

ABSTRACT OF THE EDINBURGH DISCUSSION

E-cigarettes – No Smoke without Fire

[Institute and Faculty of Actuaries, Sessional Research Event, Edinburgh, 24 February 2020]

Abstract

This abstract relates to the following paper: Daniels, N., Cosma, C., Llewellyn, A., Banks, D., Morris, H., Copeland, J., & Djarlijeva, E. (2020). E-cigarettes: No smoke without fire? *British Actuarial Journal*, 25, E12. doi:10.1017/S1357321720000112.

The Chairman (Mr N. Chadha, F.F.A.): We are 1 month shy of 14 years since the smoking ban was introduced in Scotland. Since then, many people have given up smoking. Some are still smoking and some are in the midst of giving up. Of a similar age to the smoking ban are e-cigarettes, a popular substitute for cigarettes.

This discussion, “E-cigarettes – No Smoke without Fire”, covers a paper published by the Institute and Faculty of Actuaries (IFoA)’s E-cigarettes Working Party and will be given by Christina Cosma, Helen Morris and Niel Daniels. It will cover the working party’s research on the impact of e-cigarettes on the life insurance industry.

Christina Cosma is the Global Product Actuary for BIMA, an insure-tech start-up in London, selling life and health insurance and services in emerging markets across Asia, Africa and Latin America. She has previously worked in both pricing and product development roles for the UK market and has experience of health and lifestyle engagement programmes within an insurance setting.

Helen Morris is Aegon’s Technical Underwriting and Claims Strategy Manager and is responsible for setting the company’s claims philosophy, maintaining risk controls and analysing claims experience. In addition, she is involved in product development, ensuring products meet the needs of both the company and the customer.

Niel Daniels of AUL Assurance is the Chair of the IFoA Working Party on E-cigarettes. He has extensive pricing and product experience and has researched various insurance topics including smoking risk. He is particularly interested in how e-cigarettes will change the insurance landscape and their impact on pricing, product design and underwriting.

Miss C. Cosma, F.I.A.: Our paper, “E-cigarettes – No Smoke without Fire”, has now been published online so please have a look at it.

We are going to look at the current landscape of e-cigarettes, then at the materials that make up an e-cigarette: how it is formed and what the devices look like. Helen (Morris) is then going to take us through underwriting and claims, after Niel (Daniels) has looked at some of the modelling that we have thought about. Then we are going to focus on product design and the outcomes from some surveys we have conducted across the industry.

In terms of the landscape, first is the cotinine test, which tests for nicotine. It does not identify the source of that nicotine. It takes about 3 days for nicotine to stay in your system, and after that point, it will not show up on a cotinine test.

Several countries currently ban e-cigarettes and the sale of e-cigarettes, particularly in Latin America and South-east Asia. In the US and Australia, there are limited restrictions rather than a full-blown ban.

The limit for nicotine strength in the UK for e-cigarettes is 20 mg/ml. For comparison, if you smoke one to five cigarettes a day, the equivalent vape liquid would be about 6 mg/ml. Moving up to 5 to 15 cigarettes a day, the equivalent would be 10 mg/ml, and if you are a heavy smoker, which is the classification of around 20 or over 20 a day, it would be 18 mg/ml.

If you are a heavy smoker, you would save over £3,000 a year if you quit, which is quite a lot of money, and the coronary heart disease risk runs off over a period of around 15 years. Helen (Morris) is going to touch on that aspect.

The working party was set-up in July 2016 by the IFoA to look at the impact of e-cigarettes on the life insurance industry. We have written our terms of reference in the paper, but basically we have looked at pricing, underwriting claims, product design and particularly have focused on legislation and regulation. Specifically, how this is different in the UK from other markets and what this means for us in our industry. We have looked at core life products, and we have spoken to a mixture of underwriting, claims and actuarial professionals.

We have also spoken to a number of different independent researchers. We have had quite a few scientists on some of our calls and went to meet them, and they offered quite a few different perspectives. Niel (Daniels) met some of the tobacco companies, who are very much pro-vaping, and they showed him some of their devices. We have met quite a wide range of people, to try and obtain their opinions and see where they are coming from.

In the UK, there are currently around 80,000 avoidable deaths a year for which smoking is the key contributing factor. Compare that to other lifestyle-related deaths: obesity accounts for 34,000 and HIV for just over 500. You can see just how significant smoking is as a contributing factor to those lifestyle, or avoidable, deaths.

If we then think about what would happen with the introduction of e-cigarettes, ideally we would hope that e-cigarettes would help with smoking cessation. If e-cigarettes are a tool that could help to increase smoking cessation rates, what impact could that have on these numbers?

There are just over 7 million smokers in the UK today. If e-cigarettes were to increase the success of quitting by, say 2% per annum, we would see a saving of 7,500 deaths in the UK alone, assuming that smoker mortality reverts back to that of a non-smoker over a period of 15 years. We would like to hope that e-cigarettes would help with smoking cessation, but in fact we are yet to see the evidence emerge. We need to see some longer-term studies in order to conclude on this matter.

At the moment, in the UK, there are a significant number of e-cigarette users, over half of whom are ex-smokers who now only smoke e-cigarettes.

The most interesting category, and one that has proven to be quite a challenge for us, is dual users. Of the 3.6 m smokers of e-cigarettes, 40% are dual users. We do not know anything more about these people. Do they have a long-term plan to give up cigarettes entirely? Are they hoping to stay smoking both? What is the proportion of traditional cigarettes to e-cigarettes?

Finally, 6% of e-cigarette users have never smoked at all.

Helen (Morris) is also going to touch on this a little bit later, but this is one of the biggest concerns for some markets, such as the US and Australia. The concern is that e-cigarettes may be a “gateway risk to smoking” for those who have never smoked.

In terms of the media coverage of e-cigarettes, there is a huge variety. Some articles are very negative, as we see in the US, but others are more positive, the classic example being that Public Health England has stated that e-cigarettes are 95% less harmful than tobacco.

There are a variety of different studies showing different evidence, and it is very hard to see the wood from the trees when we see the same evidence being presented in completely different lights.

In the US particularly, in 2019, there was a lot of negative press around e-cigarettes, especially associated with younger users. They branded this EVALI, which is “E-cigarette Vaping Use Associated Lung Injury”. The biggest cause has been linked to the inclusion of tetrahydrocannabinol (THC), the psychoactive substance in cannabis, being smoked in e-cigarette devices. That is unique to the US market in that they do not have any regulation around the sorts of ingredients, such as THC, that they are allowed to put in e-cigarettes. This is completely in contrast to the

UK market, where we have very strict regulations around the ingredients that can be used in e-cigarettes, and, in fact, THC is completely banned in the UK. So this is why there seems to be a far more widespread risk in the US than the UK, but that is not to say it is not a risk at all in the UK.

Mr N. D. Daniels, F.I.A.: We thought it would be helpful to step back and tell you what is in an e-cigarette. Every device seems to look completely different, but fundamentally inside they have some consistent components. There is a liquid canister, which we will come back to, but that is the thing you plug in to fill the device. Then there is some heating equipment that heats and vapourises the liquid, which you breathe in. It is not permanently heating; otherwise, eventually the liquid would run out while it is in your handbag or whatever. There are devices to switch the heating equipment on and off and some clever chips, but essentially you have a heater and some liquid.

Within the liquid, there are three key components: a dissolving solution, of which there are a couple of types, which is there to dissolve the chemicals and to allow you to vapourise them more easily; nicotine, which is the addictive chemical – the key part, I guess you could say; and the different flavourings.

There are two main dissolving solutions: vegetable glycerine and propylene glycol. These are used in the food industry, so sometimes e-cigarette users will say, “Well, these things are used in the food industry. They are totally safe.” But in the food industry, you eat them. There are no particularly strong studies to say what happens if, instead of eating them, you heat them up to a couple of hundred degrees and inhale the vapour. It is a different reaction and thus the way the body reacts to the chemical might be different. I am not saying it necessarily is different, but it has the potential to be different.

Nicotine causes some health issues. You might think, “Well, hold on, surely nicotine is terrible?” It is said that nicotine is the thing that keeps you smoking, but tar is the thing that kills you. Tar and nicotine are completely different things. Tar is the black, horrible substance you see in the scary news articles about cigarette smoking.

Nicotine is a completely different product. It does have some health issues. It creates, I think, some issues to do with blood pressure and some other things, but it is relatively low down the list of bad ingredients in a cigarette. I say that being neither a scientist nor a doctor. And it does create an addiction.

That might sound like a bad thing, but most people are not promoting e-cigarettes as a great thing to do. They are not promoting them as something to take up from scratch. They are promoting them as a way of helping people quit smoking cigarettes. You need the addictive component. If there is nothing that is feeding the addiction, then you may try the e-cigarette and say, “Well, there’s nothing in it for me”. Whereas if it swaps you from being addicted to a cigarette to being addicted to an e-cigarette, then you are potentially on the right path. Nicotine is not perfect, but it is perhaps not as bad as tar and some other things in cigarettes.

Then finally, you get to flavourings. Flavourings are a problem. The last piece of information I saw said there were in excess of 5,000 different flavours of e-cigarette. Trying to get a sense of the chemical components that are in those flavours is obviously very difficult. Many of them have diacetyl. Diacetyl was put into flavourings that went into popcorn and some people suffered from popcorn lung many years ago in factories that made popcorn.

It is put into certain e-cigarette flavourings, but it is also in cigarettes. The concentration is at a lower level in e-cigarettes, so, very simplistically, it feels like there should be lower risk. But there are so many different flavouring components and it is a struggle to keep track of them.

There are chemicals that are put into e-cigarettes in the US, largely because there is no control. Every e-cigarette liquid and e-cigarette device in the UK has to go through the Medicines and Healthcare products Regulatory Authority (MHRA), which offers some control.

Turning to modelling, Figure 1 is a multi-state model for traditional smoking, that is, without e-cigarettes. Everyone starts as a “never smoker”. They can then transition straight to death or

Modelling

A traditional multi-state model for modelling smoking transitions might look like this:

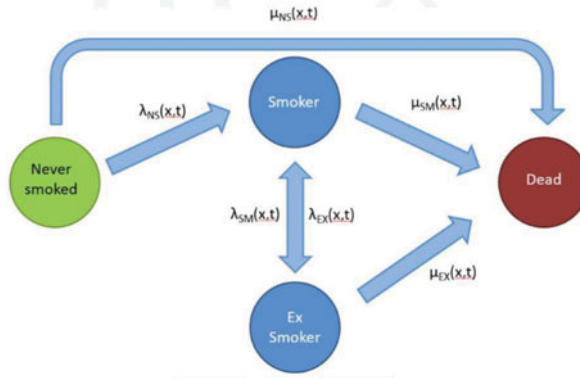


Figure 1. A traditional multi-state model for smoking.

Modelling

- But when we introduce e-cigarettes, the model gets significantly more complex:

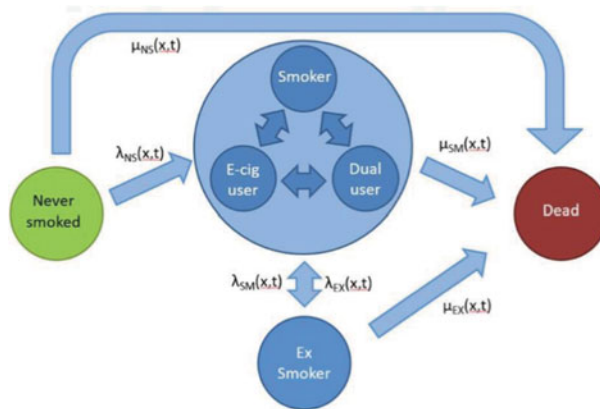


Figure 2. Multi-state model with e-cigarettes.

they can transition via smoking. If they get to smoking, then they can become an ex-smoker before dying.

It is, relatively speaking, a simple model. I did some work on it in a previous job, and when you expand the model to include periods since becoming a smoker, periods since quitting, age, gender, quantity of cigarettes smoked, you realise that it is more complicated than it initially appears and it is a lot tougher to populate the model.

When the e-cigarette equivalent is modelled, the smoker piece in the middle of Figure 2 has three types of smoker.

You have a “pure smoker”, which is what we had in the previous model; “dual users”, people who smoke both devices with an almost infinite number of permutations (do you smoke mostly one or mostly the other? How many? How long?); and finally, you have “pure e-cigarette users”. Obviously, you have the transitions from each of these to dead, each of these to ex, and you have still had the other transitions. We counted 14 transitions. Those transitions are still cut by amount you smoke, period since you quit, period since you started smoking, age, socio-economic group and all these things. It is hugely complicated. We naively started work thinking, “But it is fine, because we are good and we will get all this, and we will model it, and we will come up with some fantastic new table.”

Stop press. We did not! We wanted to, but virtually every single statistic is almost impossible to obtain. For old-style smoking, there is now a lot of data.

The more mature members of the audience might remember the old Doll and Peto smoking studies. These two gentlemen studied a number of doctors. The reason they chose doctors is that they are always easy to trace because they are members of the British Medical Association (BMA). They did a census-type analysis at 10-year period. At 10 years they said, “What are these doctors doing? How are they doing?” The analysis was also done at 20, 30, 40 years, and I think they reached 50 years. They were able to obtain a lot of data on mortality rates and morbidity rates for doctors who were smoking or who were not smoking, and how long since they had quit. It is a struggle to do this for e-cigarettes, but we did try.

Having looked at those 14 transitions, there are two in which we are particularly interested: (1) The relative risk of e-cigarette smokers (and you could say it is relative risk compared to tobacco or compared to non-smoking) and (2) the impact on quit rates. We identified those two as being our most interesting parameters and then asked what we could find. We have to separate by dual versus ex etc., by duration, by age, sex, socio-economic group and all the things I said before. Long-term research into e-cigarettes really does not exist. E-cigarettes have been around for quite a while, but people have not been studying them.

There seems to be a growing number of studies that talk about being long term, but will comprise about 400 people for 6 months. There is no large 5- or 10-year mortality study for 200,000 people. We said, “Well, in the absence of hard, tangible data, what can we use?”

We started to look at a couple of different analyses. The first one looks at the chemical output of the cigarettes. These studies look at the output from a traditional cigarette and the output from an e-cigarette, and look at the top chemicals, where “top” means most frequent rather than popular in the devices. Then we ask if one is at a higher quantity than the other. Most of the bad stuff, like diacetyl that I mentioned earlier, and various other chemicals are in e-cigarettes at a far lower level than in tobacco. Therefore, crudely, you can say, “Well, if the bad stuff is in there at a lower level, it must be a good thing.”

The problem is there are some chemicals, certain flavourings in particular, that are not in tobacco. What if those are the terrible, bad news?

We do not necessarily know if they are terribly bad news yet because you might only find out in 10 or 20 years. In the paper, there is an excerpt from a comment about the fact that 70 years ago or whatever, they advertised cigarettes as a health tonic. “Take these. They will help you out.” Mistakes have been made before so you cannot assume that just because it smells nice and has a nice flavouring, that it is benign. We just do not know.

The other study was around genetic mutation. I had not realised that you can detect mutation in genes really quickly. What they do is they take the output from the two devices, traditional tobacco and e-cigarettes, put them through a funnel into a solution and you obtain a concentrated smoke solution or vape solution. Then you wash it over some genes, so you mix the genes and the liquid together and see what happens. Some of the mutations happen really quickly, within a few hours.

You can look at genetic mutation of the two contrasting chemicals and say, “Well, this one is mutating quite heavily and this one is mutating either not at all or far less.” That is an early precursor to some of the problems that cigarette smoking gives, but again it is not quite perfect proof.

Both studies seem to suggest that, on the risk side, e-cigarettes are better than cigarettes, but it is not quite proof.

On the quit side, the data were pretty poor until one study came out early last year looking at “stop smoking” services that the NHS advertise. They took 886 people who went to “stop smoking” services and split them into two groups. One was given traditional nicotine replacement like patches, or gum and things like that. The other was given e-cigarettes. They monitored them over a period of time and then assessed the impact.

The e-cigarette users were abstaining from smoking at roughly twice the rate. So that seems great until you look at the numbers: 18% were still off cigarettes compared to 9%.

With your positive hat on, you say, “Twice as effective.” With your cynical hat on, or realistically looking at the data, you say “82% of people went back to smoking cigarettes.” It is sort of good news, but it is not there yet. If you have 100 people who are trying to quit, 82 will not manage. There is still a long way to go in terms of making these devices truly effective at helping people quit.

There are some things that people are starting to do. Imperial Tobacco has a product called blu, which is essentially an e-cigarette. It has a liquid in it, but they put in nicotine salts, which give you a quicker hit than nicotine. The speed of the hit is very important to whether people will stay off tobacco or not. Tobacco smoking gives you a very quick nicotine hit. E-cigarettes are a little bit slower so people are not obtaining the same kind of satisfaction and they give up and go back to smoking. Supposedly, nicotine salts give you that hit more quickly. Having said that, once you are at the level of particular brands some of the data are really difficult to access first and then interpret. With some of it, you are always looking at the results slightly cynically.

Public Health England came out with a view quite a few years ago, and they reiterated it a couple of years ago, which said, “95% safer.” Actually, when you read into it, they say “potentially” or “probably” or “possibly”. That word slightly dilutes the impact of the message, but they are still sticking to 95%.

The UK term insurance market – I think this was maybe not last year, but the year before – was £4.4 billion of annual premium income. Going through similar modelling to the earlier example, you obtain a smoker ratio, assuming a non-smoker has 100% mortality and smokers are higher. We model smokers using Term Smoker Male 2000 (TSM00) tables, divided by the equivalent entry in the non-smoker table (TNM00) to obtain the smoker ratio. Smokers have, roughly speaking, double the mortality of non-smokers. Then if you take 2% extra smokers per annum and make them quit. Their excess mortality runs off over this 15-year period. Depending on the condition, some things revert to normal mortality quickly and some take time, but fifteen feels like a good average proxy.

The impact from an embedded value perspective, or a Present Value (PV) of claims perspective, based on £4 billion annual premium income, is almost £1 billion. That is not £1 billion out of £4 billion, because the £4 billion is an annual premium. That is probably £40 billion of PV premium, but you are gaining £1 billion. The one guarantee with all those parameters is they will not be right, but it does show that there is a massive potential impact on the value of claims.

This is an in-force book. This is a book where people are paying fixed premiums. If they start to smoke less, then the industry gains. This is just term insurance, not other products, and in particular not annuities which might work the other way. Having said that, annuities have an older age profile, where you have fewer e-cigarette users, and they tend to be in a slightly lower socio-economic group than a term block. As you go down the socio-economic spectrum, you have fewer e-cigarette users. I am not saying you should ignore the offsetting impact of annuities, but it should be less.

Ms H. Morris: Niel (Daniels) just ended on Public Health England, and how e-cigarettes are 95% safer than traditional cigarettes. We are going to look at underwriting and work on the basis that e-cigarettes are safer, and how our world will have to change if more people start using e-cigarettes and we have to start pricing for them.

We concluded that they are less risky than a traditional cigarette. What does that mean? We need to start changing our question sets that we ask. At the moment, it is quite straightforward on an application form. You have probably got, “Do you smoke? Don’t you smoke? Have you smoked in the last 12 months?” It is quite simple. We have underwriting rules that sort that out for us. We do not just rely on a traditional underwriter anymore. We have machines that do that for us. If we introduce e-cigarettes, it is going to become more complex. Instead of just having the two options, “smoker” or “non-smoker”, you are going to have people that are “ex-smokers”, “dual smokers” and “non-smokers”. That is three or four groups of people for which we are going to have to introduce pricing. We need to capture those responses from the customers. And how long ago did they give up? Was it over a year ago? We have seen the statistic that the health risk improves 15 years after quitting smoking.

How do we allow for that? How do we make sure that we are pricing our customers fairly? People say, “Oh, I’ve moved onto e-cigarettes,” or “I’ve been an e-cigarette smoker for the last year or 2 years.” Will they stay on e-cigarettes? What happens if they run out of liquid on a Saturday night and their only access to a nicotine hit is going to buy a packet of cigarettes at the pub? How can you guarantee they will remain an e-cigarette smoker?

The second major question is around cotinine testing. When we receive an application – not on every occasion, but for some of those people that say they are a non-smoker or they are going for higher sum assured – we will carry out a cotinine test to see whether they have told us the truth. Smoking, obviously, does create quite an increase in somebody’s premium. There is an incentive there. They think, if they can get away with saying they are a non-smoker, paying a smaller premium over the life of their policy, it saves them a lot of money. We need to have something there to deter them from doing that and ensure that they are paying the right premium.

It is quite simple at the moment. It is a cotinine test. Cotinine is the end result of nicotine when somebody smokes. In the body, it produces cotinine. We can do a simple blood test or urine test to see whether somebody is smoking. It stays in the body for approximately 4 days. If you are a long-term smoker and need your regular hit, to give up for at least 4 days before taking out your policy and maybe going for a cotinine test, is going to be a big challenge for you. People tend to be honest on application forms or we will find it out. It is a simple test. It is a cheap test for insurance companies to do, and it does mean that we put people into the right pool at the beginning of the policy’s lifetime.

What is out there for e-cigarettes? It is not very reliable at the moment. There are a couple of options. When you smoke tobacco, you release quite a large amount of carbon monoxide. When you smoke an e-cigarette, the amounts of carbon monoxide are quite small. So you could test the carbon monoxide in the breath of somebody. That is a more complex test than doing a simple blood test or urine test. Therefore that is going to come at a cost to an insurance company in putting these policies on the books.

It is also not very reliable. Somebody might have a lower dose of carbon monoxide in their bloodstream. Does that mean that they are smoking e-cigarettes or cigarettes? There is also a certain amount of carbon monoxide in the atmosphere. If somebody lives in an area where there is pollution etc., then you will also obtain certain amounts – much smaller volumes of carbon monoxide – when they take a sample. It would be an indication for us that somebody maybe was smoking e-cigarettes over cigarettes, but it is not certain. So, there would be doubt.

The Americans have also been looking at another test. Tobacco leaves contain certain organic compounds, one of them called anabasine. That is only found in the tobacco leaves. We found from our enquiries when somebody goes for an organ transplant in America, they will be tested for this because they will not do the transplant on people that are smokers because they are looking

for the best outcome for their transplants. But again this is an expensive test and we are not convinced it is reliable at this point in time.

We are at the point now where we do not have a reliable underwriting test to check whether somebody is a smoker or not. That is a big concern.

Going onto claims, Niel (Daniels) was talking about our claims experience and the number of deaths that are attributed to smoking. If we can cut down the people that are smoking traditional cigarettes, we should see an improvement in our claims experience. Four of the five top causes of death could be attributable to smoking: heart disease; cerebrovascular disease, such as strokes; respiratory diseases; and lung cancer in particular. Obviously, there are more cancers than that, but lung cancer is the big one. Over £5.3 billion in claims were paid out in 2018, across all claim types. If we can just cut that number by people cutting down on their cigarette smoking, or converting to e-cigarettes, that would be a massive saving for the insurance industry. But it is going to take time for that experience to come through.

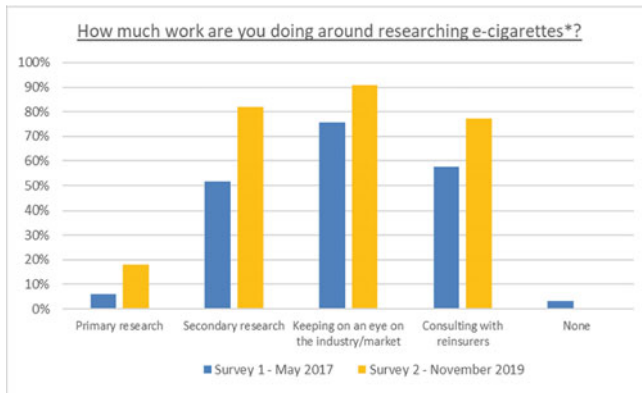
Normally, with underwriting, we have a 3-year select period, and so claims take time to come through. Without the studies etc., we need to do something now. Advisers are pushing us to try and make changes to our approach to smoking e-cigarettes and nicotine replacement. The average life expectancy of somebody at the moment is around 80 years. If we make an improvement with cigarette smoking, hopefully that may improve, though we have other issues on the horizon such as increases in obesity, diabetes and things like that. We might cut down cigarette smoking, but it might be replaced with something else.

From a claims perspective I have two main areas of concern with e-cigarettes. One is around misrepresentation. I briefly mentioned that at the underwriting stage and making sure people are being honest at the application stage. But we cannot test that, even at the claim stage. If we have doubts around whether someone has been honest or not, we will make investigations. As part of a claims process, you have a claims assessor speaking to maybe the family, or in a critical illness claim, they will speak to the actual claimant themselves. It is amazing during that conversation how honest people can be and say: "Yes, I have been a long-term smoker," or "Yes, he gave up 4 years ago." You will say, "Actually, the policy was taken out 5 years ago, so obviously he was a smoker," and we will make our investigations.

If misrepresentation is found, particularly with smoking, because it is the one thing that a customer really should know about their medical history when they are completing an application form, we will take quite serious action. It can result in a policy being cancelled and a claim not being paid. It has a massive impact for a family if they have suffered a critical illness, and they were expecting that to pay off their mortgage, or a death to pay off the mortgage, etc. We can find this information out through what we call a tele-claims process, or by looking at somebody's medical records. Doctors record, as probably many of you know, whether you are a smoker or non-smoker. They will record it if you have been trying to give up or been getting help from the surgery to quit. They record how much you smoke. You can actually obtain nicotine-replacement products on the NHS. E-cigarettes, you cannot. We do not know yet how they are going to record e-cigarettes on medical records. We have seen the odd reference to it, but there is no sort of consistency across all GP surgeries. If we cannot prove that somebody was smoking cigarettes compared to e-cigarettes, or they were smoking e-cigarettes when they said were a non-smoker, we cannot do anything at the claim stage. It is up to us, as the insurer, to prove that somebody has been not quite as honest on their application form as they should have been. If we cannot prove that, then we have to pay the claim.

The other problem, from a claims point of view, is relapse rates. A very small number of our customers are dishonest. I have just discussed misrepresentation. We do not know how many people remain e-cigarette users, how many drop back to being a traditional cigarette user, or how many become dual users. It may be that when they took out the policy, there were on e-cigarettes, and that is what they intended to be on, but for whatever reason they have slipped back and started using traditional cigarettes as well. If they have taken a policy out with us on

Industry Survey



*respondents may select multiple answers

- Uptake in research being conducted
- Industry-wide change expected in attitude within the next 3 years
- Further published research and increased prevalence of e-cigarette smokers are considered the biggest drivers of this expected change

Figure 3. Industry survey.

e-cigarette rates, they do not need to tell us if they changed that approach later on in the life of the policy. They have been receiving the benefit of that cheaper premium. Our claims experience will be affected because they have gone back to being a traditional cigarette smoker so they will be in the wrong pool. Relapse rates are a worry for us. Until we can obtain more certainty on whether people will stay off traditional cigarettes, we will remain concerned.

As a working party, we had a mixture of experience from pricing, underwritings and claims. We went out to direct offices twice during the working party's time, first of all in 2017. We surveyed underwriting managers to find out their views on e-cigarettes, traditional cigarettes and where they thought everything was going.

We did that survey again late last year to see how things had changed. In 2017, people were expecting to move down to the e-cigarette pricing approach much earlier. One or two companies were out there and asking more questions and verging on slightly different rates. Everything was quite positive about e-cigarettes at that point in time. But as you can see from Figure 3, people are taking a bit more of a watching approach now.

Most direct offices are relying on their friendly reassurer to do some of the research, or to provide them with information. Nobody really wants to be the first one to move. Back in 2017, 82% of people were expecting a move. In a survey last year, that had moved up to 95%. People think, in the next 3 years, there will be a change.

Also in that industry survey we asked the underwriting managers what they were concerned about. One is around the gateway risk, which we have mentioned for people who have never smoked moving straight to e-cigarettes. In America etc., they have had children who have taken up e-cigarette smoking who had never been smokers. We have not seen that particularly in the UK as yet, but there is a concern that what happens in one place will move across.

Introducing e-cigarette rates will mean cheaper premiums for those people who originally would have been given smoking rates because they were on e-cigarettes. There is a big risk that those people will lapse their current policies and then take out a new policy for the cheaper premium, leading to an element of churning taking place.

Younger people are more likely to be e-cigarette smokers. Older people do not tend to change quite as easily. So, it depends on how your book of business is made up as a direct office, as to whether you are going to be impacted by the introduction of e-cigarette smoker rates, and the possibility of churning. If you attract the older customer who has the higher value sums assured etc., then perhaps you will not be impacted in quite the same way.

We have had enquiries from advisers asking us what we are going to do about e-cigarette smoking. We are receiving pressure to charge cheaper premiums, but obviously we have concerns. While we have the risk of dual smoking, relapse rates, etc., a lot of underwriting managers are reluctant to move.

Someone we spoke to said, "A shift towards vaping rates to be more widespread will only happen when more long-term data becomes available." Another said that when one mainstream insurer moves, they expect there to be a market shift. But people are concerned. Until we can definitely say there is no impact from a health point of view, or it is healthier, people are just reluctant to move. Nobody wants to be the first one.

Underwriting and claims: what does this mean from a product design point of view? We have discussed this before. There are non-smokers, and there are smokers so we have a binary approach. If we move to e-cigarettes, there needs to be something in the middle, but then it depends on how long ago you gave up smoking. Have you been a long-term ex-smoker? What is the answer? We do not know. How do we stop the lapse rates, etc.? There is no certainty. One solution that we have thought about is reviewability. We have moved very much to a guaranteed product now, and there are very few reviewable rates. Will the market move onto shorter-term contracts, like 1-, 2-, 3- or 4-year contracts, etc?

Reviewable policies do seem to have fallen out of favour, but it may be one way of making things work. However, from an industry point of view, that would be a bit of a nightmare. Do we want to do smoker testing on every single customer as they come in for their reviewable rates? It would make the product more expensive. Until we develop some reliable testing to prove whether someone is a cigarette smoker, e-cigarette smoker or non-smoker, we are reluctant to move to that approach.

Philip Morris owns IQOS, which is a type of e-cigarette. They have piloted, with the Scottish Friendly Society, a new product online, to try to encourage people to move to e-cigarettes. They have offered non-smoker terms, traditional cigarette smoker terms with a 15% discount if you are on e-cigarettes, and a 25% discount if you smoke their product. It is a good move in the sense of the industry, but I think they are doing it for the wrong reasons. We are a little bit nervous with that, but people will follow. They have made that brave move, but they have something to gain from it.

So, next steps. We have not been able to stand here today and give you the answers. We would have loved to have said e-cigarettes were safer. I think we are all moving gradually that way, but we do not have the data to prove it. We are hearing mixed stories coming out in the press, positive and negative, but we have produced our paper. It is something that I think needs to continue to be worked on over the coming years. The subject needs further studies and further investigations. There will be some movement in the next 3 years.

Ms H. C. Patterson: I have a question about the safety issue. I understand that there are lots of unknowns, but is there anything indicative from animal studies or any regulatory documents that give any sense of the biological mechanisms by which there could potentially be harm?

Ms Morris: I think the simple answer is no. We have, as a group, looked for as much as possible that is out there. There are a number of studies, but it is a small number of people that have been involved in those studies. They have only gone on for a short period of time. Niel (Daniels) mentioned one had been a 6 month study of 400 people, etc., and that is what we have found. That is why we were really struggling. What we can say is the ingredients in the e-cigarette are similar to a traditional cigarette. They do not have tar, which is one of the biggest factors with cigarette smoking that causes a lot of the damage. The ingredients are in much smaller quantities, which are really positive, but more than that we really cannot say.

Miss Cosma: As part of the study, we did speak to a number of different scientists and researchers. Even in the space of a 6-week period we spoke to two different scientists, one involved in a study in London and one involved in a study in Europe. The research and feelings

from each of these two scientists could not have been more opposite. The first one, a super pro-e-cigarette fan, was advocating that non-smokers should not have a problem with people smoking e-cigarettes in the office. They should be completely normalised since they were low risk.

The other one, on the other hand, a few weeks later, said that this sort of level of evidence should be taken with a pinch of salt. The evidence that had come out with mice, for example, was not a true reflection on the impact on humans due to genetic differences, etc. They were doing a very long-term study. They were only, I think, 6 months out of the 2 years through. He was advising to proceed with caution, and only up until the point where we actually have conclusive evidence should people be advocating e-cigarettes seriously and really promoting them. Ultimately, we would need to proceed with caution.

So, even the experts were giving contradictory views. I think this is the perfect example of how difficult it is to determine the relative risk and to try and obtain some conclusive evidence behind it.

Mr P. O. J. Kelliher, F.I.A.: You mentioned about the first scientist talking about permitting e-cigarette use in public spaces. As an asthmatic myself, one thing I find very difficult is when somebody starts up an e-cigarette next to me. What level of research is going into the impact of secondary vaping smoke on non-smokers?

Miss Cosma: There is quite little, in all honesty, on passive e-cigarette smoking. It has not really been an area of focus, given they are already struggling to try and find the primary effects.

Mr Daniels: Yes, I agree with that. I have read a couple of papers that say that the droplet of propylene glycol, or the other chemical, is essentially far bigger than a smoke particle. Smoke particles are incredibly small and thus can travel a lot further. Supposedly, the distance that these droplets travel is smaller, and thus, other things being equal, there should be less of a risk.

That is the extent of the level of research. We have certainly not seen anything that has tried to study the subject of passive e-smoking properly. As Christina (Cosma) said, they are trying to work on the first question initially.

It is interesting. I spoke to a doctor who said that e-cigarettes are not allowed in various spaces where there are lots of people. I boarded the plane to come up here and they said, “Just to remind you, you cannot smoke, and that includes e-cigarettes.” When I get on my train home from London after work, they say, “You cannot use either of these devices.” You mostly cannot use them in any kind of enclosed space.

I checked at my company where I worked, where we wrote most of the paper. I spoke to our HR people just to see if they had a policy. They had a policy of not allowing it, but they had no idea why they had that policy. I spoke to a doctor who said that if we can get that switched around, and we recognise that there is growing evidence to suggest that there is less of a problem – I will not say no problem but less of a problem – then the moment we start making it more acceptable for people to use e-cigarettes might be the point at which usage rises.

Anecdotally, I worked with an underwriter (this is a sample of one so do not critique me on the statistics) and he said: “If I have to go outside the building anyway, I might as well just have a cigarette. If I was allowed to use an e-cigarette at my desk but I have to go outside for a cigarette, I might use e-cigarettes more.” A sample of one, but if we encourage the usage it might make more people quit. But I do recognise that approach is not without issue.

Mr A. J. Rankine, F.F.A.: There are a couple of points on which most people would agree: non-smoking is a better status to be in than smoking and that vaping is almost certainly in between those two. I think also that people would agree there is a significant protection gap in the market. I wonder if perhaps what we would like to see is something, and I think you highlight this in the paper, more akin to the Vitality model, where we move to helping people to manage their health status. Promoting quitting and potentially e-cigarettes, or whatever, as a kind of intermediate stage

but with a clear expectation of quitting. You conclude at the end that this is a good time to launch an additional investigation into this area. I wonder whether, given the real challenges of determining in any conclusive manner whether the long-term benefits of vaping are going to be as expected, or less good, or what long-term problems might arise, a better focus would be to look at the likelihood of restarting smoking or of long-term quitting from vaping.

Mr Daniels: My take is that the risk of people not sticking with a product is a massive risk. The study that came out last year showed that 82% of people give up on quitting and go back to cigarettes. Whilst e-cigarettes might be better than other forms of quit aids, there is a long way to go. I do not think something that looks at relapse rates is necessarily where I would think that the Continuous Mortality Investigation (CMI), or someone like that, should focus their efforts. Unless we bring in frequent assessment of people's smoking status then they cannot do that. They measure at a point in time the status of somebody, whether it is to do with smoking or to do with other things, and then monitor experience. Until products start to look at an annual re-test, I do not think it is something for the CMI.

I think there will be more studies at a population level which look at relapse rates because it is a massive factor. You can have the best device in the world. They could have zero risk – and I am not saying they do, just to be clear – but if they only help one or two people quit because everyone else goes back to cigarette smoking then they are useless.

The relapse rate feels like one where there could be population studies relatively quickly because it is a relatively easy thing to obtain. You do not need huge volumes of data, unlike mortality studies. The rate of relapsing is pretty high.

I also think there is fairly strong evidence – I am probably saying this anecdotally – to say that as you go past a certain period, if you are still off tobacco, then you are not likely to go back. You do not need to do that test for 20 years and say, “What is the relapse rate after 18?” Because it is zero, almost. It is that first year or two which are important, and especially the first few months. But I would imagine that would come from the population study.

When I spoke about the CMI, I was thinking of the mortality side. Of course that can also come from the population study. We have a history of looking at things that are boiled down to our population – the population of insured people. There are so many things that are specific about insured people that are different from the general population.

Mr Rankine: And do you think there is going to be a trajectory in terms of the products available towards that kind of annual testing? The Vitality model is broadly in that space.

Miss Cosma: From the free text answers on the surveys that we conducted it seems that insurers are not keen to do that. They just do not want to be the first one to move. They want to follow someone else down that path.

When we did the first survey, there were two providers that were allowing e-cigarette users to be priced at non-smoker rates. That has subsequently stopped. I had some anecdotal feedback from an advisor in the time where they were still pricing as a non-smoker. The advisor was saying, “Anyone who comes through the door who is an e-cigarette user, the first thing I do is buy that policy. It is just selection against that insurer”. If one provider does it and they go out alone, it is not going to be good for them. It almost needs to be an industry agreement, an ABI-esque shift in the way that we are prepared to treat e-cigarette users, so that no one provider is taking the hit for everybody else.

I used to work for Vitality. You see people that are fully bought in and people who are going to lapse after a few years because they are not interested in on-going engagement. I think with younger people you will see more stick-ability with that type of contract, but again that is going to take quite a number of years to flow through. So, we are in the same situation in that it is a bit of a waiting game.

Mr Daniels: Three things that have to be in place for it to work. The test has to be effective and, as Helen (Morris) said, cotinine tests nicotine. It does not test whether you smoke an e-cigarette or tobacco, or how long you have been doing one of those. The test has to be effective. It has to be cheap.

If the test costs multiple hundreds of pounds and we are doing it for every single policy holder every year, then it becomes prohibitively expensive. It also has to be of a form that people are happy to do. I have this vision, and this is just a made-up thought, of something where you have it in your local Boots or Superdrug, or your local gym, where you touch some device, breath in some device, and you receive a little receipt that says, “Yes, you are a non-smoker. You have not smoked for 5 years.” If you reach that point, where it is cheap, instant and reliable, then maybe there is hope. But if it is a block and every year you see 30% lapses because people do not want to do the test, you fail at the first hurdle.

Ms Morris: No one company particularly wants to be the first one to move because they are then going to attract all sorts of e-cigarette smokers. One way forward would be something like an underwriting platform. We have the protection platform out there. That would be a good way to ask the same questions, and the providers would quote behind the scenes. That would be a consistent way of progressing.

Miss Cosma: We have seen in the last few years two specific diabetes-related plans come out. We are seeing people trying to be more creative and trying to cater for specific niches of customers. This is not a niche, because 3.6 million people are vaping. I would like to think that someone is hoping to effectively meet the needs of these customers.

Mr M. Slee, F.I.A.: Just following up on that last point. If insurers are saying there is a benefit to e-cigarettes over normal cigarettes but, from an underwriting perspective, they are still rating them as though they smoked, the insurance companies could be accused of unfairly taking money off policy holders. What would your response be to that?

The second wider question is, this paper is now in the general domain. If the press read it and ask you what the IFoA’s views are on e-cigarettes, are you going to give them a definitive response which they are going to accept? Or are they going to say, “So, yet again, you are sitting on the fence and not really saying anything.”

Ms Morris: You are right. I can understand why people would ask whether we are being fair on our customers if we are charging them a higher rate when they are perhaps less likely to make a claim than somebody who is a traditional cigarette smoker. That is how we feel it is at the moment. We are not saying with any certainty that it is definitely safer. I cannot say much more than that. We do not have the data to substantiate a move to e-cigarette rates.

Any move would be a cautious approach and will not initially be a massive discount. Rather, I think it will move slowly in the right direction.

If you go back to the 1940s–1950s, everyone was saying cigarettes were good for you. We were discussing this just before this presentation today and doctors were saying, “take up smoking, it is good for your health”. And look where we are now. We are taking a cautious approach.

Mr Daniels: The question needs to be clarified as the first step. What type of e-cigarette user is applying for cover? Are they a dual smoker? In which case, I would say there remains the risk of them smoking tobacco.

Back to my underwriter, and my sample of one, he took up e-cigarettes for the sole reason that his wife would let him vape at home, but not smoke. It would allow him to get his nicotine hit in the house so he did not have to go outside. He was still smoking pretty well the same number of cigarettes. I would suggest, very roughly, that his risk has not really reduced.

On the other hand, somebody else who has been a pure e-cigarette user for 2 or 3 years and remains an e-cigarette user. If e-cigarettes end up being significantly safer, then that second person is going to be a much better risk.

I was invited to one of the IFoA Health Boards. There was a relatively lively debate between two people in the room over whether the IFoA should have a policy. That is not for us because we are doing something on behalf of the IFoA. It was far from clear that there was consensus over whether the IFoA should have a policy. I certainly do not think we are defining policy.

As for the sitting on the fence, we agonised over the right wording for the executive summary in that paper. As a gut feeling – I say this on my own behalf and not that of my company, or the audience, or the IFoA, or the life insurance industry – I think e-cigarettes are quite a bit safer than cigarettes. However, we toned that down within the paper so that it was sufficiently vague.

Part of the reason was that there was a nervousness about having that picked up as being the viewpoint of the IFoA. You can call it sitting on the fence, but you can also call it trying to protect the industry a little, and not being too dogmatic.

Mr J. Copeland: Can you explain where Public Health England obtained their 95% safer statistic?

Mr Daniels: There were apparently, I think, 12 doctors who sat around a table and quoted different views coming from bits of research, augmented by general gut feelings. They concluded on 95%. My understanding – and again it is purely anecdotal – is that it was not derived by the most robust science. But the person I spoke to who critiqued it said there has been a more recent piece of work where again they looked at a few dozen papers and tried to summarise them and concluded that the figure is probably fairly close. This is based on examples like the chemical output analyses and not on a study of two groups of 100,000 people tracked for 20 years because that data just does not exist.

Miss K. Ince, F.I.A.: A few of the insurers in the industry allow non-nicotine vaping devices to be covered by the non-smoker definition. Do you think there is a risk there, given that nicotine is potentially one of the less harmful substances in e-cigarettes?

Ms Morris: You are correct, and probably most providers follow that approach. If somebody is on an e-cigarette with non-nicotine liquid, we would do a cotinine test. If it came back as negative, then we would allow them non-smoker rates. I agree that there is a potential risk.

Smokers, apparently, just like having a cigarette. It is something to do with their hands. Some people are using non-nicotine e-cigarettes just so they have something in their hands. It makes them feel more comfortable.

If they are managing to go without nicotine and we have done the cotinine test and it is negative, then we are happy to give them non-smoker rates.

The Chair: Thank you very much for a most interesting discussion and thank you all for your contributions this evening. Thank you also to the whole working party for producing the paper.