systematic basic research into the effective implementation of dementia-specific prevention measures has been carried out.

However, modelling is also an option, alongside conventional evidence-based development of prevention measures: for instance, individual disease progression or the influence of risk factors can be simulated using digital twins or by integrative data approaches for generating “foundation models”. These allow different levels of data to be combined in such a way as to best reflect an individual's situation and so enable simulation of possible changes which might result from the action of influencing factors.

In addition, each individual risk factor can be specifically weighted in the model, so reflecting the individual risk constellation while also enabling personalised prediction of the possible effect of interventions. Demonstrating to an individual the process of ageing and deterioration of their brain or indeed its structural maintenance might encourage them to make long-term behavioural changes because they can see personally for themselves what measures would be of most benefit to them.

93 Implementation research focuses on the effective implementation of evidence-based measures in practice. It involves the targeted investigation of strategies for adapting and applying evidence-based measures and emphasises the need to optimise interventions continually over the course of their implementation and to adapt them to the complexities of real situations.

94 Setting means the environmental factors (background, surroundings etc.) specific to an individual or people group.

95 See Ryu *et al.* 2024.

96 See Morse *et al.* 2024.

97 See Mace *et al.* 2024.

However, changes in personal behaviour are unlikely to remain the only option for individual dementia prevention in the future, as drug therapies will probably also play a role for certain risk groups. In this respect, however, it is necessary to distinguish between the various forms of dementia; furthermore, drug therapies do not have to address dementia directly to have a positive influence on dementia risk.

Current investigations would suggest, for instance, that vaccination against shingles may prevent or delay dementia.⁹⁸ There are also similar indications for glucagon-like peptide-1 receptor agonists, which are currently primarily used to treat type 2 diabetes.^{99, 100} There is so far no causal rationale for these findings, but they do underpin the added value of a holistic approach to dementia risk and data-driven dementia prevention. The data used primarily originate from electronic patient records and large cohort studies from a number of countries. With Germany's current system, relevant data are only available on a limited basis, if at all, and therefore such positive effects cannot be determined.

In its fourth statement, the federal government's Expert Council on Health and Resilience emphasised just how important prevention services based on individual needs and preferences are in promoting long-term engagement by the individuals involved, as well as the need for appropriate feedback systems. However, according to these experts, successful prevention also requires structural support as far as structural prevention measures are concerned. Lowering dementia risk for subsequent generations means that dementia prevention must thus also be firmly embedded in healthcare at population level and in government policy.¹⁰¹

Consideration could also be given to expanding the role of existing professional groups to cover dementia prevention. Health experts in general, but also specialist dementia personnel (e.g. dementia care managers) could be involved in the implementation of prevention services.¹⁰² Care measures which can reduce risk factors, such as telephone befriending¹⁰³ or local community offerings are important but are dependent on basic funding.

Establishing effective dementia prevention at population level means that closer links will in future have to be created between the healthcare and welfare systems as the healthcare system has no way of intervening in some risk factors such as social isolation or educational level. There is already a broad body of evidence in support of measures for modifying certain risk factors (smoking, alcohol consumption, obesity, high blood pressure, low level of education) at population level. In addition, interventions which have potential for practical prevention have already been investigated for the stated risk factors as well as for other factors such as depression or physical inactivity. However, there is at present only limited evidence in support of these interventions and statements regarding their effectiveness at population level therefore also have limited validity.

Possible dementia-specific structural prevention measures can be divided into four categories: fiscal interventions such as a sugar tax, marketing and advertising interventions for example in relation to unhealthy foods, interventions targeting the availability of risk factors such as alcohol and tobacco products and legislative interventions.¹⁰⁴ These measures are, however, of only a general nature and therefore take no account of any individual risk profiles. There is not yet

98 See Eytting *et al.* 2025.

99 See Seminer *et al.* 2025.

100 See Tang *et al.* 2025.

101 See ExpertInnenrat "Gesundheit und Resilienz" 2024a.

102 See Eichler *et al.* 2014.

103 See www.silbernetz.org.

104 See Walsh *et al.* 2024a.

sufficient data available for making a nuanced assessment of such measures.

Regardless of the nature of the particular measure, it is important to define how to measure its success. Various metrics are conceivable: (1) implementation success in terms of whether it has been possible to implement a programme as planned, (2) the number of measures implemented as part of the prevention programme, (3) local policy intervention effects such as new leisure, recreation and care facilities, number of prevention and intervention jobs created, (4) changes in attitudes representative of the population, (5) reduction of the overall burden of disease and (6) changes in health system indicators, for example relating to dementia-related healthcare provision.¹⁰⁵

- ▶ *If dementia prevention is actually to contribute to reducing the burden of the disease, relevant risk profile information must be communicated to those at increased risk and translated into appropriate measures. A number of initial steps have been taken in this direction, but some significant basic research is still lacking for effective individualised risk factor management, personalised approaches to dementia prevention and suitable structural prevention measures.*

One practical example of a successful national structural prevention initiative is Great Britain's NHS Health Check-up¹⁰⁶ which provides large-scale screening and advice on individual cardiovascular risk for people aged between 40 and 74. The consequences of the prevention programme are lower average blood pressure, blood lipid and cholesterol levels¹⁰⁷ and a reduction in the average risk of cardiovascular events from 32.9 per cent to 29.4 per cent across the population.¹⁰⁸

¹⁰⁵ See Felmingham *et al.* 2023.

¹⁰⁶ See Office for Health Improvement & Disparities 2021.

¹⁰⁷ See Artac *et al.* 2013.

¹⁰⁸ See Cochrane *et al.* 2012.

4 Approaches to promoting data-driven dementia prevention

Effective dementia prevention, which can contribute to reducing the individual and social burden of the disease, is already possible today. However, putting this potential to better use in Germany will mean making existing health data available for research and care in the short term. In the medium term, widespread and systematic collection of dementia-specific data for research and care purposes will also be necessary. In addition, data-based research findings must be quickly translated

into individualised and general prevention measures. In the long term, prevention campaigns for other conditions such as obesity, cardiovascular disease, cancer or diabetes could also benefit from such a data-driven approach. The interdisciplinary working group of the Leopoldina Coordinating Committee has proposed six measures for implementing a data-based dementia prevention strategy and these will be explained in more detail below.

4.1 Continue the National Dementia Strategy and strengthen prevention

The National Dementia Strategy should be carried on beyond 2026 as a “Decade for Brain Health” and also be further developed in terms of prevention, digitalisation



Figure 3: Approaches to promoting data-driven dementia prevention (source: own presentation)

and participation¹⁰⁹. The aim should be to establish fundamentally data-driven dementia prevention in Germany which should also be accompanied by other prevention approaches such as promoting mental health. Specifically, what is needed above all is more and more readily available health data for fundamental and prevention research. Any findings should then be translated into specific recommendations for behavioural prevention and appropriate structural prevention measures.

Data-driven dementia prevention is an interdisciplinary field, which is why the measures mentioned here can only be implemented at federal level through interministerial cooperation. In addition, the implementation of a comprehensive dementia prevention strategy should be overseen by a committee of experts able to identify, develop and evaluate specific prevention approaches.

In the long term, the dementia prevention outlined here should also be integrated into a comprehensive health prevention strategy which is committed to an intersectoral approach to health policy and takes account of the fact that, given the diversity and overlap of risk factors for dementia and other diseases, there are opportunities to have an impact on all areas of life. Indeed, many of the risk factors for dementia also play a major role in the course of other chronic conditions such as diabetes, cancer and cardiovascular disease. A data-driven overall prevention strategy could therefore create synergies. The extent of the effects of the respective risk factors in different diseases requires further investigation and, accordingly, an enlarged pool of data. From a political and societal standpoint, it would be more

effective to address these factors within a common health strategy.

4.2 Facilitate and expand health data use

Data must be made more accessible for healthcare provision and research so as to enable the provision of individualised services to the population in the first place and to create the foundations for necessary research projects. The findings made to date have shown that the greater the variety of data that is made available and linkable from the different areas of an individual's life for deriving targeted and individualised measures, the greater the added value for dementia prevention. Given the variety of influencing factors for dementia, improved data availability is the basis for defining the parameters for and practically implementing the presented prevention model consisting of risk profiling, dementia risk screening and interventions.

Design health data according to FAIR principles

The first step therefore needs to be to make the relevant health data “FAIRer” and to roll out “Common Data Models” and standardised metadata structures, such as those which have been developed by Germany's National Research Data Infrastructure for Personal Health Data (NFDI4Health). “FAIR” means in this context that data must be findable, accessible, interoperable and reusable. Given developments in artificial intelligence and machine learning, we would also require the criteria of AI readiness, machine readability and equitability to apply to these data, in addition to the FAIR principles. Common Data Models allow the structure and content of observational data to be standardised and then evaluated across different domains. Metadata in turn denote specific study, data, or structural characteristics, the creation of

¹⁰⁹ Participation means here, on the one hand, the active involvement of the population in the research and development of prevention and intervention measures and, on the other hand, greater opportunities for people with dementia to participate in social life due to milder disease progression as a result of better prevention.

corresponding metadata catalogues thus facilitating the search for specific data records.

Further develop existing data infrastructure and establish a research data ecosystem

It would be ideal to establish a national ecosystem for prevention and research which provides access to all relevant data for deriving prevention measures as a function of risk profile. As a first step, such an ecosystem would provide access to existing data for further developing known prevention recommendations and identifying further risk factors and indicators, for example the role of sleep quality and the circadian rhythm. In the long term, the ecosystem would also be continuously expanded with data from prevention measures. In addition to care management, the ecosystem would also form the basis for answering key research questions in the context of dementia prevention.

The technical prerequisite for an ecosystem is the corresponding infrastructure, the core element of which is the platform. There are already several research data platforms at the German and European levels: Germany's National Research Data Infrastructure for Personal Health Data (NFDI4Health), the Network of University Medicine (NUM), the Medical Informatics Initiative (MII), the Health Data Lab (FDZ) and the German Centers for Health Research (DZG) together with the European Health Data Space (EHDS), which is currently under development.¹¹⁰ These measures and structures currently only partially meet the requirements for extended dementia prevention and the above-mentioned national ecosystem. Many of these initiatives were not primarily set up for data use in prevention, but could be further developed in that direction.

Similarly, the linkage of billing data with data from medical registries as set out in Germany's Health Data Use Act should be expanded in the long term. There is also great potential in linking with further data from cohort studies as well as data from clinical trials.

Another interesting prospect is the use of data from Germany's electronic patient record (ePA) which is planned under the umbrella of the Health Data Lab (FDZ). The ePA has the potential to provide a suitable basis for data-driven prevention. In other countries' healthcare systems, electronic health records already act as such a hub for collecting and utilising medical care data. It would therefore be welcome if such potential could also be tapped as part of the implementation of the ePA. Given the individual risk profiles and resultant recommendations involved, pseudonymised data should be accessible here. Depending on risk status, and subject to the individual's consent, the use of personalised data could offer an opportunity for even more effective prevention recommendations.

The linkage of health data should be technically and legally enabled so that relevant data can be analysed, exchanged and compared across research locations and project boundaries. Implementing "data visiting" principles can promote such linking measures and, within a context of secure processing environments, appropriate structures can provide access for various analyses and AI model training. This can build on preliminary work by the major research data initiatives (e.g. NFDI) regarding rules for sharing data from different sources and federated data analyses. The genomDE initiative has already shown that new data infrastructure in healthcare can be quickly implemented once it has been acknowledged that insufficient data is available in one area of healthcare, in this case genomic data.

¹¹⁰ See EBRAINS 2022.

However, it is not only health data that are important in a dementia prevention context: public administration data (e.g. social, environmental and mobility data) can also provide information about risk factors, correlations and prevention needs. Such data could be appropriately linked with health data for the purposes of dementia prevention, which is why the Research Data Act currently under development should create more opportunities, in particular for linking microdata from different sources (data spaces) and across different legal jurisdictions (federal and state).¹¹¹ The Federal Ministry of Education and Research formulated key points for a possible Research Data Act back in 2024 and, under the current coalition agreement, the act is to be presented in 2025.¹¹²

Introduce unique identifiers for health data

The introduction of a unique identifier (UID) is central to the effective linkage of personal health data from different sources (record linkage). The UID enables the unique identification of an individual but does not as yet exist in Germany for health data. Health research instead frequently makes use of fault-tolerant “probabilistic” record linkage which uses various identifiers such as gender, date of birth and first and last names. However, other methods, for example based on hash codes or control numbers, carry the risk of a false positive (homonym error) or false negative (synonym error) assignment. Because there is no unique identifier and probabilistic identification methods are administratively, legally and organisationally complex, linking errors occur when health data is merged, which significantly reduces the quality and quantity of available data records. In practice, this means that until now it has often only been possible or permitted to make isolated use of data sets

from individual data holders, for example individual hospitals, health insurers or cancer registries.

Germany’s existing identification numbers such as the personal health insurance number or the tax identification number are already available today as models for a unique identifier and, while at present they still have certain disadvantages, they are a good starting point for a healthcare UID.¹¹³ Such a UID should in future also be used to technically and organisationally enable the linkage of data from other sectors (e.g. social data or mobility data) which is to be regulated under the Research Data Act. Given the wide variety of dementia-specific influencing factors from many different areas of life, dementia prevention offers a use case which impressively illustrates the added value of such a solution for all directly and indirectly health-relevant data.

Make health data permanently usable for research

Like many other studies, large cohort studies also generate data which can be relevant to dementia prevention far beyond the actual reason for which they were collected. The deletion of such valuable, painstakingly collected data sets should therefore be prevented in future. In the long term, subject to certain conditions, such data could also be transferred into a constantly growing pool of research data, for example on a national research platform, where they would be permanently and continuously available.

4.3 Intensify research

There are still key questions that need to be answered if the potential of data-driven dementia prevention is to be fully tapped, and these require further research. The findings from such research could well be

¹¹¹ See Leopoldina 2024.

¹¹² See CDU, CSU, SPD 2025.

¹¹³ See NFDI4Health 2023.

of importance for the prevention of other diseases beyond the spectrum of dementia.

Conduct further research into the molecular and cellular bases of dementia and the potential of digital biomarkers for prevention

Key research perspectives on dementia prevention include the question of how far statements about dementia risk and status based on digital biomarkers and lifestyle factors can be projected onto classical, i.e. molecular and cellular, biomarkers. Ideally, understanding these relationships will enable more accurate prediction of dementia risk on the basis of digital biomarkers as a surrogate for molecular biomarkers, digital biomarkers being inexpensive and easier to implement on a broad scale using appropriate apps and devices. Gaining a better understanding of the molecular and cellular mechanisms of dementia also requires significantly more basic research, in particular for the risk and latency phase, i.e. the period long before the onset of the condition. A combination of the two research perspectives could in future enable more accurate simulations and models of risk factor-dependent changes in the brain and their relationship to digital surrogate markers.

Accelerate model building for a mechanistic understanding at different organisational levels of the brain

Tools for research, diagnostics and prevention planning which permit meaningful integration of data on the different organisational levels of the brain and interacting organs such as the immune system should be developed on the basis of increased research into molecular and cellular biomarkers. Cell- and molecule-specific findings must be linked with imaging and biomarker data available from clinical or outpatient settings. Since these data cannot typically be collected at all levels *in vivo* from an individual, modelling which allows individually missing data to

be replaced by simulation must be driven forward so as to improve personalised predictions on the assumption of corresponding biological mechanisms.

Evaluate the effectiveness of individualised prevention measures

Another field of research that is currently still open concerns the effectiveness of prevention measures for the dementia spectrum in relation to the individual, but also in relation to health economics. This requires randomised studies to investigate, for example, the relevance of social and cultural context to prevention measures. Such studies require a very long period of observation and could therefore likewise sensibly be centrally embedded within the above-mentioned ecosystem. In a further step, given the partially overlapping influencing factors, it would then be appropriate to conduct further investigations into similarities and overlaps with prevention measures for other conditions such as obesity, cardiovascular disease and cancer.

Increase research into the implementation of prevention measures

Approaches to prevention and intervention for individual dementia prevention must be developed in such a way that they address those affected regardless of their level of education or socioeconomic status, and at the same time in an individualised manner, so taking account, among other things, of individual differences in comprehension, habits and language use or native language. The approaches offered must therefore be inclusive.

Population-based cohorts are the most important basis for evidence-based prevention. By using a standardised, regularly repeated investigation programme and following-up over many years, methodologically high-quality cohort studies representative of population enable the

identification of causes and early forms of various conditions.¹¹⁴

Previous intervention studies suggest that dementia-related risk profiles can be modified. However, further feasibility studies are needed to determine which specific prevention services work for those affected in their respective life situations, and to identify the target groups, especially particularly vulnerable population groups, for which new programmes may need to be developed. Health research requires interaction with those affected, which is why the design of such studies also requires the involvement of representatives from different population groups.

Experience gained from the dementia risk factor checklist in German general practitioner practices shows that individualised services, such as courses or brochures, for reducing individual risk factors should be developed and made available in the future.¹¹⁵ In the long term, personalised digital models could also complement the prevention services offered in general practitioner practices.

4.4 Promote scientific communication on dementia prevention

The numbers speak for themselves – dementia is an issue for the entire population. Over and above measures for data use and research, there is therefore also a need for measures to involve the population more actively in prevention. This should enable a bidirectional exchange, for example based on methods from the field of citizen science, raise awareness of dementia prevention and boost willingness to provide data and participate in research projects.

Data from a global survey as part of the World Alzheimer Report 2024 show that 80 per cent of the public consider dementia to be a normal phenomenon of ageing and not a disease.¹¹⁶ This figure has even risen by 14 percentage points compared to 2019. There is thus a need to raise public awareness further in future by education and scientific communication, focusing both on dementia prevention in general and on individual risk factors. The Federal Institute of Public Health already offers basic information under the title “Keeping mentally fit – 10 measures to prevent dementia” and this could be appropriately added to.

Another problem in the public perception of dementia is the stigmatisation of the condition: again according to a survey by the World Alzheimer Report, 88 per cent of respondents living with dementia stated that they had experienced stigmatization.¹¹⁷ Such experiences can lead those affected to conceal their condition and delay seeking appropriate care.¹¹⁸ Campaigns to destigmatise the condition, as have been carried out for some time in a psychiatric-psychological context, are therefore a key component of effective dementia prevention.

4.5 Accelerate app development for dementia research and prevention

A national research and prevention app or an ecosystem of apps as part of a data ecosystem is proposed for further developing dementia prevention. This ecosystem is intended to offer opportunities for collecting digital biomarkers, for example via speech recognition, as well as individual cognitive status risk factors via questionnaires. In this way, the apps will firstly assist with early detection and possibly also with tertiary prevention and secondly

114 See ExpertInnenrat “Gesundheit und Resilienz” 2024b.

115 See Rodriguez *et al.* 2025b.

116 See Alzheimer’s Disease International 2024.

117 See *ibid.*

118 See Rewerska-Juśko/Rejda 2020.

they will expand the risk profile data set, allowing new research questions to be addressed. Designing such a system as a national app or national ecosystem will allow the relevant sociocultural context to be taken into account and ensure compliance with data protection requirements in the European system.

Such an ecosystem of apps should go beyond existing offerings: they should be scientifically sound and enable simple and low-threshold use for different socioeconomic groups and different levels of education to ensure that groups beyond the digitally savvy with a high level of health literacy can also be reached. Statistically speaking, people with a higher level of education, greater financial resources, and better health awareness are more likely to succeed in making risk-reducing behavioural changes. Since, on average, this group has a higher life expectancy and a lower dementia-specific disease burden, there is the potential for preventive measures to further widen the socioeconomic gap in the health sector. There is thus a need for a participatory approach to developing dementia prevention apps, a tailored communication strategy and, where appropriate, incentives for app use.

Results from other projects and cohort studies could be used as the basis for developing the ecosystem and validating individual applications. Such studies already include groups of people who have been characterised phenotypically in detail and who have provided their consent for data usage and for the data to be linked with other sources (e.g. billing data, pension insurance data). For example, in the Netherlands, the MyBraincoach app, which has similar objectives, has already been developed in a research context.¹¹⁹

The necessary research efforts and establishment of the stated ecosystem

should be securely funded for at least a decade, or ideally made permanent, to ensure the future development of data-driven dementia prevention. Prevention demands long-term planning and thus also long-term funding.

4.6 Promote accompanying structural prevention

Effective dementia prevention requires an improved regulatory environment in order to promote healthy lifestyles, even if the risk factors themselves cannot be completely eliminated. However, over and above dementia-specific goals, targeted structural prevention can simultaneously reduce risk factors for a variety of conditions and should therefore be planned holistically as part of an overall prevention strategy.

The existing evidence base primarily shows the benefit of restrictive structural prevention measures such as higher duties on alcohol or tobacco. The potential of other, more participatory approaches cannot yet be estimated on the basis of current data. The same applies to indirect prevention effects. Data-driven dementia prevention should in future therefore also include the development of structural prevention measures using an expanded pool of data and with the participation of people at increased risk of dementia. In this way, support measures can be designed depending on the particular setting and, if necessary, with the involvement of healthcare professionals.

By making measures more specific, initiatives such as telephone befriending can themselves add value to structural prevention, providing the ongoing funding of these projects is secure. Federal, state and local authorities are called upon to ensure that such prevention measures are funded, formats for cooperation

¹¹⁹ See Heger *et al.* 2023.

established and participation enabled.¹²⁰ The goal should be to ensure greater participation in dementia-specific structural prevention measures especially by vulnerable population groups which have previously been unsuccessfully targeted.

Increased availability of all types of data relevant to dementia risk is the basis for planning and developing extended services for the population. Existing indicators should be used or, if necessary, new

metrics developed to monitor health-promoting aspects. Such indicators, for example measuring cyclability or walkability, assess how well the immediate living environment in a particular location is suited to physical activity. Tools such as the Federal Institute of Public Health's StadtRaum-Monitor could therefore be adapted and expanded accordingly in order to provide information in future about how well an individual's living environment is designed in health prevention terms.

120 See Walsh *et al.* 2023.

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Transparency information

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References

Aldus et al. 2020

Aldus, C. F./Arthur, A./Dennington-Price, A./ Millac, P./ Richmond, P./Dening, T./Fox, C./Matthews, F. E./Robinson, L./Blossom, S. C. M./ Brayne, C./Savva, G. M.: *Undiagnosed Dementia in Primary Care. A Record Linkage Study*, 2020. URL: <https://www.ncbi.nlm.nih.gov/books/NBK555872/> [as at: 23.06.2025].

Allan et al. 2019

Allan, L. M./Wheatley, A./Smith, A./Flynn, E./Homer, T./ Robalino, S./Beyer, F. R./Fox, C./Howel, D./Barber, R./Connolly, J. A./Robinson, L./Parry, S. W./Rochester, L./Corner, L./Bamford, C.: *An Intervention to Improve Outcomes of Falls in Dementia. The DIFRID Mixed-Methods Feasibility Study*, 2019. URL: <https://www.ncbi.nlm.nih.gov/books/NBK549015/> [as at: 23.06.2025].

Alzheimer Europe 2019

Alzheimer Europe a. s. b. l.: *Dementia in Europe Yearbook 2019. Estimating the Prevalence of Dementia in Europe*, 2019. URL: https://www.alzheimer-europe.org/sites/default/files/alzheimer_europe_dementia_in_europe_yearbook_2019.pdf [as at: 23.06.2025].

Alzheimer's Disease International 2024

Alzheimer's Disease International: *World Alzheimer Report 2024*, 2025. URL: <https://www.alzint.org/resource/world-alzheimer-report-2024/> [as at: 24.06.2025].

Alzheimer's Research UK 2025

Alzheimer's Research UK 2025: *Dementia and Ageing*, 2025. URL: <https://www.alzheimersresearchuk.org/dementia-information/dementia-risk/dementia-and-ageing/> [as at: 23.06.2025].

Angelow et al. 2022

Angelow, A./Klötzer, C./Donner-Banzhoff, N./Haasens-ritter, J./Schmidt, C. O./Dörr, M./Chenot, J.-F.: "Validierung der kardiovaskulären Risikoprädiktion des arriba-Instruments". In: *Deutsches Ärzteblatt*, 119, 2022, p. 476–482.

Anstey et al. 2022

Anstey, K. J./Zheng, L./Peters, R./Kootar, S./Barbera, M./ Stephen, R./Dua, T./Chowdhary, N./Solomon, A./ Kivipelto, M.: "Dementia Risk Scores and Their Role in the Implementation of Risk Reduction Guidelines". In: *Frontiers in Neurology*, 12, 2022, 765454.

Antwerpes et al. 2025

Antwerpes F./Schuckel, S./Ibrahim, A./Feldheim, T./ Fink, B./Dodegge, M./Nadjoua, M./Nolte, J./Schad, C./van den Höfel, N./Walter, F./Yiga, M./Wedig, M. P./Resick, J./Bignon, C./Gerlach, L./Siwek, D./ Walensi, M./Graf von Westphalen, G./Hircin, E.: *DocCheck Flexikon. Demenz*, 2025. URL: <https://flexikon.doccheck.com/de/Demenz#:~:text=Als%20Demenz%20bezeichnet%20man%20ein,Alltagskompetenz%20und%20zu%20einem%20Pers%C3%B6nlichkeitszerfall.> [as at: 23.06.2025].

Artac et al. 2013

Artac, M./Dalton, A. R. H./Majeed, A./Car, J./Millett, C.: "Effectiveness of a National Cardiovascular Disease Risk Assessment Program (NHS Health Check). Results after One Year". In: *Preventive Medicine*, 57: 2, p. 129–134.

Baker et al. 2025

Baker, L. D./Espeland, M. A./Whitmer, R. A./Snyder, H. M./Leng, X./Lovato, L./Papp, K. V./Yu, M./Kivipelto, M./Alexander, A. S./Antkowiak, S./Cleveland, M./ Day, C./Elbein, R./Farias, S. T./Felton, D./Garcia, K. R./Gitelman, D. R./Graef, S./Howard, M./Katula, J./ Lambert, K./Matongo, O./McDonald, A. M./Pavlik, V./Raman, R./Salloway, S./Tangney, C./Ventrelle, J./ Wilmoth, S./Williams, B. J./Wing, R./Woolard, N./ Carrillo, M. C.: "Structured vs Self-Guided Multi-domain Lifestyle Interventions for Global Cognitive Function. The US POINTER Randomized Clinical Trial". In: *JAMA – Journal of the American Medical Association*, 334, 2025, p. 681–691.

Banerjee et al. 2024

Banerjee, G./Farmer, S. F./Hyare, H./Jaunmuktane, Z./ Mead, S./Ryan, N. S./Schott, J. M./Werring, D. J./ Rudge, P./Collinge, J.: "Iatrogenic Alzheimer's Disease in Recipients of Cadaveric Pituitary-Derived Growth Hormone". In: *Nature Medicine*, 30, 2024, p. 394–402.

Blotenberg et al. 2023

Blotenberg, I./Hoffmann, W./Thyrian, J. R.: "Dementia in Germany: Epidemiology and Prevention Potential". In: *Deutsches Ärzteblatt*, 120, 2023, p. 470–476.

BMG 2025

Bundesministerium für Gesundheit (BMG): *Gesundheits-Check-up*, 2025. URL: <https://www.bundesgesundheitsministerium.de/checkup.html> [as at: 24.06.2025].

BMFSFJ/BMG 2020

Bundesministerium für Familie, Senioren, Frauen und Jugend (BMFSFJ)/Bundesministerium für Gesundheit (BMG): *Nationale Demenzstrategie*, 2020. URL: https://www.nationale-demenzstrategie.de/fileadmin/nds/pdf/2020-07-01_Nationale_Demenzstrategie.pdf [as at: 25.07.2025].

Borland et al. 2024

Borland, E./Mattson-Carlsson, N./Tideman, P./Alzheimer's Disease Neuroimaging Initiative/Stomrud, E./Hansson, O./Palmqvist, S.: "Individualized, Cross-Validated Prediction of Future Dementia Using Cognitive Assessments in People with Mild Cognitive Symptoms". In: *Alzheimer's & Dementia*, 20: 12, 2024, p. 8625–8638.

Caselli et al. 2021

Caselli, R. J./Langlais, B. T./Dueck, A. C./Chen, Y./Su, Y./Locke, D. E. C./Woodruff, B. K./Reiman, E. M.: "Neuropsychological Decline up to 20 Years before Incident Mild Cognitive Impairment". In: *Alzheimers & Dementia*, 16: 3, 2021, p. 512–523.

CDU, CSU, SPD 2025

Christlich Demokratische Union Deutschlands (CDU), Christlich-Soziale Union in Bayern (CSU), Sozialdemokratische Partei Deutschlands: *Verantwortung für Deutschland. Koalitionsvertrag zwischen CDU, CSU und SPD*, 2025. URL: https://www.koalitionsvertrag2025.de/sites/www.koalitionsvertrag2025.de/files/koav_2025.pdf [as at: 29.09.2025].

Chadwick et al. 2014

Chadwick, R./Levitt, M./Shickle, D. (eds.): *The Right to Know and the Right Not to Know. Genetic Privacy and Responsibility*, Cambridge: Cambridge University Press 2014.

Chambers et al. 2017

Chambers, L. W./Sivanathan, S./Brayne, C.: "Is Dementia Screening of Apparently Healthy Individuals Justified?". In: *Advances in Preventive Medicine and Health Care*, 2017, 9708413.

Cochrane et al. 2012

Cochrane, T./Davey, R./Iqbal, Z./Gidlow, C./Kumar, J./Chambers, R./Mawby, Y.: "NHS Health Checks through General Practice. Randomised Trial of Population Cardiovascular Risk Reduction". In: *BMC Public Health*, 12, 2012, 944.

Dadaczynski/Paulus 2018

Dadaczynski, K./Paulus, P.: "Verhaltens- und Verhältnisprävention". In: Kohlmann, C.-W./Salewski, C./Wirt, M. A. (eds.): *Psychologie in der Gesundheitsförderung*, Göttingen: Hogrefe 2018, p. 257–268.

DZA 2025

Deutsches Zentrum für Altersfragen (DZA): *Nationale Demenzstrategie. Akteure*, 2025. URL: <https://www.nationale-demenzstrategie.de/die-strategie/akteure> [as at: 23.06.2025].

Dementia & Alzheimer's Australia 2024

Dementia & Alzheimer's Australia: *About Dementia. Genetics and Dementia*. URL: <https://www.dementia.org.au/about-dementia/genetics-and-dementia> [as at: 23.06.2025].

de Rojas et al. 2021

de Rojas, I./Moreno-Grau, S./Tesi, N./Grenier-Boley, B./Andrade, V./Jansen, I. E./Pedersen, N. L./Stringa, N./Zettergren, A./Hernández, I./Montreal, L./Antúnez, C./Antonell, A./Tankard, R. M./Bis, J. C./Sims, R./Bellenguez, C./Quintela, I./González-Perez, A./Calero, M./Franco-Macías, E./Macías, J./Blesa, R./Cervera-Carles, L./Menéndez-González, M./Frank-García, A./Royo, J. L./Moreno, F./Huerto Vilas, R./Baquero, M./Diez-Fairen, M./Lage, C./García-Madrona, S./García-González, P./Alarcón-Martín, E./Valero, S./Sotolongo-Grau, O./Ullgren, A./Naj, A. C./Lemstra, A. W./Benaque, A./Pérez-Cordón, A./Benussi, A./Rábano, A./Padovani, A./Squassina, A./de Mendonça, A./Arias Pastor, A./Kok, A. A. L./Meggy, A./Pastor, A. B./Espinosa, A./Corma-Gómez, A./Martín Montes, A./Sanabria, Á./DeStefano, A. L./Schneider, A./Haapasalo, A./Ståhlbom, A. K./Tybjaerg-Hansen, A./Hartmann, A. M./Spottke, A./Corbatón-Anchuelo, A./Rongve, A./Borroni, B./Arosio, B./Nacmias, B./Nordestgaard, B. G./Kunkle, B. W./Charbonnier, C./Abdelnour, C./Masullo, C./Martínez Rodríguez, C./Muñoz-Fernandez, C./Dufouil, C./Graff, C./Ferreira, C. B./Chillotti, C./Reynolds, C. A./Fenoglio, C./Van Broeckhoven, C./Clark, C./Pisanu, C./Satizabal, C. L./Holmes, C./Buiza-Rueda, D./Aarsland, D./Rujescu, D./Alcolea, D./Galimberti, D./Wallon, D./Seripa, D./Grünblatt, E./Dardiotis, E./Düzel, E./Scarpini, E./Conti, E./Rubino, E./Gelpi, E./Rodriguez-Rodriguez, E./Duron, E./Boerwinkle, E./Ferri, E./Tagliavini, F./Küçükali, F./Pasquier, F./Sanchez-Garcia, F./Mangialasche, F./Jessen, F./Nicolas, G./Selbæk, G./Ortega, G./Chêne, G./Hadjigeorgiou, G./Rossi, G./Spalletta, G./Giaccone, G./Grande, G./Binetti, G./Papenberg, G./Hampel, H./Bailly, H./Zetterberg, H./Soininen, H./Karlsson, I. K./Alvarez, I./Appollonio, I./Giegling, I./Skoog, I./Saltvedt, I./Rainero, I./Rosas Allende, I./Hort, J./Diehl-Schmid, J./Van Dongen, J./Vidal, J.-S./Lehtisalo, J./Wiltfang, J./Thomassen, J. Q./Kornhuber, J./Haines, J. L./Vogelgsang, J./Pineda, J. A./Fortea, J./Popp, J./Deckert, J./Buerger, K./Morgan, K./Fließbach, K./Slegers, K./Molina-Porcel, L./Kilander, L./Weinhold, L./Farrer, L. A./Wang, L.-S./Kleineidam, L./Farotti, L./Parnetti, L./Tremolizzo, L./Hausner, L./Benussi, L./Froelich, L./Ikram, M. A./Deniz-Naranjo, M. C./Tsolaki, M./Rosende-Roca, M./Löwenmark, M./Hulsman, M./Spallazzi, M./Pericak-Vance, M. A./Esiri, M./Bernal Sánchez-Arjona, M./Dalmaso, M. C./Martínez-Larrad, M. T./Arcaro, M./Nöthen, M. M./Fernández-Fuertes, M./Dichgans, M./Ingelsson, M./Herrmann, M. J./Scherer, M./Vyhnalek, M./Kosmidis, M. H./Yannakouli, M./Schmid, M./Ewers, M./Heneka, M. T./Wagner, M./Scamosci, M./Kivipelto, M./Hiltunen, M./Zulaica, M./Alegret, M./Fornage, M./Roberto, N./van Schoor, N. M./Seidu, N. M./Banaj, N./Armstrong, N. J./Scarmeas, N./Scherbaum, N./Goldhardt, O./Hanon, O./Peters, O./Skrobot, O. A./Quenez, O./Lerch, O./Bossù, P./Caffarra, P./Dionigi Rossi, P./Sakka, P./Mecocci, P./Hoffmann, P./Holmans, P. A./Fischer, P./Riederer, P./

- Yang, Q./Marshall, R./Kalaria, R. N./Mayeux, R./Vandenberghe, R./Cecchetti, R./Ghidoni, R./Frikke-Schmidt, R./Sorbi, S./Hägg, S./Engelborghs, S./Heli-salmi, S./Sando, S. B./Kern, S./Archetti, S./Boschi, S./Fostinelli, S./Gil, S./Mendoza, S./Mead, S./Ciccone, S./Djurovic, S./Heilmann-Heimbach, S./Riedel-Heller, S./Kuulasmaa, T./del Ser, T./Lebouvier, T./Polak, T./Ngandu, T./Grimmer, T./Bessi, V./Escott-Price, V./Giedraitis, V./Deramecourt, V./Maier, W./Jian, X./Pijnenburg, Y. A. L./EADB contributors/ GR@ACE study group/DEGESCO consortium/IGAP (ADGC, CHARGE, EADI, GERAD)/PGC-ALZ consortia/ Kehoe, P. G./Garcia-Ribas, G./Sánchez-Juan, P./Pastor, P./Pérez-Tur, J./Piñol-Ripoll, G./Lopez de Munain, A./García-Alberca, J. M./Bullido, M. J./Álvarez, V./Lleó, A./Real, L. M./Mir, P./Medina, M./Scheltens, P./Holstege, H./Marquié, M./Sáez, M. E./Carracedo, Á./Amouyel, P./Schellenberg, G. D./Williams, J./Seshadri, S./van Duijn, C. M./Mather, K. A./Sánchez-Valle, R./Serrano-Ríos, M./Orellana, A./Tárraga, L./Blennow, K./Huisman, M./Andreassen, O. A./Posthuma, D./Clarimón, J./Boada, M./van der Flier, W. M./Ramirez, A./Lambert, J.-C./van der Lee, S. J./Ruiz, A.: “Common Variants in Alzheimer’s Disease and Risk Stratification by Polygenic Risk Scores”. In: *Nature Communications*, 12, 2021, 3417.
- Destatis 2025a**
Statistisches Bundesamt (Destatis): *Statistik der Sterbefälle. Qualitätsbericht zur Statistik der Sterbefälle*, 2025. URL: https://www.destatis.de/DE/Methoden/Qualitaet/Qualitaetsberichte/Bevoelkerung/sterbefaelle.pdf?__blob=publicationFile [as at: 23.06.2025].
- Destatis 2025b**
Statistisches Bundesamt (Destatis): *Krankheitskosten nach Diagnosen*, 2025. URL: https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Gesundheit/Krankheitskosten/Tabellen/_tabellen-innen-krankheitskosten-diagnosen.html [as at: 23.06.2025].
- Deutsche Alzheimer Gesellschaft e. V. 2024**
Deutsche Alzheimer Gesellschaft e. V.: *Informationsblatt 1. Die Häufigkeit von Demenzen*, 2024. URL: https://www.deutsche-alzheimer.de/fileadmin/Alz/pdf/factsheets/infoblatt1_haeufigkeit_demenzerkrankungen_dalzg.pdf [as at: 23.06.2025].
- Deutscher Bundestag 2022**
Deutscher Bundestag: *Sachstand Kopfballverbot im Fußball. Zur Forderung nach einem gesetzlichen Verbot von Kopfballen im Fußball*, 2022. URL: <https://www.bundestag.de/resource/blob/898218/95c2310542dfa6b38e217a792f90589/WD-10-019-22-pdf.pdf> [as at: 23.06.2025].
- Dodds et al. 2025**
Dodds, L./Deckers, K./Harris, C. B./Siette, J.: “Behaviour Change Techniques Used in Interventions Targeting Dementia Risk Factors amongst Older Adults in Rural and Remote Areas. A Systematic Review and Meta-Analysis”. In: *The Journal of Prevention of Alzheimer’s Diseases*, 12: 4, 2025, 100093.
- Düzel/Thyrian 2023**
Düzel, E./Thyrian, J. R.: “Mobile, alltagsnahe digitale Technologien für die Prävention der Alzheimer-Demenz. Kognitive Gesundheit und kognitive Sicherheit”. In: *Der Nervenarzt*, 94, 2023, p. 400–407.
- EBRAINS 2022**
EBRAINS: “eBRAIN-Health Project Awarded Funding by Horizon Europe”. (press release of 10.06.2022). URL: <https://www.ebrains.eu/news-and-events/ebrain-health-project-awarded-funding-by-horizon-europe> [as at: 24.06.2025].
- Eggink et al. 2022**
Eggink, E./Hafdi, M./Hoevenaer-Blom, M. P./Edo, R./Moll van Charante, E. P./PRODEMOS-Konsortium: “Attitudes and Views on Healthy Lifestyle Interventions for the Prevention of Dementia and Cardiovascular Disease among Older People with Low Socioeconomic Status. A Qualitative Study in the Netherlands”. In: *BMJ Open*, 12: 2, 2022, e055984.
- Eichler et al. 2014**
Eichler, T./Thyrian, J. R./Dreier, A./Wucherer, D./Köhler, L./Fiß, T./Böwing, G./Michalowsky, B./Hoffmann, W.: “Dementia Care Management. Going New Ways in Ambulant Dementia Care within a GP-Based Randomized Controlled Intervention Trial”. In: *International Psychogeriatrics*, 26: 2, 2014, p. 247–256.
- Eichler et al. 2015**
Eichler, T./Thyrian, J. R./Hertel, J./Michalowsky, B./Wucherer, D./Dreier, A./Kilimann, I./Teipel, S./Hoffmann, W.: “Rates of Formal Diagnosis of Dementia in Primary Care. The Effect of Screening”. In: *Alzheimer’s & Dementia*, 1: 1, 2015, p. 87–93.
- European Commission 2025**
European Commission: *European health data space (EHDS)*. URL: https://health.ec.europa.eu/health-digital-health-and-care/european-health-data-space-regulation-ehds_de [as at: 24.06.2025].
- ExpertInnenrat “Gesundheit und Resilienz” 2024a**
ExpertInnenrat “Gesundheit und Resilienz”: *4. Stellungnahme des ExpertInnenrats ‘Gesundheit und Resilienz’*. URL: <https://www.bundesregierung.de/resource/blob/976074/2310122/2cfee892119fc7be6b23e53b6a5398a7/2024-09-20-expertinnenrat-stellungnahme-4-data.pdf?download=1> [as at: 23.06.2025].
- ExpertInnenrat “Gesundheit und Resilienz” 2024b**
ExpertInnenrat “Gesundheit und Resilienz”: *8. Stellungnahme des ExpertInnenrats ‘Gesundheit und Resilienz’*. URL: <https://www.bundesregierung.de/resource/blob/976074/2328276/ebocc108f025c922305b20ad36dafd86/2024-12-23-8-stellungnahme-expertinnenrat-gesundheit-resilienz-data.pdf?download=1> [as at: 24.06.2025].
- Eyting et al. 2025**
Eyting, M./Xie, M./Michalik, F./Heß, S./Chung, S./Geldsetzer, P.: “A Natural Experiment on the Effect of Herpes Zoster Vaccination on Dementia”. In: *Nature*, 641, 2025, p. 438–446.

FDA 2025

Food and Drug Administration (FDA): “FDA Clears First Blood Test Used in Diagnosing Alzheimer’s Disease” (press release of 16.05.2025). URL: <https://www.fda.gov/news-events/press-announcements/fda-clears-first-blood-test-used-diagnosing-alzheimers-disease> [as at: 23.06.2025].

Felmingham et al. 2023

Felmingham, T./Backholer, K./Hoban, E./Brown, A. D./Nagorcke-Smith, P./Allender, S.: “Success of Community-Based System Dynamics in Prevention Interventions. A Systematic Review of the Literature”. In: *Frontiers in Public Health*, 24: 11, 2023, 1103834.

Gan et al. 2024

Gan, D. R. Y./Mann, J./Chaudhury, H.: “Dementia Care and Prevention in Community Settings. A Built Environment Framework for Cognitive Health Promotion”. In: *Current Opinion in Psychiatry*, 37: 2, 2024, p. 107–122.

GBE 2025

Gesundheitsberichterstattung des Bundes (GBE): *Sterbefälle (absolut, Sterbeziffer, Ränge, Anteile) für die 10/20/50/100 häufigsten Todesursachen (ab 1998). Gliederungsmerkmale Jahre, Region, Alter, Geschlecht, ICD-10*, 2025. URL: https://www.gbe-bund.de/gbe/isgbe.archiv?p_indnr=6&p_archiv_id=7289696&p_sprache=D&p_action=A [as at: 23.06.2025].

Haraldsen et al. 2024

Haraldsen, I. H./Hatlestad-Hall, C./Marra, C./Renvall, H./Maestú, F./Acosta-Hernández, J./Alfonsin, S./Andersson, V./Anand, A./Ayllón, V./Babic, A./Belhadi, A./Birck, C./Bruña, R./Caraglia, N./Carrarini, C./Christensen, E./Cicchetti, A./Daugbjerg, S./Di Bidino, R./Diaz-Ponce, A./Draws, A./Giuffrè, G. M./Georges, J./Gil-Gregorio, P./Gove, D./Govers, T. M./Hallock, H./Hietanen, M./Holmen, L./Hotta, J./Kaski, S./Khadka, R./Kinnunen, A. S./Koivisto, A. M./Kulashekhar, S./Larsen, D./Liljeström, M./Lind, P. G./Marcos Dolado, A./Marshall, S./Merz, S./Miraglia, F./Montonen, J./Mäntynen, V./Øksengård, A. R./Olazarán, J./Paajanen, T./Peña, J. M./Peña, L./Lrabien Peniche, D./Perez, A. S./Radwan, M./Ramírez-Toraño, F./Rodríguez-Pedrero, A./Saarinen, T./Salas-Carrillo, M./Salmelin, R./Sousa, S./Suyuthi, A./Toft, M./Toharia, P./Tveitstøl, T./Tveter, M./Upreti, R./Vermeulen, R. J./Vecchio, F./Yazidi, A./Rossini, P. M.: “Intelligent Digital Tools for Screening of Brain Connectivity and Dementia Risk Estimation in People Affected by Mild Cognitive Impairment. The AI-Mind Clinical Study Protocol”. In: *Frontiers in Neurobotics*, 5: 17, 2024, 1289406.

Heger et al. 2023

Heger, I./Decker, K./de Vugt, M./Verhey, F./Oenema, A./van Boxtel, M./Köhler, S.: “Using mHealth for Primary Prevention of Dementia. A Proof-of-Concept Study on Usage Patterns, Appreciation, and Beliefs and Attitudes Regarding Prevention”. In: *Journal of Alzheimers Disease*, 94: 3, 2023, p. 935–938.

Jia et al. 2024

Jia, J./Ning, Y./Chen, M./Wang, S./Yang, H./Li, F./Ding, J./Li, Y./Zhao, B./Lyu, J./Yan, S./Yan, X./Wang, Y./Qin, W./Wang, Q./Li, Y./Zhang, J./Liang, F./Liao, Z./Wang, S.: “Biomarker Changes during 20 Years Preceding Alzheimer’s Disease”. In: *New England Journal of Medicine*, 390, 2024, p. 712–722.

Johnson et al. 2023

Johnson, E. C. B./Bian, S./Haque, R. U./Carter, E. K./Watson, C. M./Gordon, B. A./Ping, L./Duong, D. M./Epstein, M. P./McDade, E./Barthélemy, N. R./Karch, C. M./Xiong, C./Cruchaga, C./Perrin, R. J./Wingo, A. P./Wingo, T. S./Chhatwal, J. P./Day, G. S./Noble, J. M./Berman, S. B./Martins, R./Graff-Radford, N. R./Schofield, P. R./Ikeuchi, T./Mori, H./Levin, J./Farlow, M./Lah, J. J./Haass, C./Jucker, M./Morris, J. C./Benzinger, T. L. S./Roberts, B. R./Bateman, R. J./Fagan, A. M./Seyfried, N. T./Levey, A. I./Dominantly Inherited Alzheimer Network: “Cerebrospinal Fluid Proteomics Define the Natural History of Autosomal Dominant Alzheimer’s disease”. In: *Nature Medicine*, 29, 2023, p. 1979–1988.

Jönsson et al. 2023

Jönsson, L./Wimo, A./Handels, R./Johansson, G./Boada, M./Engelborghs, S./Frölich, L./Jessen, F./Kehoe, P. G./Kramberger, M./de Mendonça, A./Ousset, P. J./Scarmeas, N./Visser, P. J./Waldemar, G./Winblad, B.: “The Affordability of Lecanemab, an Amyloid-Targeting Therapy for Alzheimer’s Disease. An EADC-EC Viewpoint”. In: *The Lancet Regional Health Europe*, 22: 29, 2023, 100567.

Kivipelto et al. 2013

Kivipelto, M./Solomon, A./Ahtiluoto, S./Ngandu, T./Lehtisalo, J./Antikainen, R./Bäckman, L./Hänninen, T./Jula, A./Laatikainen, T./Lindström, J./Mangialasche, F./Nissinen, A./Paajanen, T./Pajala, S./Peltonen, M./Rauramaa, R./Stigsdotter-Neely, A./Strandberg, T./Tuomilehto, J./Soininen, H.: “The Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER). Study Design and Progress”. In: *Alzheimer’s & Dementia*, 9: 6, 2013, p. 657–665.

Koulouri/Zannas 2024

Koulouri, A./Zannas, A. S.: “Epigenetics as a Link between Environmental Factors and Dementia Risk”. In: *Journal of Alzheimer’s Disease Reports*, 8, 2024, p. 1372–1380.

Kourtis et al. 2019

Kourtis, L. C./Regele, O. B./Wright, J. M./Jones, G. B.: “Digital Biomarkers for Alzheimer’s Disease. The Mobile/Wearable Devices Opportunity”. In: *npj Digital Medicine*, 2, 2019, 9.

Leopoldina 2024

German National Academy of Sciences Leopoldina: *Das Forschungsdatengesetz. Für exzellente Forschung, effektivere Governance und evidenzbasierte Politik* (Leopoldina Fokus, no. 2/2024). URL: https://levana.leopoldina.org/receive/leopoldina_mods_01163 [as at: 29.09.2025].

Licher et al. 2019

Licher, S./Ahmad, S./Karamujić-Čomić, H./Voortman, T./Leening, M. J. G./Ikram, M. A./Ikram, M. K.: “Genetic Predisposition, Modifiable Risk Factor Profile and Longterm Dementia Risk in the General Population”. In: *Nature Medicine*, 25: 9, 2019, p. 1364–1369.

Livingston et al. 2024

Livingston, G./Huntley, J./Liu, K. Y./Costafreda, S. G./Selbæk, G./Alladi, S./Ames, D./Banerjee, S./Burns, A./Brayne, C./Fox, N. C./Ferri, C. P./Gitlin, L. N./Howard, R./Kales, H. C./Kivimäki, M./Larson, E. B./Nakasujja, N./Rockwood, K./Samus, Q./Shirai, K./Singh-Manoux, A./Schneider, L. S./Walsh, S./Yao, Y./Sommerlad, A./Mukadam, N.: “Dementia Prevention, Intervention, and Care. 2024 Report of the Lancet Standing Commission”. In: *The Lancet Commissions*, 404: 10452, 2024, p. 572–628.

Lloyd-Jones et al. 2022

Lloyd-Jones, D. M./Allen, N. B./Anderson, C. A. M./Black, T./Brewer, L. C./Foraker, R. E./Grandner, M. A./Lavretsky, H./Perak, A. M./Sharma, G./Rosamond, W.: “Life’s Essential 8. Updating and Enhancing the American Heart Association’s Construct of Cardiovascular Health. A Presidential Advisory from the American Heart Association”. In: *Circulation*, 146: 5, 2022, e18–e43.

Mace et al. 2024

Mace, R. M./Lyons, C./Cohen, J. E./Ritchie, C./Bartels, S./Okereke, O. I./Hoepfner, B. B./Brewer, J. A./Vranceanu, A.-M.: “Optimizing the Implementation of a Lifestyle Dementia Prevention Intervention for Older Patients in an Academic Healthcare System”. In: *Journal of Alzheimer’s Disease*, 100: 4, 2024, p. 1237–1259.

Michalowsky et al. 2019

Michalowsky, B./Kaczynski, A./Hoffmann, W.: “Ökonomische und gesellschaftliche Herausforderungen der Demenz in Deutschland. Eine Metaanalyse”. In: *Bundesgesundheitsblatt*, 62, 2019, p. 981–992.

Morse et al. 2024

Morse, R. M./Lang, I./Rapaport, P./Poppe, M./Morgan-Trimmer, S./Cooper, S.: “How Might Secondary Dementia Prevention Programs Work in Practice. A Pre-Implementation Study of the APPLE-Tree Program”. In: *BMC Geriatrics*, 24, 2024, 188.

NFDI4Health 2023

Nationale Forschungsdateninfrastruktur für personenbezogene Gesundheitsdaten (NFDI4Health): *Verbesserung des Record Linkage für die Gesundheitsforschung in Deutschland* (White Paper), 2023. URL: <https://repository.publisso.de/resource/frl:6461898/data> [as at: 24.06.2025].

NHS 2023

National Health Service (NHS): *Tests for Diagnosing Dementia*, 2023. URL: <https://www.nhs.uk/conditions/dementia/symptoms-and-diagnosis/tests/> [as at: 23.06.2025].

Nicosai et al. 2023

Nicosai, J./Aschenbrenner, A. J./Balota, D. A./Sliwinski, M. J./Tahan, M./Adams, S./Stout, S. H./Wilks, H. M./Gordon, B. A./Benzinger, T. L. S./Fagan, A. M./Xiong, C./Bateman, R. J./Morris, J. C./Hassenstab, J. J.: “Reliability, Validity, and Feasibility of a Smartphone-Based Cognitive Assessment for Preclinical Alzheimer Disease”. In: *Alzheimer’s & Dementia*, 19: 54, 2023, e063363.

Office for Health Improvement & Disparities 2021

Office for Health Improvement & Disparities: *Preventing Illness and Improving Health for All. A Review of the NHS Health Check Programme and Recommendations*. URL: <https://www.gov.uk/government/publications/nhs-health-check-programme-review/preventing-illness-and-improving-health-for-all-a-review-of-the-nhs-health-check-programme-and-recommendations> [as at: 24.06.2025].

Pinto et al. 2022

Pinto, J. O./Peixoto, B./Dores, A. R./Barbosa, F.: “Measures of Cognitive Reserve. An Umbrella Review”. In: *The Clinical Neuropsychologist*, 38: 1, 2022, p. 42–115.

Polk et al. 2025

Polk, S. E./Öhmann, F./Hassenstab, J./König, A./Papp, K. V./Schöll, M./Berron, D.: “A Scoping Review of Remote and Unsupervised Digital Cognitive Assessments in Preclinical Alzheimer’s disease”. In: *npj Digital Medicine*, 8: 1, 2025, 266.

Rewerska-Juško/Rejda 2020

Rewerska-Juško, M./Rejda, K.: “Social Stigma of People with Dementia”. In: *Journal of Alzheimer’s Disease*, 78: 4, 2020, p. 1339–1343.

Rodriguez et al. 2025a

Rodriguez, F. S./Hofbauer, L. M./Reppermund, S./Samtani, S./Röhr, S.: “Updating Risk and Protective Factors for Dementia in Older Adults”. In: *Nature Reviews Psychology*, 4: 5, 2025, p. 322–335.

Rodriguez et al. 2025b

Rodriguez, F. S./Knecht, H. L./Michalowsky, B./Goerss, D./Teipel, S./Hoffmann, W./Boccardi, M.: “Practicality of a Patient Self-Assessment Checklist to Manage Dementia Risk Factors in GP Practices”. In: *Scientific Reports*, 15, 2025, 17064.

Rosenau et al. 2023

Rosenau, C./Köhler, S./Soons, L. M./Anstey, K. J./Brayne, C./Brodaty, H./Engedal, K./Farina, F. R./Ganguli, M./Livingston, G./Lyketsos, C. G./Mangialasche, F./Middleton, L. E./Olde Rikkert, M. G. M./Peters, R./Sachdev, P. S./Scarmeas, N./Salbaek, G./van Boxtel, M. P. J./Deckers, K.: “Umbrella Review and Delphi Study on Modifiable Factors for Dementia Risk Reduction”. In: *Alzheimer’s & Dementia*, 20, 2023, p. 2223–2239.

Ryu et al. 2024

Ryu, S. I./Lee, M. H./Park, Y.-H.: “Determinants of Dementia-Preventive Behaviors. A Scoping Review Based on the PRECEDE Model”. In: *SAGE Open*, 14: 3, 2024.

Satizabal et al. 2016

Satizabal, C. L./Beiser, A. S./Chourak, V./Geneviève, C./Dufouil, C./Seshadri, S.: "Incidence of Dementia over Three Decades in the Framingham Heart Study". In: *New England Journal of Medicine*, 374: 6, 2016, p. 523–532.

Seminer et al. 2025

Seminer, A./Mulihamo, A./O'Brien, C./Krewer, F./Costello, M./Judge, C./O'Donnell, M./Reddin, C.: "Cardioprotective Glucose-Lowering Agents and Dementia Risk: A Systematic Review and Meta-Analysis". In: *JAMA Neurology*, 82: 5, 2025, p. 450–460.

Shi et al. 2022

Shi, C./Babiker, N./Urbanek, J. K./Grossman, R. L./Huising-Scheetz, M./Rzhetsky, A.: "Free-Living Wrist and Hip Accelerometry Forecast Cognitive Decline among Older Adults without Dementia over 1- or 5-Years in Two Distinct Observational Cohorts". In: *NPJ Aging*, 8: 1, 2022, 7.

Stephan et al. 2010

Stephan, B. C. M./Kurth, T./Matthews, F. E./Brayne, C./Dufouil, C.: "Dementia Risk Prediction in the Population. Are Screening Models Accurate?". In: *Nature Reviews Neurology*, 6, 2010, p. 318–326.

Stern 2009

Stern, Y.: "Cognitive Reserve". In: *Neuropsychologia*, 47: 10, 2009, p. 2015–2028.

Tang et al. 2025

Tang, H./Donahoo, W. T./DeKosky, S. T./Lee, Y. A./Kotecha, P./Svensson, M./Bian, J./Guo, J.: "GLP-1RA and SGLT2i Medications for Type 2 Diabetes and Alzheimer Disease and Related Dementias". In: *Jama Neurology*, 82: 5, 2025, p. 439–449.

Vanderweyde et al. 2010

Vanderweyde, T./Bednar, M. M./Formann, S. A./Wolozin, B.: "Iatrogenic Risk Factors for Alzheimer's Disease. Surgery and Anesthesia". In: *Journal of Alzheimer's Disease*, 22, 2010, p. 91–104.

Visseren et al. 2021

Visseren, F. L. J./Mach, F./Smulders, Y. M./Carballo, D./Koskinas, K. C./Bäck, M./Benetos, A./Biffi, A./Boavida, J.-M./Capodanno, D./Cosyns, B./Crawford, C./Davos, C. H./Desormais, I./Di Angelantonio, E./Franco, O. H./Halvorsen, S./Hobbs, F. D. R./Hollander, M./Jankowska, E. A./Michal, M./Sacco, S./Sattar, N./Tokgozoglu, L./Tonstad, S./Tsioufou, K. P./van Dis, I./van Gelder, I. C./Wanner, C./Williams, B./ESC National Cardiac Societies/ESC Scientific Document Group: "2021 ESC Guidelines on Cardiovascular Disease Prevention in Clinical Practice. Developed by the Task Force for Cardiovascular Disease Prevention in Clinical Practice with Representatives of the European Society of Cardiology and 12 Medical Societies, with the Special Contribution of the European Association of Preventive Cardiology (EAPC)". In: *European Heart Journal*, 42: 34, 2021, p. 3227–3337.

Walsh et al. 2023

Walsh, S./Govia, I./Peters, R./Richard, E./Stephan, B. C. M./Wilson, N.-A./Wallace, L./Anstey, K. J./Brayne, C.: "What Would a Population-Level Approach to Dementia Risk Reduction Look Like, and how Would It Work?". In: *Alzheimers & Dementia*, 7, 2023, p. 3203–3209.

Walsh et al. 2024a

Walsh, S./Wallace, L./Kuhn, I./Mytton, O./Lafortune, L./Wills, W./Mukadam, N./Brayne, C.: "Population-Level Interventions for the Primary Prevention of Dementia. A Complex Evidence Review". In: *EclinicalMedicine*, 10: 70, 2024, 102538.

Walsh et al. 2024b

Walsh, S./Wallace, L./Merrick, R./Hayat, S./Luben, R./Mytton, O./Lafortune, L./Brayne, C.: "How Many Future Dementia Cases Would Be Missed by a High-Risk Screening Program? A Retrospective Cohort Study in a Population-Based Cohort". In: *Alzheimers & Dementia*, 20, 2024, p. 6278–6286.

WHO 2019

World Health Organization (WHO): *Risk Reduction of Cognitive Decline and Dementia WHO Guidelines*, 2019. URL: <https://iris.who.int/bitstream/handle/10665/312180/9789241550543-eng.pdf?sequence=17> [as at: 11.09.2025].

WHO 2024

World Health Organization (WHO): *Global Health Estimates. Leading Causes of DALYs Disease Burden, 2000–2021, 2024*. URL: <https://www.who.int/data/gho/data/themes/mortality-and-global-health-estimates/global-health-estimates-leading-causes-of-dalys> [as at: 23.06.2025].

Yu et al. 2024

Yu, C./Ryan, J./Orchard, S. G./Robb, C./Woods, R. L./Wolfe, R./Renton, A. E./Goate, A. M./Brodthmann, A./Shah, R. C./Chong, T. T.-J./Sheets, K./Kyndt, C./Sood, A./Storey, E./Murray, A. M./McNeil, J. J./Lacaze, P.: "Validation of Newly Derived Polygenic Risk Scores for Dementia in a Prospective Study of Older Individuals". In: *Alzheimers & Dementia*, 19: 12, 2024, p. 5333–5342.

Zeiler et al. 2023

Zeiler, M./Chmelirsch, C./Dietzel, N./Kolominsky-Rabas, P. L.: "Wissenschaftliche Evidenz und Nutzerqualität von Mobile-Health-Anwendungen für Menschen mit kognitiven Beeinträchtigungen und deren Angehörige". In: *Qualität und Sicherheit in der Gesundheitsversorgung*, 177, 2023, p. 10–17.

Zhang et al. 2024

Zhang, J./Zhang, Y./Wang, J./Xia, Y./Zhang, J./Chen, L.: "Recent Advances in Alzheimer's Disease. Mechanisms, Clinical Trials and New Drug Development Strategies". In: *Signal Transduction and Targeted Therapy*, 9, 2024, 211.

Zülke et al. 2024

Zülke, A. E./Pabst, A./Luppa, M./Oey, A./Weise, S./Fankhänel, T./Kosilek, R. P./Schillok, H./Brettschneider, C./Czock, D./Wiese, B./Thyrian, J. R./Hoffmann, W./Frese, T./Gensichen, J./König, H.-H./Kaduszkiewicz, H./Riedel-Heller, S. G.: "Effects of a Multidomain Intervention Against Cognitive Decline on Dementia Risk Profiles. Results from the AgeWell.de Trial". In: *Alzheimer's & Dementia*, 20: 8, 2024, p. 5684–5694.

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