It's always a popular New Year's resolution: to quit smoking. An admirable personal goal, but at the population level perhaps a more sustainable impact will come from smoking bans. Evidence in the UK suggests that since July 2007 – when the ban here was introduced – there has been a significant reduction in deaths caused by heart-related diseases. This reduction is greater than was initially expected with "knock-on" savings in healthcare costs. However, whilst the ban appears to have "delivered" it must be asked whether there have been unforeseen ramifications for the liability of UK defined benefit pension plans and the management of longevity risk.

Heart disease: the facts

- In the UK, heart disease kills around 140,000 people each year.
- In 2006, heart disease accounted for approximately 25% of total deaths in the UK.
- In recent years, more men have been dying from heart disease than women.
- There is more experience of heart attack in older age brackets, specifically at ages 65 and above.

Table 1: Number of deaths caused by circulation disease excluding strokes in 2006

	All ages	<35	35-44	45-54	55-64	65-74	75+
Males	**72,692**	433	1,221	3,529	8,753	15,290	43,466
Females	**67,409**	214	428	1,038	2,811	7,841	55,077
Total	**140,101**	647	1,649	4,567	11,564	23,131	98,543

Source: Office of National Statistics

What has been the effect of the smoking ban?

According to a BBC report, "heart attack rates fell by about 10% in England in the year after the ban on smoking in public places was introduced." The report goes on to say that "the latest work, based on the results of numerous different studies collectively involving millions of people,

indicated that smoking bans have reduced heart attack rates by as much as 26% per year."

All other things being equal, the above would suggest that people will live longer. If such improvements are sustained every year in the future, life expectancy would increase as follows:

Table 2: Current life expectancy from age 65, assuming different rates of annual improvements in mortality related to heart disease

Annual improvement	0% (current)	10%	15%	20%	26%
Male	18.3	20.3	20.6	20.8	21.0
Female	21.1	23.0	23.3	23.4	23.5

Source: Human Mortality Database, Office of National Statistics, Redington analysis[1]

The impact is greater on male life expectancy than on female life expectancy. The primary reasons for this are:

1. Current female life expectancy is longer, so the marginal impact of the additional annual improvements is smaller. This is particularly the case as the underlying mortality tables assume no life will continue beyond age 120.

2. The fact that more males than females are known to die as a result of heart disease. The consequence of this is that the impact of the improvements on male lives is proportionately greater.

Impact on defined benefit pension fund deficits

This analysis usefully might be extended to defined benefit pension liabilities. The table below illustrates the increase in male and female liability value resulting from different annual rates of improvement in mortality due to heart disease. The adjusted mortality tables have been applied to a typical UK pension plan.

Table 3: Increase in pension plan liabilities assuming different annual rates of improvement in mortality related to heart disease

	Increase in liability	
Annual improvement	Males	Females
0%	-	-
10%	8.9%	7.7%
15%	10.0%	8.8%
20%	10.6%	9.4%
26%	11.0%	9.8%

Source: Redington analysis[2]

[1] UK death and exposure data has been taken from the Human Mortality Database and extended beyond age 100 using standard PA92 tables. Future improvements are assumed to be in line with standard medium cohort projections, with an additional fixed annual improvement for the portion of mortality due to heart disease.

Assuming an aggregate UK defined benefit liability of £1 trillion, this could result in an increased deficit of up to £100 billion. Compare this to estimates of the cost which falls to the NHS as a result of smoking, which range between £1 billion and £5 billion a year.

Getting a clearer view of longevity risk

The analysis provided here has been undertaken at a high level. It does not entertain an allowance for secondary effects (an example of which might be the substitution of the reduction in deaths as a result of heart disease, by an increase in deaths resulting from other illnesses). This highlights just one of the inherent difficulties in projecting longeivity. Consider also the divergent opinions of Professor Jay Olshansky and geneticist Aubrey de Gray: the former opines that an impending obesity epidemic will reduce life expectancy, whereas the latter suggests that life expectancy is to increase dramatically as medical technology begins to stem the tide of the causes of premature ageing.

Of the issues to be addressed by defined benefit pension plans, there has been a tendency to dismiss longevity as "too difficult", with many plans using prudent actuarial assumptions to provide the "illusion" of risk management. However, the recent emergence of longevity risk-transfer solutions in the UK (as was discussed in one of our previous RedViews) appears to provide the elusive "final piece" of the LDI risk management "jigsaw puzzle".

Redington has a team dedicated to researching and modelling longevity risk. You can access our technical paper on longevity risk models here.

However, before "grabbing" those solutions, it is imperative that pension plans are first able both to understand and to measure their longevity risk, and to understand the potential cost impact of that risk. This is because it is only then that pension plans will be able to engage in a clear and objective discussion about the price they are willing to pay for products that off-load the risk.

[2] Valuations have been carried out using GBP inflation and notional swap curves at 30 September 2009.

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