The dementia dilemma

Our consumer research shows that fear of dementia is one of the top concerns of our growing ageing population. This report takes a look at what has become one of our greatest global public health challenges. It includes a review of the latest findings on contributing risk factors and thoughts on how and where the re/insurance industry could make a difference.
The dementia dilemma
A review of the risk factors and a look at how insurers can help those living with dementia and those who care for them.

One of the most arresting and powerful portrayals of a person being overtaken by dementia was by actress Julianne Moore in the movie "Still Alice." When speaking with the Guardian about her Oscar-winning role she said, "The idea our inner self could be taken away is very frightening."

Indeed the ravages of Alzheimer's disease and dementia are more than a frightening reality for millions of older people and nearly every one of us is touched by this heart-breaking, memory-stealing disease through someone we know.
Fifty million people worldwide are living with dementia

Today, more than 50 million people live with dementia which is more than the population of Spain. This number is estimated to increase to 152 million by 2050.

Alzheimer's or dementia?

While the terms are often interchanged, they mean different things. Dementia is an umbrella term that describes a set of symptoms that may include memory loss and difficulties with thinking, problem solving or language. These changes, although often small to begin with, can become severe enough to seriously affect daily life.

Dementia is caused when diseases, or a series of strokes, damage the brain. Of all the diseases that cause dementia, Alzheimer’s disease (AD) is the best understood and most common in older adults.

During the course of AD, proteins build up in the brain to form structures called ‘plaques’ and ‘tangles’. This leads to the loss of connections between nerve cells, and eventually to cell death and loss of brain tissue. People with AD also have a shortage of chemical messengers that help transmit signals around the brain. A deficit of these chemicals also causes AD.
What makes us vulnerable?
Around a third of AD cases worldwide are attributable to potentially modifiable risk factors. These are factors that increase the likelihood of getting the disease and can be changed or modified by medical interventions or lifestyle choices. These factors include diabetes, mid-life obesity and hypertension, high cholesterol, smoking, physical inactivity, unhealthy diet and excessive alcohol consumption. Other modifiable risk factors include depression, low educational attainment, social isolation, and cognitive inactivity.

There are other contributing factors that can’t be changed or altered and the greatest of these is age. Others include family history, genetic susceptibility and gender.

Dementia’s financial burden makes it one of the world’s greatest global public health challenges
Dementia has a huge economic impact, with a worldwide cost of USD1 trillion – more than the cost of cancer, heart disease and stroke combined.

If we can’t cure it, can we delay it?
Attempts to cure, halt, or mitigate dementia’s effects have been largely unsuccessful, and sadly there is no breakthrough on the horizon. We still don’t fully understand its cause. Given all these factors and the sheer scale of the problem, researchers have turned their focus to prevention with a focus on healthy individuals at risk of developing AD and dementia.

Evidence shows that 35% of all Alzheimer's disease and dementia cases are attributable to lifestyle-related factors.

Lifestyle-related preventive interventions have the potential to prevent or postpone AD and dementia in the general population. Though it’s not a cure, even a delay in the onset of the disease will considerably alleviate social and economic burdens.
How the re/insurance industry can help

“With no cure in sight, the best position for the re/insurance industry is to find ways to decrease the burden of dementia with services and solutions rooted in the real needs of consumers. This means solutions that focus both on reducing the risk and providing support and care to those who are living with AD.

Our consumer research shows that fear of getting dementia is among the top concerns of an ageing population. Dementia can derail life for everyone who’s touched by it – patient and loved ones alike.

Swiss Re is leading the way with a new dementia care solution that bundles financial support and practical services that help ease the biggest concerns for people living with dementia – including concerns for their families or caregivers.

Through our research, we’re also contributing evidence-based information to help clients and ultimately the end consumer to understand the impact that lifestyle choices have on the risk of developing dementia and other diseases.

Swiss Re has a suite of solutions in markets around the world that are beginning to use this knowledge to build new connections between insurance protection and creating healthier consumers.

With their epidemic proportions, pre-diabetes, diabetes, obesity and other metabolic risks are a perfect target. As this paper outlines, these cardiovascular risks can contribute to dementia, but we also consider them to be risks that are modifiable – areas where individuals can modify and improve their own long-term health.

As such they are an opportunity for re/insurers to not only help people improve health and decrease risk, they create new ways to measurably improve business results in the form of lower claims, increased engagement and strengthened loyalty.

If you’re interested in exploring how these new propositions can step up your product offering, improve customer engagement or strengthen your in-force portfolio, come talk with us.”
What affects the risk of dementia?

Source: United against Dementia, Alzheimer’s Society²
Modifiable risk factors – risk that's in our hands

Modifiable risks come in two categories:

**Lifestyle** + **Cardiovascular**

### Lifestyle risk factors

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Risk Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>59%</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>82%</td>
</tr>
<tr>
<td>Lack of social and cognitive engagement</td>
<td>80%</td>
</tr>
</tbody>
</table>

#### Smoking 59%

Smokers have a 59% increased risk of developing AD compared to non-smokers. It is estimated that nearly 14% (4.7 million) of cases worldwide are attributable to smoking.3

#### Physical inactivity 82%

The association between physical inactivity and AD has been explored in many large observational studies. The findings show that physical inactivity is associated with an increased risk of cognitive impairment and accounts for approximately 21% of AD cases in the UK, US and Europe, and 13% worldwide.1,3-8 People who are physically inactive are 82% more likely to develop AD compared to physically active people.

#### Lack of social and cognitive engagement 80%

Remaining socially and mentally active throughout life is thought to reduce the risk of AD as it supports brain health and helps build cognitive reserve. This is like extra storage of resilience that helps the brain resist the neurodegenerative changes that cause AD. Studies suggest that lifelong experiences, including education, leisure and social activities can increase cognitive reserve and subsequently delay the clinical expression of AD.9 People who are cognitively inactive (little or no involvement with mentally stimulating activities) are 80% more likely to develop AD and other forms of dementia compared to cognitively active people.3

#### Diet

Evidence suggests a causal relationship between an unhealthy diet and risk of AD. A poor diet (high saturated fat/low vegetable intake) has been associated with increased risk of AD.10-12 However, the information is limited and conflicting around how various aspects of a diet, including nutrients, vitamins and food groups affect risk. There is growing evidence that the Mediterranean diet (relatively little red meat with an emphasis on whole grains, fruits and vegetables, fish, nuts, and olive oil)13,14 or a combined Mediterranean-DASH (Dietary Approaches to Stop Hypertension) which comprises whole grains, fruits, vegetables and low-fat dairy products, is associated with lower AD risk.11,13,15
Findings from comprehensive meta-analyses show that low educational attainment is associated with an increased risk of AD. Approximately 19% of all AD cases have been linked to low-education levels.\textsuperscript{16} People with low educational attainment are 59% more likely to develop AD compared to those with a high level of educational attainment.\textsuperscript{1,3}

Education is thought to have an impact in two ways.

1. It can affect one's level of cognitive reserve.
2. The impact of education might also be mediated by health behaviours.

More education is generally associated with higher levels of wealth, occupations that lead to more cognitive stimulation, and healthier behaviour in the form of things like lower smoking and obesity levels and increased physical activity – all of which confer increased protection against cognitive and physical decline. The timing of AD diagnosis may also be affected by education. Previous studies have demonstrated that education can influence performance on cognitive tests. More educated people perform better, which, in turn, leads to later diagnosis and vice versa.

Depression, psychological distress, anxiety and sleep disorders have been linked to the risk of developing AD and other causes of dementia. More than 10% (3.6 million) of AD cases worldwide may be attributable to depression. Depression increases the risk for AD by 90%.\textsuperscript{17-19} However, questions remain regarding whether depression actually increases an individual’s risk or is rather an early marker of brain changes associated with AD.

A new risk factor on the scene is hearing loss. Findings from cohort studies show that even mild levels of hearing loss increase the long-term risk of cognitive decline and dementia in individuals who are cognitively intact but hearing impaired.\textsuperscript{19} People with hearing loss are nearly twice as likely to develop AD compared to those without.\textsuperscript{19}

Considering that 32% of people over 55 have hearing loss, this potential risk factor is getting noticed but the underlying mechanisms for the association are not yet clear. A plausible connection is that hearing loss could make individuals more socially isolated and depressed – two factors which are already independently proven to be risk factors.

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Increase in Risk</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>59%</td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Hearing loss</td>
<td>94%</td>
<td></td>
</tr>
</tbody>
</table>

The various factors that increase risk for CVD also increase the risk of developing AD and vascular dementia. As many as 80% of those who have Alzheimer's also have CVD.
Hypertension increases the risk of developing AD and vascular dementia. Approximately 5% (1.7 million) of AD cases worldwide are potentially attributable to midlife hypertension. People who develop hypertension in midlife are on average 61% more likely to develop AD compared to those with a normal blood pressure.1,3,19,20

Diabetes is also associated with an increased risk of developing AD and vascular dementia. Approximately 2-3% of all AD cases worldwide are attributable to diabetes.3 People with type 2 diabetes are on average 50% more likely to develop AD compared to those without diabetes.3,19,21

Obesity is an important risk factor for diabetes and hypertension, both of which contribute to the risk of developing AD. Obesity also independently contributes to the risk of developing AD. Approximately 2% of AD cases worldwide are potentially attributable to midlife obesity. People who are obese in midlife are 60% more likely to develop AD compared to people who are not obese.19

People with high total cholesterol levels in midlife are, on average, more likely to develop AD compared to those with a normal total cholesterol level. Evidence shows that treatment of high cholesterol levels with statins reduces risk of AD.22

### Cardiovascular risk factors

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>PAR (%)</th>
<th>Relative risk (95% CI)</th>
<th>PAR (confidence range)*</th>
<th>Number of cases attributable (thousands; confidence range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>6.4%</td>
<td>1.46 (1.20–1.77)</td>
<td>2.9% (1.3–4.7)</td>
<td>969 (428–1592)</td>
</tr>
<tr>
<td>Midlife hypertension</td>
<td>8.9%</td>
<td>1.61 (1.16–2.24)</td>
<td>5.1% (1.4–9.9)</td>
<td>1 746 (476–3 369)</td>
</tr>
<tr>
<td>Midlife obesity</td>
<td>3.4%</td>
<td>1.60 (1.34–1.92)</td>
<td>2.0% (1.1–3.0)</td>
<td>678 (387–1 028)</td>
</tr>
<tr>
<td>Depression</td>
<td>13.2%</td>
<td>1.90 (1.55–2.33)</td>
<td>10.6% (6.8–14.9)</td>
<td>3 600 (2 295–5 063)</td>
</tr>
<tr>
<td>Physical inactivity</td>
<td>17.7%</td>
<td>1.82 (1.19–2.78)</td>
<td>12.7% (3.3–24.0)</td>
<td>4 297 (1 103–8 122)</td>
</tr>
<tr>
<td>Smoking</td>
<td>27.4%</td>
<td>1.59 (1.15–2.20)</td>
<td>13.9% (3.9–24.7)</td>
<td>4 718 (1 338–8 388)</td>
</tr>
<tr>
<td>Low education</td>
<td>40.0%</td>
<td>1.59 (1.35–1.86)</td>
<td>19.1% (12.3–25.6)</td>
<td>6 473 (4 163–8 677)</td>
</tr>
<tr>
<td>Combined (maximum)</td>
<td>50.7%</td>
<td></td>
<td></td>
<td>17 187 028*</td>
</tr>
</tbody>
</table>

*PAR = Population Attributable Risk, the percent of cases attributable to a given factor. Source: The projected effect of risk factor reduction on Alzheimer’s disease prevalence.31
Modifiable risk factors – risk that’s in our hands

Life-course model that shows how various modifiable risk factors contribute to dementia*

* The percentage relates to the amount this risk could be reduced if eliminated.

Source: Dementia, prevention, intervention, and care²⁵
Non-modifiable factors: the risk that's out of our control

Age

Age is the biggest risk factor for AD which generally affects people over 65. After age 65, the risk of developing AD doubles approximately every five years. However, AD has not been proven to be an inevitable part of ageing.

Family history and genetics

Another strong risk factor for AD is family history. Two categories of genes influence whether or not a person develops a disease: risk genes and deterministic genes. Risk genes increase the likelihood of developing a disease, but do not guarantee it will happen. The best understood and well-established risk gene identified to date for AD is the apolipoprotein E-ε4 gene (APOE4). It was the first risk gene identified and remains the one with the strongest impact. Evidence shows that over 60% of people affected by AD harbour at least one APOE4 allele. Having the APOE4 gene usually results in the development of AD after the age of 65 and thus is termed late-onset AD (LOAD). People who have one copy (heterozygotes) of the APOE4 (about 25% of the population) are on average a little over two times more likely to be affected by AD, with a mean age at diagnosis of 76 years. A small number of people – about 2% of the population – inherit two copies of the APOE4 gene (homozygotes), one from each parent, and are on average three to five times more likely to develop AD (mean age at diagnosis 68 years). However, due to other contributing factors, they still may never develop the disease.

Deterministic genes directly cause disease and are a virtual guarantee you will one day develop the disease. When AD is caused by these deterministic variations, it is called autosomal dominant Alzheimer’s disease (ADAD) or familial Alzheimer's disease (FAD), or early onset familial Alzheimer's disease (EOFAD). These genes account for 60-70% of all EOFAD and usually result in a much earlier onset than other types of AD. In this form, symptoms can develop well before the age of 65 (usually between ages 40-60). EOFAD is a very rare form of AD and accounts for 1-2% of all cases. Three known genes have been identified to be responsible for EOFAD: amyloid precursor protein (APP), presenilin-1 (PS-1) and presenilin-2 (PS-2). Of these, PS1 mutations account for most EOFAD, while APP and PS2 are rarer. A mutation in any of these genes results in the development of AD.

Gender

More than 60% of all AD cases are women, indicating that women are at greater risk of developing AD compared to men. This increased risk is attributed to the fact that typically women outlive men by an average of 4.5 years and the fact that the APOE4 gene is more common in women. The number of new AD cases in a given period is comparable for men and women until later ages when the incidence becomes greater for women.
The genetic risk for AD

<table>
<thead>
<tr>
<th>Causes of AD</th>
<th>Risk of Alzheimer's disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSEN1, PSEN2, APP</td>
<td>Very common</td>
</tr>
<tr>
<td>TREM2</td>
<td>Medium</td>
</tr>
<tr>
<td>APOE4 1 copy</td>
<td>Low</td>
</tr>
<tr>
<td>APOE4 2 copies</td>
<td>Very rare</td>
</tr>
<tr>
<td>MS4a CR1, PICALM, BIN1, CLU, CD2AP, CD33, EPHA1, ABCA7</td>
<td>Very common</td>
</tr>
</tbody>
</table>

How many people have the gene?
A large number of studies and reports indicate that the age-specific risk of AD in higher income Western countries has declined in the past 25 years.

Yet almost all current projections of the coming dementia epidemic tag ageing as the main driver and assume that age and gender specific prevalence will increase over time.

Mixed prospects
A decline in age-specific incidence of AD and dementia, at least in high income countries, is theoretically possible, driven by changes in educational attainment in early life, hypertension in midlife, and smoking and diabetes across the life course. Smoking rates, total cholesterol and blood pressure levels have been decreasing in many countries. If current rates continue to decrease, incidence of AD can be expected to follow. Conversely, the increased prevalence of obesity and diabetes could result in secular trends.

Prevalence is also expected to increase due to an increase in population ageing and improvements in life expectancy. Between 2015 and 2030, the number of people in the world aged 60 years and over is projected to grow by 56%.

By 2050, the number of older people in the world will exceed the number of young for the first time in history.

However, in a recent modelling exercise, it was estimated that a 10% reduction in the aforementioned key risk factors would lead to an 8.3% reduction in the prevalence of dementia through to 2050 and a 20% reduction in the key risk factors would result in a 15.3% reduction in the prevalence of AD.
What does this mean for insurers?

Total costs of dementia in 2015 (USD billion)

Informal care costs 331

Direct social care costs 328

Direct medical costs 159


For dementia, informal care and direct social care costs are generally higher compared to direct medical costs, which is what makes dementia particularly different from other diseases with high expenditure.

Informal care
Unpaid care provided by families and others.

Direct social care costs
Paid, professional care either in home or at a care facility.

Direct medical costs
The actual costs to treat dementia and other related conditions in primary and secondary care.
Insurers need to adjust their stance

If dementia were a country, its cost would be the world’s 18th largest economy and would be more than the market values of companies such as Amazon and Google\textsuperscript{34}.

The cost of caring for those with dementia is expected to increase due to our increasing ageing population and improvements in life expectancy. As a result, out-of-pocket spending by patients and their families, (currently about 40% of the total costs), will increase. It will also require larger contributions from governments and national health systems. However, these aren’t likely to adequately cover the financial burden of the disease, establishing dementia as one of the biggest global public health challenges.

This challenge creates opportunities for insurers to fill the void with packages of services and solutions that can reduce this burden and meet the needs of individuals as they age.

Today our industry is generally focused on selling products like income annuities attempting to create a market for traditional long-term care insurance. Annuities tend to focus only on day-to-day living expenses and traditional long-term care is unaffordable for most.

This is creating space for much needed innovation. Ageing consumers have very different needs and this diversity hasn't been recognised. Forward-thinking insurers are trying to truly understand those needs and find solutions that fit. Swiss Re has carried out extensive consumer research to gauge people's aspirations and concerns as they reach later life.

**Valuable research by Swiss Re**

Swiss Re reached out to more than 9,000 people between the ages of 35-75 in nine markets across Europe, Asia and the Americas. Our research showed that the fear of dementia and the need to better understand the disease ranked among the top concerns of the ageing population. Our testing also showed that certain consumer segments would be willing to purchase insurance products that helped them understand and manage the financial and emotional impact of dementia. These insights have helped us build a new dementia care solution that helps people at all stages from a healthy state, to diagnosis and beyond. The solution helps with advance planning, supports independent living after diagnosis and provides more financial support as care needs escalate.
References


2. Alzheimer’s Society United Against Dementia.


