Not to Be Sneezed at – The Threat From Infectious Disease

by Ross Campbell, Gen Re, London

The range of infectious diseases that cause distress, illness and death remains truly staggering. Malaria, pneumonia, HIV, meningitis, plague, yellow fever, cholera, influenza and most recently Ebola continue to influence not only individuals but the economic and social life within large regions of the world. Most countries have experienced epidemics of one form or another over the past decade. The majority has been contained, but the H1N1 influenza outbreak of 2009 briefly demonstrated the potential for global reach.

The Ebola Virus Disease (EVD) emergency underlined that infection can create unprecedented levels of sickness and mortality. Although centred in Western Africa where the hobbled efforts to contain it are well known, isolated cases emerged in more distant countries – a reminder that microbes can spread rapidly across borders. Anxiety about EVD spread was particularly marked in medically advanced countries that may regard themselves as largely immune to this kind of problem. Yet their very sophistication is creating drug-resistant bacteria capable of becoming significant threats in their own right. Because international cooperation is poor and hampered by budget cuts, awareness of the scale of new threats, through monitoring and reporting, remains weak.

Distress and disease

The psychology of disease outbreaks is of interest. As an outbreak occurs, anxiety rises in developed countries as the perceived threat to their economic activities grows. Forces to combat infection are mobilised only once the threat becomes significant, but they are usually too late for the people on the ground. Rumour and panic may spread faster than a virus. Action plans are developed, mock exercises take place and people may even be ostracised in a completely unreasonable manner.

As the epidemic dies away, any medical opportunities to develop countermeasures, such as vaccines, are shelved as interest moves on to the next threat. HIV is probably the exception that proves the rule as its effects were being felt in more developed countries. Treatments for HIV were relatively rapidly developed and advanced for use in the West, but the technology remains sparse elsewhere in the world.
The organisms responsible for infectious diseases are incredibly inventive in the ways they find to spread from person to person. On a day-to-day basis, we are most familiar with bacterial and viral infections that may be transmitted in body fluids, by direct contact with infected individuals or by touching surfaces that harbour germs. Waterborne cryptosporidium causes prolonged diarrhoeal illness. Haemorrhagic colitis and renal failure stem from food infected with (Escherichia) E. coli. Hantavirus pulmonary syndrome is transmitted from rodents. Zoonotic diseases, such as Severe Acute Respiratory Syndrome (SARS), influenza and Ebola, are infectious diseases of animals that can be transmitted to humans.

However devious these routes of transmission are, they require help from us. People are more vulnerable to infection when they are receiving medication to suppress their immune systems or when they are ill, very old or malnourished. Resurgent diseases, including cholera and tuberculosis, illustrate our vulnerability to microorganisms in a changing environment.

The immense difficulties experienced during efforts to contain EVD serve to underline how much global cooperation and coordination is required when infectious disease spirals out of control. Worryingly, the transmission routes for EVD are extremely limited, and this raises questions about the potential international response to a fast-moving and more easily transmitted pathogen.

Antimicrobial resistance (AMR) – when a bacteria, fungus, virus or parasite can no longer be controlled with drugs – threatens to create a post-antibiotic era in which common infections can once again kill. Modern medicine risks being undermined by AMR as health systems have become reliant on antibiotics to reduce the risk of infection following most surgery and when patients require chemotherapy. Resistance of bacteria to treatment has been increasing in line with rising levels of antibiotic prescription and a slowing in the development of new drugs. Second- and third-generation antibiotics are expensive and less widely available but some strains of bacteria are resistant to them.

Table 1 – Contributing factors to emerging infectious disease

<table>
<thead>
<tr>
<th>Societal events</th>
<th>Poverty, war, urban migration, urban decay, population growth</th>
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</thead>
<tbody>
<tr>
<td>Healthcare</td>
<td>Increased use of antibiotic and immunosuppressive drugs</td>
</tr>
<tr>
<td>Food production</td>
<td>Globalised food supply, changes in food processing</td>
</tr>
<tr>
<td>Human behaviour</td>
<td>Travel, sex, drug use, outdoor recreation, diet</td>
</tr>
<tr>
<td>Environment</td>
<td>Deforestation, drought, famine, climate change</td>
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<tr>
<td>Public health</td>
<td>Poor infrastructure, lack of trained personnel</td>
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<tr>
<td>Microbial change</td>
<td>Drug resistance, changes in virulence</td>
</tr>
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Cause and response

Infectious diseases are caused by pathogenic microorganisms – bacteria, viruses, fungi and parasites. The threat that these pose to human health and social cohesion is nothing new. Public health measures and the development of antibiotics led to expectations of control, or even eradication of infectious disease, but this has never materialised. New organisms emerge in response to the antibiotic challenge (e.g. malaria) and other organisms experience a resurgence by finding new hosts in which to reproduce. Health systems become distracted by other demands (e.g. tuberculosis). Novel infections can result from the evolution of existing organisms. Known diseases may spread to new geographic areas in response to social and economic change. Previously unrecognised infections may emerge in regions undergoing ecological change, which increases human exposure to animals and insects that host these agents.
In 2011 the World Health Organization (WHO) European Strategic Action Plan on Antibiotic Resistance called for better information sharing, more effective interventions to slow the development of AMR, and stimulation for new antimicrobial drugs development. In 2014, the World Health Assembly provided the WHO a mandate to produce a global action plan on AMR for approval in 2015.

Already, patients with infections caused by AMR are at increased risk of worse clinical outcomes and death. The results of new research show the considerable human and economic cost. Looking only at part of the impact of AMR, a continued rise in resistance by 2050 would lead to an extra 10 million people dying every year – more than die from cancer today – at a loss of 100 trillion USD of economic output.

**Anticipate and forecast**

A striking feature of the unfolding EVD outbreak – the “largest” to date – was the inaccuracy of statistical reporting. In a world used to real-time data, this seems an aberration. Knowing that the true numbers of infections and deaths were under-reported also calls into question those recorded for prior outbreaks when surveillance infrastructures were even less well-developed. Merely knowing the total numbers of infected and dead in a disease outbreak, however, does not help the public health agencies, researchers or the aid workers preparing for a future pandemic.

The WHO views predicting pandemics as akin to weather forecasting. There is a parallel between certain climatic conditions and disease incidence and spread; cold weather brings influenza while floods allow the spread of rodent and waterborne disease. To this end the agency reports working with the World Meteorological Organization to develop more effective forecasting tools. The “Supramap” initiative takes the analogy a step forward. It works by integrating knowledge of pathogen genomes with host biology and geographical information to reveal the aetiology of an epidemic. By overlaying genomic data and geospatial information on Google Earth, it can reveal how pathogens are spread from a geographical origin and host species, allowing infectious disease to be tracked. It is now possible to deploy real-time disease detection in the community – taking samples following clinical consultation and integrating this with geo-spatial information to see if a disease outbreak is occurring.

The Global Microbial Identifier (GMI) is a genomic epidemiological database that stores whole genome sequencing data of microorganisms, offers identification of relevant genes, and compares genomes to detect outbreaks and emerging pathogens. The GMI initiative seeks to harness genomic technology and informatics tools to improve global patient diagnostics, surveillance, research and public health response to make informed decisions on where and how to allocate resources to prepare for emerging diseases.

Biomedical informatics – collections of comparative genomic, phenotypic and geospatial information – are powerful tools but the outputs require careful interpretation if they are to be helpful in disease control. The context comes from phylogenetics – an analysis of the classification of organisms that traces their relationship and evolutionary trajectory over time. In phylogenetic analysis, similar strains of organisms are grouped into lineages. Information known about one lineage is used to predict the properties of another, including predicting which strains are capable of infecting humans, and which are pathogenic or resistant to drugs.

**Prediction and control**

There is no evidence that new business dwindles during epidemic activity – in fact, it likely prompts an increase in demand for life and health insurance – which prompts the question: Could the underwriting process be effective at selecting out those at risk during a sweeping pandemic? Traditional underwriting approaches are ill-equipped to recognise acute infectious disease risk. Instead, assessment protocols have been developed to be adept at exposing and assessing heart, circulatory, malignant and nervous diseases. Most life insurance application forms are restricted to requesting details of known chronic infection (e.g. Hepatitis or HIV). It seems unlikely that insurers would wish applicants to make disclosure of the mild symptoms of early infections or ask...
underwriters to expend energy investigating these because most are trivial. Questions about travel patterns and occupation serve to fill in the knowledge gaps about applicants’ risk of exposure to infection.

For underwriters, understanding the mortality threat from pathogenic microorganisms would assist them in selecting risks should the inevitable outbreak happen. For agencies and healthcare providers, the ability to anticipate outbreaks of epidemic-prone diseases would help them to prepare an orderly response to a pandemic. The Global Outbreak Alert and Response Network (GOARN) seeks to pool the human and technical resources of existing health agencies and charity networks in a bid to combat the international spread of disease outbreaks. The WHO outlines a vision of an integrated global alert and response system for epidemic emergencies with the capacity to mount an effective and coordinated international response.

From those in the front line fight to gain control of Ebola, much of this sounds like just that, a vision. Their request was not simply for the international community to construct isolation wards but to provide trained staff to run them and to do so without delay. Despite the presence of GOARN, the response was deemed slow and fractured.

During a pandemic, over-stretched local health services suffer a double blow with reductions in care because of the surge of newly-ill people leading to further compromising the care of existing patients as they cease to be treated with priority. Part of the difficulty in limiting the spread of EVD in West African countries stemmed from chronic under-funding in their national health systems. Put simply, too many patients for too few isolation beds.

**Conclusion**

Despite the advances in medical capabilities, the versatility of the organisms to adapt and exploit changes in human behaviour means infectious diseases remain a significant challenge. Despite its importance, the reporting and monitoring of infectious disease is slow and unreliable, with the detection of new threats undermined by ineffective international cooperation. Ensuring antibiotics are used less, and more responsibly, will take international commitment. To complicate matters, there are gaps in surveillance and standards for methodology, while data sharing and coordination are both lacking.

The quest to develop swift diagnostic tests and effective vaccines remains a future hope. The spread of pathogens across international borders may be the price of globalisation. The immense difficulties encountered by those tasked with managing and containing the Ebola outbreak underlines how poor administration coupled with a lack of infrastructure and interconnectivity can undermine already weak health systems. The WHO even found it hard to track the number of dead accurately – surely the most profound data available.

Harnessing the power of scientific research, creating effective disease models, collecting and managing data, coordinating national public health systems and mobilising an international crisis response with adequate funding is, unarguably, visionary. With limited resources for addressing EVD, it feels more likely the focus will be elsewhere – on diabetes, cancer and heart disease, for example, or the politically fraught areas of tobacco and alcohol control.

Perhaps this is precisely because the health systems of the developed countries are so adept at isolating and treating dread illnesses, even including EVD. Once EVD infections occurred in the U.S. and in Europe, the outcomes offered a stark contrast to those in Western Africa; the virus was contained and patients had a real chance of recovery. The problem is that the epicentres of future infection are again likely to be territories with low economic importance and poor health infrastructures, making tracking and limiting pathogen spread nigh impossible. This means long-term investments in the non-commercial projects, such as vaccine development, are less likely to happen.

Using microbial genomic data and informatics tools to monitor and manage outbreaks requires a coordinated infrastructure with excellent communication, data storage, analytics and real-time reporting. Once in place, accessing and sharing such data raises legal and ethical privacy issues. Investment in surveillance, laboratory research and training, and epidemiologic investigations with prevention and control efforts,
are needed. The Ebola crisis underlines the need for urgent solutions to these complex difficulties if the human and economic loss from infectious disease is to be mitigated.

Endnotes


6 https://supramap.renci.org/supramap/home.


About the Author

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The thyroid is a physically insignificant endocrine gland located in the neck anterior to the trachea. Cancer of the thyroid has historically been uncommon, yet incidence rates have been increasing dramatically worldwide over the past 20 years. A corresponding increase in thyroid cancer claims has also been observed in Critical Illness (CI) insurance over the past decade.

The nation with the highest levels of incidence is the Republic of Korea, where it is now the most frequently reported cancer in women with an incidence double that of breast cancer. If a similar surge in incidence rates were to be repeated in other countries, it could pressurise CI pricing, leading to either a substantial increase in premium rates or the imposition of exclusions for early thyroid cancer in policy definitions.

The vast increase in the reported thyroid cancers has been due to one particular histological type called Papillary Thyroid Cancer (PTC); Medullary, Follicular and Anaplastic tumours of the thyroid have not increased in incidence. The size of these PTC tumours is predominately less than 2 centimetres (cm) in size with most below 1cm. Many specialists label these small tumours “microcarcinomas”, although some reserve this term for those below 0.5cm. It is of relevance to CI definitions that there is no stage 0, pre-invasive stage or carcinoma-in-situ in the accepted staging systems of thyroid cancer. This means that tissue is either described as “benign” or “malignant” with no pre-malignant category in the histological classification. This article looks at the possible causal factors of the increased incidence across the world, and the implications this may have for CI products.

**Increasing incidence**

Korea has the highest incidence rates of PTC and the fastest rate of increase of any country. In females, rates have increased by 20.7% year-on-year from 1999 to 2011. In 1999 the age-standardised incidence rate in Korean females was 11.9 per 100,000, but by 2011 this had risen to 113.8 (see Figure 1).

Figure 1 – Trend in age-standardised incidence rates for major cancers in Korean females

![Figure 1](image_url)


1) Major cancers selected based on 2011 crude rates
2) Age-standardized incidence Rate (ASR) uses “mid-year population in 2000” as standard population
Other countries are experiencing a lower absolute incidence rate – commensurate with the rates seen in Korea during the 1990s – but the speed of the rise in incidence suggests that thyroid cancer will become a potentially serious issue for CI elsewhere (see Table 1).\textsuperscript{1}

**Table 1 – Worldwide annual percentage change (APC) in incidence rates of thyroid cancer**

<table>
<thead>
<tr>
<th>Country</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>4.0</td>
<td>13.8</td>
</tr>
<tr>
<td>Canada</td>
<td>8.4</td>
<td>7.3</td>
</tr>
<tr>
<td>UK</td>
<td>6.0</td>
<td>5.7\textsuperscript{2}</td>
</tr>
<tr>
<td>US</td>
<td>5.5\textsuperscript{3}</td>
<td></td>
</tr>
<tr>
<td>China (Shanghai)</td>
<td>14.4</td>
<td>19.9\textsuperscript{4}</td>
</tr>
<tr>
<td>Korea</td>
<td>24.2</td>
<td>23.3</td>
</tr>
</tbody>
</table>

The age distribution for cancer of different sites in Korea is shown in Figure 2. Thyroid cancer incidence in males is strongly related to age, with the highest incidence rates being in older men. However, incidence in females is unusual as it does not follow the same pattern of increasing incidence with age seen in males (and most other cancers).

PTC mainly affects women, with a female-to-male ratio of 5:1 in Korea compared to 2.5:1 in the UK. The peak incidence occurs at a much younger age than is seen in many other cancers. This has significant implications for CI because the strong increase and the peak affect much younger ages and earlier durations.

### Impact of screening

There is evidence that the rise in incidence of PTC in Korea results from “overdiagnosis” of small lesions that would not have become clinically significant in a person’s lifetime – borne out by the fact that mortality from thyroid cancer has not increased in spite of a massive increase in detection. There is a clear correlation between the amount of screening and the number of thyroid lesions found.\textsuperscript{5}

In Korea screening for cancer is much more popular, and as a consequence it is detected more frequently. The Korea National Cancer Screening Program recommends regular screening only for stomach, breast, cervix uteri, liver and colorectal cancer. However, screening for thyroid cancer is opportunistic, relying on the selling of an ultrasound of the neck as an additional procedure to asymptomatic individuals while in a medical environment, and varies depending on the medical institution.

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1) Major sites selected based on 2011 crude rates

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No country has an organised national screening programme to detect thyroid cancer. It seems unlikely that any country would do so given the very low mortality from thyroid cancer in spite of the increasing incidence. However, radiological imaging with CT or MRI scanning of the head or chest, which has increased significantly in recent years, often provides images of the neck incidentally. These may reveal thyroid lesions as an incidental finding. Once identified, it is difficult to avoid further investigation, including biopsy, even when the likelihood of subsequent health benefits is low. The disparity between rising incidence and flat mortality rates is one marker that supports the concept of overdiagnosis of thyroid cancer.

**Underlying cause**

While most observers accept that the increased incidence is driven by increased use of modern imaging technologies, others argue it is not the sole explanation. There is some evidence in the US that, even when people emigrate, those from Asian countries have higher rates of diagnosis than native populations, although the reported increase was in South Asians rather than those from North Asia, including China and Korea. Obesity has been implicated as a risk factor for thyroid cancer as it has for several malignancies. One large study showed a moderate but significant increase in risk with increasing BMI.

Iodine is an integral component of thyroid hormones, so the metabolism of the gland is linked to the availability of iodine in the diet. In areas of iodine deficiency, goitres are common and there is a higher proportion of Follicular Thyroid tumours. Where there is adequate iodine, as when supplemental iodine is added to salt, the proportion of PTC rises. Increased exposure to radiation is one potential environmental contributing factor, and it has been shown that the exposure to radiation has increased mainly in the US population over the past 25 years mainly due to medical imaging technology. Events such as the Chernobyl disaster have shown that environmental radiation is a cause of thyroid cancer in those exposed at a young age.

Of all the possible drivers, the most important appears to be the access to high levels of medical care. There is a clear correlation between the access to and numbers of ultrasound scans performed and the incidence of diagnosed thyroid cancers. Again, the implication is that the increase is more related to overdiagnosis than a true increase in incidence. There is no evidence to suggest that the rates reported in Korea cannot be replicated elsewhere.

**Thyroid and Critical Illness**

If all thyroid cancer is included with the scope of CI coverage, an assessment of the maximum numbers of possible diagnoses is required if pricing is to reflect the risk adequately. One approach would be to assume similar levels to Korea will emerge because high levels of incidence have been reported, despite the fact that just 25% of the population has undergone opportunistic ultrasound screening. This suggests that the levels in Korea could climb even higher, so using the current rates for pricing purposes may underestimate the potential future risk.

An alternative method of assessing the potential level of undiagnosed disease in the population is to study the prevalence of undiagnosed thyroid cancer found at autopsy in those without known disease. Harach et al. (1985) reported a prevalence rate of 35% for occult PTC at autopsy when thyroid glands were sectioned at 3-4 millimetres (mm) intervals. A more recent meta-analysis has demonstrated a 7.6% prevalence rate for PTC in over 7,800 autopsies with a sampling interval that varied between 1mm and more than 3mm. With modern ultrasound, lesions as small as 1mm in diameter have been identified and biopsied, so it is possible that a large reservoir of undetected thyroid lesions may exist and could still be diagnosed in the population. A weakness of these studies is that autopsy is more common with increasing age, whereas the incidence of PTC, illustrated in Figure 2, decreases with age in females.

Small-sized, early stage PTC constitutes the major part of the overall increase of thyroid cancer amongst all ages, but especially in women aged 30 to 60 years, yet worsening mortality has not been seen. Lesions described as microcarcinomas have an excellent long-term survival rate of over 95%.

Currently undetected thyroid cancers found by increased screening would satisfy many current CI definitions. To identify these tumours in the...
population does not require a step-change in technology because the equipment needed is commonly available and widely used. The cost of a simple non-invasive ultrasound scan is out of proportion to the potential CI claim benefit. Treatment is with surgical removal of part, or the entire, thyroid gland. Subsequent replacement medication may be necessary, but this is hardly a major life-threatening illness compared to many advanced cancers, strokes or progressive neurological disease.

Already most CI policies exclude early prostate cancer, non-melanoma skin cancers and certain indolent Chronic Lymphatic Leukaemias. These exclusions were introduced when the projected incidence rates threatened to drive up CI prices. If companies wish to guarantee the price of CI for any significant period, an exclusion of small PTC from the cancer definition may be a reasonable adjustment. In the Korean market, most CI products originally excluded PTC of less than 2 cm in size, but some of the larger companies have since completely excluded thyroid cancer from coverage.

The sharp rise in PTC diagnosis in Korea is likely to be replicated elsewhere. Those working on the design and pricing of CI may wish to consider an appropriate response. If the exclusion approach used in Korea is not followed, it could prove difficult to guarantee future CI risk in countries where similar levels of PTC incidence look likely. The Korean experience serves to highlight how new developments in screening can affect cancer incidence and therefore the cost of CI cover. There remains an interesting dichotomy between the possible benefits to patients of screening and the impact on providers of an insurance product that is diagnosis-based.

Endnotes
6 Haselkorn T et al. “Why are thyroid cancer rates so high in Southeast Asian women living in the U.S.? The Bay Area Thyroid Cancer Study”, Cancer Epidemiol Biomarkers Prev February 2003 12; 144.
9 Mi Ah Han et al. op.cit.
13 Mi Ah Han et al. op.cit.
Demographic changes, in particular increasing life expectancy and decreasing fertility rates, continue to put pressure on social systems and society in respect of elder care. We live in a world where smaller and less stable family units are facing an increasing struggle to provide care for their elderly relatives. Increasingly, the traditional caregivers – for example, the daughters or daughters-in-law – are themselves engaged in long-term working careers. Finding solutions to fund the care of elderly relatives is therefore of key importance in ageing societies.

One measure of the mismatch between requirement and provision is the old-age dependency ratio. This is the ratio of the number of people aged 65 and over to the number of people aged between 15 and 64 years. It is projected to rise in the EU-28 countries from 27.48 in 2013 to 39.01 by 2030. By 2060, the old-age dependency ratio is expected to hit 50.16, which means there will be just two people of working age to support each pensioner. To put this in context, an analysis from the German private insurance sector projects that every second man and two-thirds of all women will require care in the years prior to death.

Long Term Care (LTC) insurance provides cover against the risk of becoming too frail to care for oneself without physical assistance from another person even when using assistive devices. Even though the need to set aside funds for future care costs of an ageing population is evident, few governments have acted to create public funding systems, whilst the uptake of private LTC insurance policies has lagged far behind expectations in almost all markets. This article looks at some established LTC markets – Germany, Singapore, the UK and France – where government and private solutions coexist, and considers the reasons behind this apparent failure.

Germany

The German social security scheme aims to bear around half of the actual cost incurred by an individual in need of care. The level of support varies, depending on whether a cash benefit or reimbursement of care costs is required and whether care is provided at home or in a nursing home. The system is based on three “care levels”. The assessment of the level of care required takes account of the frequency and duration of the assistance required to provide for personal hygiene, feeding, mobility and housekeeping needs.

Criticism of the time criterion, the focus on physical abilities and the limited benefit amounts has led to the development of new concepts the government intends to introduce in the near future. An adjustment to the system has seen (small) levels of benefit granted to people with limited capabilities in everyday life, specifically including those with dementia but no physical care needs.

The private LTC market is characterised by competition between life and health insurers offering products that display sometimes subtle, sometimes glaring, differences. The market is dominated by the generally cheaper products that health insurers offer. However, the number of policies sold by life insurers is growing significantly, with an average annual growth of 31% in the years 2005 - 2013 compared to an average annual growth of 16% for health insurance products (see Figure 1).
The price differential between life and health LTC products is largely driven by the possibility to adjust premiums. Health insurers are obliged to review the adequacy of premiums annually and can or must adjust them if required. While policyholders of health products are used to regular premium adjustments from their basic health insurance, life carriers must offer guaranteed premiums with only profit participation to mitigate adverse development of their portfolio. In theory premium adjustments are lawful under the terms of the Insurance Contract Act but, so far, have never been applied.\

Another reason premium levels differ is based in regulatory requirements such as the technical interest rate (health insurers use around 2.75% subject to a maximum of 3.5%, while life insurers use a maximum of 1.25% – as of 1 January 2015) or the consideration of lapses (allowed for health insurers but not for life insurers).

Standalone LTC products tend to reflect the care definitions used in the public scheme with an additional benefit trigger based on Activities of Daily Living (ADLs) and an independent dementia trigger. Benefits are paid out when either the public scheme definition is met or a certain number of ADLs is failed or the person has dementia. The benefits are tiered with reduced amounts paid at lower needs (care levels I and II) and 100% paid out for the highest needs (care level III). The benefit paid for dementia usually matches care level II. Benefits are fixed annuities, paid until death, sometimes combined with an optional additional lump sum benefit at the start of impairment.

Various premium payment structures exist, the most common being with lifetime regular premiums and limited premiums until age 85. Other product features include indexation, increased options in the event of specified changes in living conditions and without further medical evidence, and refund of premiums if death occurs before any care is given. Deferment periods – the time between sickness inception date and the beginning of benefit payments – have not found favour with distributors or customers. Applicants are typically medically underwritten, allowing policies to operate without a waiting period – the time between commencement date and the beginning of insurance cover. A new product offered by health insurers, and subsidised by government, is different in that no underwriting is allowed, there is an obligation to contract (except for those who are already in need of care) and all applicants are subject to a waiting period of five years.

Perhaps because carriers struggle to sell adequate volumes, other LTC product formats have appeared on the market. A recent trend is to combine LTC with disability income or annuity insurance. The underlying (disability income or annuity) policy provides an increased (e.g. double) benefit if the claimant is in need of care at the same time. Alternatively, purchasers of life and disability cover are offered the option to add LTC insurance at a later date without undergoing further underwriting.

In Germany LTC insurance is perceived as expensive and is not widely distributed yet relative to the population size. It is possible that the new product approaches may help to penetrate the market more.

**Singapore**

Singapore operates the Central Provident Fund (CPF), a mandatory social security savings plan for the working population. CPF policies cover savings for retirement, housing and healthcare, with LTC a subsection under saving for healthcare. The Singapore model serves as an example of a public-private LTC partnership. The government’s stated aims include nurturing a healthy nation, promoting personal responsibility for health and healthcare financing while providing good and affordable medical services. There is a reliance on market forces to improve these services, but the system allows for intervention when market forces fail to keep costs down. The solution to the cost of caring for Singapore’s senior citizens is ElderShield, an insurance scheme set up in 2002 and run by the Ministry of Health (MoH).

ElderShield initially operated using two life insurance companies chosen by a tender process, with a third company added five years later. The MoH provides the framework for the scheme while the private insurance industry assumes the role of risk taker and administrator. Pricing was based on overseas data in lieu of local experience. At launch the monthly benefit was S$300 payable for a maximum of 60 months per lifetime. This was later increased to S$400 for a maximum of 72 months.
for new entrants. Existing policyholders were given
the option to upgrade their policies to these enhanced
benefit conditions. A further review of benefit levels,
scheduled for 2012, has been put on hold due to the
government's efforts to focus on extending the
MediShield scheme (a public-private health insurance
partnership) during this same period.

Singapore nationals and all permanent residents aged
40 to 69 holding CPF accounts were automatically
enrolled in the scheme. There is a right to opt out
and no underwriting except when opting back in.
Individuals are randomly allocated to one of the
three insurers. People already in need of care can
apply for benefits through a separate scheme.
Premiums are payable to age 66 and are deducted
from individual's MediSave accounts – funds that
cover personal and family healthcare costs including
outpatient treatment and long-term medication.

Premium adjustment is subject to independent
investigation and MoH approval. Adjustment is
possible only at five-year intervals and is limited to
20% of the current price. Premium rebates are
considered every five years to account for better
than projected experience. The government
resolved to return 50% of any accumulated surplus
to existing policyholders. In 2007 and 2012
policyholders were entitled to rebates, as actual
claims were lower than projected.\(^5\)

The MoH has the final call on claim validity if the
involved parties cannot agree. Care benefits are
payable when three out of six ADLs are failed
following a deferred period of 90 days. Nursing
home charges in Singapore are estimated to range
between S$1,200 and S$3,500 per month.\(^6\) As
ElderShield provides for only basic levels of care,
a MediSave account may be used to finance
approved top-up plans sold by the three
participating insurance companies up to a cap
of S$600 per insured person per year. With
supplements monthly benefits can reach S$3,500
and be extended throughout life. Some of the
supplements include initial lump sum benefits,
death benefits during the claims period or
dependent care benefits if the claimant has a child.\(^7\)

By year-end 2012, more than one million citizens
(out of the 3.1 million with MediSave accounts)
had an ElderShield policy, while 265,000 people
had a policy with supplementary cover.\(^8\) The opt-
out rate decreased significantly from 38% initially
to 8% for the 2011 cohort.\(^9\) Managing the care
costs of those opting out may pose a political and
economic challenge in the future, but at least the
vast majority of the population enjoys some basic
protection.

**United Kingdom**

Political devolution has allowed the four UK nations
some freedom to pursue differing LTC strategies;
for example, only Scotland provides free personal
and nursing care services.\(^10\) The actions of the UK
government in respect to England, of the Scottish
Executive and of the National Assembly of Wales,
however, have failed to quell concerns about the
fairness, efficiency and sustainability of care
arrangements.

Nationally, the UK health system is financed by the
government with individuals of working age
contributing to the cost through their national
insurance contributions. The system provides elderly
or disabled persons and their caregivers with cash
help and other benefits, such as home adaptations
and special equipment. Care is provided by a blend
of voluntary organisations, local councils, health
authorities and private agencies. A high proportion
of older adults are helped by friends or family and
pay for their own care.

Although there is no precise definition of LTC used
in the UK, increasingly sophisticated assessments of
health and social care needs are employed to
understand the requirements of a given individual.
This divide between health and social care, a subject
for much discussion, means that direct comparison
with other schemes can be difficult. Healthcare is not
means tested and free at the point of delivery, whilst
social care is means tested in England and Wales,
with individuals paying all their care costs until their
assets have dwindled below £23,250.

Private, pre-funded LTC insurance policies have not
been sold since 2004. All the care products
currently available are immediate needs annuities
(INAs) – plans that provide a guaranteed, tax-free
income to meet the costs of the insured's registered
care provider. The annuity starts immediately and
continues until death. It is financed by a single
premium based on age and state of health. Some
products return a percentage of the capital
invested if death occurs within the first six months.
There are currently three providers of INAs in the market. To date the uptake of INAs has been slow and largely by wealthy, single people. In the peak year for sales (2004), the number of new policies issued totalled 1,730 but in 2010 this sank to 1,288 (see Figure 2). Yet, due to the high single premiums involved, the premium volume hit £127 million in 2012. Naturally, INAs are focused at higher age bands, with 99% of the products held by people aged above 70. Overall, the number of policies in force comprising pre-funded products, INAs, deferred needs annuities and LTC bonds totalled 30,515 in 2012 (of which 5,753 were INAs) compared to 46,104 in the peak year 2003. Between 2010 and 2012, an average of £108 million per year was paid in claims.¹¹

The market for INAs may still be very small but it has the potential to grow. In 2012 around 43% (175,000) of older care home residents paid the full costs of their LTC.¹² This is because their assets had not yet fallen below the threshold set in the public scheme. It is estimated that as many as 40% of those self-funders can afford, and would benefit from, an INA.¹³

The government-appointed Commission on Funding of Care and Support was critical of the shortcomings of the system of funding adult care in England.¹⁴ The main recommendations for reform that it made were subsequently codified in the Care Act (2014) and will apply from April 2016:

- Individuals’ lifetime contribution towards their personal social care costs is capped at £72,000.
- After the cap is reached, individuals are eligible for full state support.
- The means-tested threshold in assets increases to £118,000.
- Eligibility criteria for service entitlement are standardised to improve consistency and fairness across England.

It is important to remember that the changes will apply only in England. The cap applies only to the “personal social care” element and is subject to both eligibility criteria and the prevailing local authority rate. The cap will not cover general living expenses (estimated at £7,000 - £10,000 per year), or any “hotel” costs above the rate paid for by a local authority. Time will tell whether or not a new private market for LTC will develop subsequently to support this new funding structure.

### France

In the public sector, the costs of home care and nursing care are paid for through a mixture of state payments and public health insurance. The state covers the dependency part of the care (help to perform ADLs) via the allocation personnelle d’autonomie – the personalised autonomy allowance, or APA – and for the nursing part of the care (nursing and medical care) via health insurance. APA is co-funded by the National Solidarity Fund for Autonomy (CNSA), which is a centralised body responsible for funding support services for people who are no longer independent. Its funds come from employer social insurance contributions and taxation including a “general solidarity contribution”.

For those living at home, APA provides support towards expenses incurred in line with a personalized support plan identified by a social-medical team. Plans generally include support for both ADL and Instrumental Activities of Daily Living (IADL) by employing a caregiver who could be a family member although not the spouse or the partner. For those living in a retirement centre, APA offsets a portion of the dependence cost while the remainder is paid by the resident.

Care is classified according to a national scale gérontologique known as AGGIR (Autonomie Gérontologie Groupes Iso-Ressources) that defines
LTC in a nutshell

An internationally recognised, and widely used, definition for LTC insurance is based on six Activities of Daily Living (ADLs): dressing, feeding, washing, continence, mobility and transferring. Here “transferring” means the ability to get into an upright position from a bed or a chair; “feeding” does not include the ability to prepare meals.

To claim, the insured person must be incapable of performing a defined number of ADLs even when using special equipment. Instead, they require continuous physical assistance from another person and are very likely to require help for the next six months. This means, for example, that a person who can use a wheelchair to move from one room to another will not fail the ADL “mobility”.

Gen Re LTC claims experience shows “washing”, “dressing” and “mobility” are the first ADLs to be failed and “transferring” and “feeding” the last. For practical reasons, if a public scheme exists, private insurance products often copy the local definition, sometimes in addition to the ADL trigger.

People suffering from dementia also require help and support, but they may remain physically capable of performing ADLs so would not qualify for benefit based on ADL assessment alone. For this reason, many products consider dementia as an alternative claims trigger based on the individual’s need for continuous supervision by another person. Different tests are used to measure the severity of dementia in this context. The Clinical Dementia Rating (CDR) and the Mini Mental State Examination (MMSE) are popular. The MMSE consists of questions and tests of mental ability with points allocated for correct answers. A maximum score of 30 points is possible, which indicates normal cognitive functioning.

<table>
<thead>
<tr>
<th>GIR 1</th>
<th>GIR 2</th>
<th>GIR 3</th>
<th>GIR 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>€1,235</td>
<td>€1,059</td>
<td>€794</td>
<td>€530</td>
</tr>
</tbody>
</table>

Evaluation includes 10 “discriminatory” variables that are used for calculating the GIR, and seven “illustrative” variables that provide useful information for elaborating a support plan:

- Discriminatory variables: Coherence, Orientation, Toileting, Dressing, Eating, Continence, Transferring, Indoor/Outdoor movement and Telephone communication
- Illustrative variables: Financial Affairs, Cooking, Housekeeping, Transportation, Shopping, Medical treatment and Leisure activities

France has been a leading market for private LTC insurance for over 30 years. Almost six million people are covered by insurance companies, mutual insurance companies and provision funds. This number represents around 15% of the population aged over 40 years. The average entry age is 60 years and the average age when a person becomes dependent is 79 years. Benefits are usually monthly fixed annuities not earmarked for care.

Providers attach great importance to providing “assistance benefits”, such as advice on how to retain autonomy, find a care home and organise domestic care services, as well as proposing psychological support. The products on the market usually contain a waiting period between one (for other diseases than dementia) and three years (for dementia) except for accidents. If a claim occurs during that period, the policyholder is not entitled to a benefit, premiums paid will be reimbursed and the contract is terminated. A deferment period of 90 days is commonly included.

The group market is large; almost half of all LTC policies are group business. Employers may pay a share of the premium and employees are generally required to participate in the plan. However, a lot...
of group plans provide only temporary annual coverage and employees lose their coverage when they are no longer working.\(^{18}\)

The private LTC market is characterised by a jungle of definitions, including some based on the AGGIR scale and others using an ADL measure. The Fédération Française des Sociétés d’Assurances launched the new label “GAD Assurance Dépendance” in May 2013 with the aim to create a common technical base for insurance contracts that cover total LTC. Features of this “label” include no medical underwriting below age 50, a minimum benefit of €500 per month to be paid as an annuity until death, and a common trigger based on ADLs (dressing, mobility, washing/continence, feeding and transferring) with cognitive assessment based on Mini-Mental State Examination (MMSE) scores. The benefit trigger itself consists of three alternatives (see Table 2).

Table 2 – GAD Assurance Dépendance benefit trigger alternatives

<table>
<thead>
<tr>
<th>Failure to perform 4/5 ADLs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failure to perform 2/5 ADLs plus MMSE score ≤ 10</td>
</tr>
<tr>
<td>Failure to perform 3/5 ADLs plus MMSE score ≤ 15</td>
</tr>
</tbody>
</table>

Benefits from total impairment are hence based on a common set of alternative triggers, but for partial impairment, which pays 50% to 60% of the benefit, there are several definitions on the market. They are based on the five ADLs, MMSE score or on the AGGIR scale. Around two-thirds of covered people (68%) have opted to cover only total dependency.\(^{19}\)

France is one of the leading markets for LTC insurance, with long experience both in the public and private sector. The focus on the better age groups by the insurance companies and financial strains on the public system suggest this is a market with potential to grow.

**Conclusion**

The challenges of meeting the care needs of ageing societies are being approached in different ways by governments and insurance companies in different areas of the world. In some countries, Germany and France for example, a well-established public system exists that must overcome various challenges in the future, not least of which being that so many people remain to be convinced that setting aside money to fund for their future care is imperative. This is one reason why the market for private LTC products is still extremely small, especially in Germany, although political indecisiveness and unfavourable past experience make it difficult for UK insurers to launch sustainable and affordable pre-funded products. Singapore demonstrates how an effective and widely accepted public-private partnership can provide cover for almost the whole population. Nevertheless, public benefits are still too small to provide a complete solution but supplementary policies are not bought by everyone. More action is needed to tackle the rising problem of funding care, and only time will tell if any nation is fully prepared to meet the challenge.

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**About the Author**

Sabrina Link works as a Product Specialist for long term care insurance in the Life/Health Research & Development department with responsibility to support international clients in questions of product design and actuarial aspects. Her tasks include conducting annual mortality investigations in the German market and extending Gen Re’s expertise in Predictive Modelling. Sabrina is a member of the German Actuarial Society (DAV). Sabrina can be reached at Tel. +49 221 9738 286, or sabrina.elena.link@genre.com.
Personal care is available free of charge in Scotland to everyone aged 65 and over. Free nursing care is available to people of any age who have been assessed as requiring it. Personal care is not provided free of charge in the other UK countries.


Association of British Insurers statistics.


Ibid at Note 16.
Claire Henshall highlights that the work a claimant does prior to disability is actually what determines if their claim is valid. Mary Enslin discusses the unique role claims assessors play in managing relationships between claimant, medical personnel and employer. Fionna Kossmann describes the effect of pre-existing medical exclusions and highlights how important it is that claims assessors know how they may be applied.

Risk Insights – Vol.18, No 4

Mexico has experienced a rapid increase in the prevalence of obesity such that it is now recognised as a major public health problem. Janice Mina investigates the impact this has had on Health Insurance. Karin Neelsen describes how fallout from the Global Financial Crisis coupled with consumer scepticism continues to blight life and health insurance sales. Ross Campbell discusses the role added sugar in food and drink plays in driving up levels of obesity.

Risk Matters

Breast Cancer, Prophylactic Mastectomy and Critical Illness
Critical Illness (CI) insurance provides valuable protection against breast cancer. Alex Levitt and Adrian Mak examine why CI policies purposely do not cover surgical procedures undertaken in the absence of pre-surgically diagnosed disease to prevent future cancer.

Life Out The Fast Lane – Driving Simpler Lipid Profiles
Fasting lipid profiles are commonly requested by underwriters despite the restriction on eating and drinking that this requires proving unpopular with applicants. Dr. Ian Cox reviews new evidence that supports the conclusion that fasting prior to a cholesterol test is unnecessary in this context thus paving the way for more convenient screening.

Dementia – The Presence of Mind
It is estimated that 35 million people worldwide had dementia in 2010, but by 2050 that number will exceed 115 million. Ross Campbell considers the various types of dementia and sets this in the context of increasing public awareness of its threats.

Underwriting Focus 2014, No. 2

Obesity and overweight numbers have doubled worldwide over the last 25 years. Anke Siebers discusses the causes of the “epidemic”. Wan Siang Cheong considers the underwriting response to this trend in Asia. Ross Campbell reviews the positives and negatives of gastric surgery as a “cure” for severe obesity.
Mark Your Calendar

Gen Re offices around the world will run the following events:

> **Gen Re, China & Southeast Asia**
  *Dread Disease Survey 2008-2012 Seminars – 16-26 March*

> **Gen Re, Vienna**
  *Underwriting & Claims Seminar – 17 March*

> **Gen Re, Cologne**
  *Life & Disability Insurance Congress – 6 March*
  *Professional Assessment for Private Disability Insurance – 17 April*
  *Risk Management Programme – 22-26 June*

> **Gen Re, London**
  *Underwriting & Claims Seminar (Dublin) – 22 April*
  *Underwriting & Claims Seminar (Bristol) – 29 April*
  *Underwriting & Claims Seminar (Edinburgh) – 19 May*

> **Gen Re, México**
  *Underwriting Round Table (Santiago) – 21 April*

> **Gen Re, Madrid**
  *Encontro de Análise de Risco de Vida (Lisbon) – 10 March*
  *Jornada de Médicos Gen Re – 24 March*
  *Jornada para Suscriptores de Vida – 5 May*
  *Jornada para Suscriptores de Vida (Barcelona) – 19 May*

Industry Meetings

> **Carol Smit**, Claims Manager, Gen Re, Sydney, presented “Claims Professionals Decoded” and **Andres Webersinke**, Regional Director, Gen Re, Sydney, participated in a panel discussion “Where’s the Competitive Advantage in Life Insurance?” at the Australasian Life Underwriting and Claims Association biennial conference in Maroochydore 18 - 22 October 2014.


Gen Re, Sydney ran seminars in Sydney 18 September and in Auckland 23 September 2014. Gen Re presenters were: Andres Webersinke, Regional Director, “Protection Products Overseas Solutions”, James Louw, Deputy General Manager, “DI Wallabies v All Blacks”, Carol Smit, Claims Manager, “Claims Professionals Decoded”, Lindsay Cross, Principal Underwriter, “The March of Obesity and Bariatric Surgery” and Dr. Rami Mukhtar, Chief Executive Officer, Ambiata, presented “Making Big Data Work – Stories from the Trenches”.

Gen Re, Tokyo held a seminar on 11 November 2014. Dr. Winfried Heinen, member of General Re’s Board of Executive Directors presented “Impact of the Economic Environment on the Insurance Sector”.

Gen Re, Vienna hosted a seminar from 12 to 14 November 2014 on Disability Insurance Management supported by Ralf Hagemann, Senior Claims Specialist, Gen Re Cologne.

Gen Re, Cologne, hosted the “Congress on Insurance Medicine” on 19 November 2014. The event was attended by 82 clients from 49 companies from Germany, The Netherlands, Switzerland and Austria. The focus was eating disorders, attention deficit hyperactivity disorder (ADHD) and food intolerance. Astrid Kahl, Head of Life/Health Client Services, presented “New from the World of Underwriting” and Dr. Gundula Ashhoff, Senior Medical Consultant, Gen Re Cologne, took part in a panel discussion “Depression – Drugs versus Psychotherapy”.

Gen Re, Cologne hosted a seminar on 20 November 2014 that was attended by 19 clients from the German market. Ralf Hagemann, Senior Claims Specialist, Gen Re, Cologne presented “Psychological Tests and Examinations for Psychological Disorders from the Perspective of Claims Management”.

Gen Re, Tokyo hosted a seminar on 27 November 2014 that was attended by 80 executives, actuaries, and underwriters. Dr. Dirk Nieder, Vice President & Regional Chief Actuary, presented “Developing Successful Protection Products – The Past, Today and Making the Future More Reliable”. Dr. Wolfgang Droste, Chief Advisor, Asia, presented “Sometimes it’s the Simple Things in Life – or – Changing Consumer Buying Behaviour – How Do Insurers Evolve?”.


Gen Re, Singapore, co-hosted a Product, Underwriting and Claims Seminar on 10 and 11 February in Jakarta, Indonesia, with local reinsurer, ReIndo. A total of more than 140 delegates attended. Dr. Wolfgang Droste, Chief Advisor, Asia, presented the preliminary Dread Disease Survey update, and “Early CI Experience”, Chua Tuan Miang, Regional General Manager, Gen Re Asia, and Yong Pei Nee, Underwriting Manager, Gen Re, Singapore, co-presented “Direct Marketing Products and Underwriting” and “Preferred Lives Products and Underwriting”, Frank McInerney, General Manager, Gen Re, Singapore, presented “Managing Health Business”, John Ferguson, Regional Chief Actuary, Gen Re, Asia, presented “CI Developments and Guarantees” and “Long Term Care Products”, Dr. Himanshu Bhatia, Senior Medical Consultant, Gen Re Mumbai, presented “Underwriting Atrial Fibrillation: Getting the Rhythm” and Irene Ng, Regional Chief Underwriter, Gen Re, Asia, presented “Claims Case Studies”.

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