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COVID-19: Life insurance impacts

Matthew Edwards and Stuart McDonald ask whether we could see a doubling of mortality in Europe this year as a result of the coronavirus

At the time of writing, it is likely that – following the steady exponential growth seen to date – we will have well over 100,000 cases reported around Europe when this issue is published, and many thousands of associated deaths. We will still be on the 'ascending' part of the curve, and wondering when we might ever be able to claim that the peak is in sight.

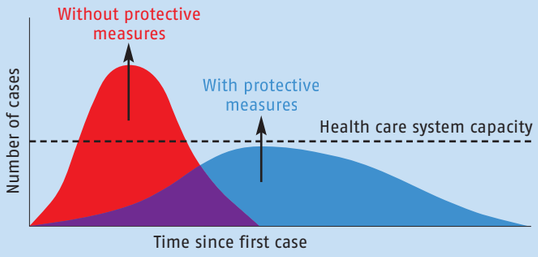

Figure 1: The 'curve' in this instance means the distribution of infections, which will be different depending on implemented protective measures such as increasing social distancing in order to slow the spread of the virus, to avoid a spike in the number of people getting sick all at once and overwhelming the healthcare system

This article tries to provide some insight into the current situation, with particular reference to the experience in Italy, and to let readers know what actuaries are doing to help.

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COVID-19: A KILLER IN TWO DIMENSIONS

As with any infectious disease, there are two aspects to worry about: how infectious it is – and so, how quickly it spreads – and how lethal it is if you are infected. So far, the experience in Italy provides a reasonable guide to lethality. However, infectiousness (seen via the 'R0' reproduction parameter central to much pandemic modelling) is harder to quantify usefully, partly because it depends so much on the cultures, systems and awareness of the countries studied.

For lethality, the experience in Italy so far, published by the Istituto Superiore di Sanità (www.iss.it), provides a valuable reference point thanks to the age and gender splits. We see:

COVID-19 in Italy (as at 12 March 2020 – www.iss.it)

	Males			Females		
	Cases	Deaths	Mortality	Cases	Deaths	Mortality
0-49	1,468	1	0.1%	1,426	1	0.1%
50-59	1,359	10	0.7%	1,033	4	0.4%
60-69	1,611	53	3.3%	744	12	1.6%
70-79	1,916	216	11.3%	886	57	6.4%
80-89	1,306	252	19.3%	794	103	13.0%
90+	155	40	25.8%	230	35	15.2%
Not known	272	10	3.7%	195	5	2.6%
Total	8,087	582	7.2%	5,308	217	4.1%

The gender split is immediately interesting, with cases split 60% men, 40% women. However, the disease is far more lethal for men, with deaths split 73% men, 27% women.

Italy is well known for its high age distribution, and this is a factor in the disturbing statistics that have been reported from Italy. If we take the crude mortality rates above but apply them to a UK population profile, the crude mortality rates above decrease by a factor of around 70%.

We can then compare these adjusted rates with the mortality expected from seasonal influenza. For this, we have used recent data from the USA's CDC that provides a very useful age breakdown. This shows mortality from influenza of approximately 0.5% for people aged 50 and above. (Here we mean mortality in the sense of 'Case Fatality Rate': i.e. the probability of death given the infection.)

Adjusting for undiagnosed cases, and also the likely 'time lag' between reporting and death, we estimate the mortality of COVID-19 to be around 3.5% for men aged over 50, 2.5% for women aged over 50. Thus, it looks to be something like six times as lethal as normal flu. The table also shows plausible upper and lower bounds, with particular regard to varying the parameterisation for undiagnosed cases and the time lag effect.

The problem of infectiousness

		Normal influenza	COVID-19 Central	COVID-19 High	COVID-19 Low
Mortality	M 50+ F 50+	0.50% 0.50%	3.5% 2.5%	6.0% 4.0%	1.5% 1.0%
Multiple of flu mortality	M 50+ F 50+	100% 100%	700% 500%	1200% 800%	300% 200%

There has been great variation in published results to date regarding infectiousness. However, it seems clear that the rapid spread seen to date, exacerbated by the phenomenon of asymptomatic infectiousness, makes the Coronavirus considerably more infectious than not only normal influenza, but also the 1957 and 1968 pandemics.

The infectiousness is not just a problem of the total number of people infected, but also the speed at which they are infected and become (in some cases) in need of hospital care. High-speed infection leads to a concentration of cases over time, swamping healthcare facilities – as was the case in North Italy in March.

This may lead to the pandemic having an effect much worse than the 1957/68 influenza pandemics, moving up perhaps towards the level of the Spanish Flu (generally described as having a 2% case fatality rate compared with the 1% of the 1957/68 outbreaks).

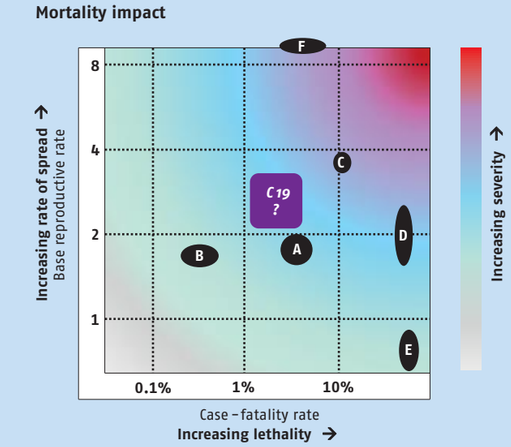

Figure 2: How COVID-19 compares with other pandemics and diseases

It takes only a few seconds of calculations to realise we could see a doubling of mortality in the UK this year (or at the very least, a doubling of mortality for the second half of this year).

Moreover, the above perspective considers only those deaths directly relating to COVID-19, and overlooks various likely and material indirect impacts. The likely surge in patient volumes at healthcare facilities related to a sustained COVID-19 outbreak would mean a corresponding squeeze on access to care (and hence, increased mortality) for patients already suffering from other serious conditions in secondary care. There would be an equivalent but less severe effect at the primary care level. Quarantine and self-isolation will also have a detrimental effect on those suffering from chronic conditions at home. The healthcare workforce will itself be depleted by absences. Furthermore, supplies of medicine taken for granted will potentially be adversely affected by production supply chain issues.

NEXT STEPS

The whole world has been caught off-guard, as is generally the case with extreme events of any type. Even where insurers are confident that their capital modelling puts them in good stead for the awful magnitude of this emergency, there is still an urgent need for actuaries to find reliable outputs to help with planning and also any decisions necessary for assumption reviews.

To this end, a small group of life actuaries and medical experts are collaborating as an ad hoc working group. Our immediate aim is to help actuaries formulate views through our publication of short bulletins or longer studies on aspects such as essential numbers, medical aspects, and pandemic model projections. If you would like to know more, please check the LinkedIn page https://www.linkedin.com/company/covid-19-actuaries-response-group/about/. ■

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