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E-cigarettes – good or bad for your health?

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IFoA e-cigarettes working party

23rd November 2017

Agenda

- Working party members
- Working party brief
- The different streams of work
- Key aims of the WP
- Work to date
- Next steps
- What we want from you ...



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Working Party Members

- Niel Daniels (chair) SCOR Life
- Christina Cosma (vice chair) Pacific Life Re
- Joel Copeland Lloyds Banking Group
- Elena Dzarlijeva Deloitte
- Ricki Nabeshima SCOR Life
- Carl Padget Pacific Life Re
- Mark Paulson Barnett Waddingham
- Nicola Shaw Aviva
- Cillian Tierney Partner Re
- Andrew Wibberley Alea
- Dr Derek Yach Foundation for a Smoke Free World



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Working Party Brief

- Initiated by the IFoA H&C Research Committee in July 2016 after feedback from members
- High level Terms of Reference
 - The impact of e-cigarettes on the insurance industry (with a focus on Life / CI / impaired annuity products). Will consider data (pricing), underwriting, claims issues
- An informative submission to the Life conference
 - E-cigarette usage has dramatically increased in recent years (2.9 million UK – ASH estimate, 2017). The overall impact on health is uncertain: the relative impact of these products compared to cigarettes seems to be at least 95% less in terms of disease; unknown impact around behavioural changes made by smokers; and public perception is confused! There is an ongoing debate on the health impact for individuals which could potentially lead to a major contribution towards preventing premature death, disease and social inequalities in health that smoking currently causes in the UK.
 - An IFoA working party has been set up consisting of a multi-disciplined team of insurance professionals including actuaries; underwriters; and medical practitioners, to consider the impact on the insurance industry.



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Working Party Brief

For the purposes of our group, we are focussing on e-cigarettes

- But have come across a variety of info on wider "Reduced Risk Products" so will continue to look at that also

We are not the only people looking into this topic...

The IAA are looking into this topic and we have agreed to cooperate with them

The government's Science and Technology Committee have also opened an inquiry into e-cigarettes with the aims of:

- Examining the impact on human health (including their effectiveness as a stop-smoking tool)
- Suitability of regulations
- Financial implications of a growing market on both business and the NHS

Key aims of the working party

- Ultimately, trying to assess the impact of e-cigarettes on mortality / morbidity / longevity in an insurance context
- Which will be made up of, amongst other things,
 - Usage of e-cigarettes
 - Impact on quit rates / prevalence rates of conventional cigarettes
 - Relative risk of usage
- Aim is to work towards a paper that is of use to actuaries

The various streams of work

We have 4 streams of work:

- Medical/Research/Underwriting/Categorisation
 - Research into the impacts of e-cig usage on smoking quit rates
 - Research into the relative risk of e-cigarettes
- Social Demographics/International
 - Find data on usage amongst different groups (socio-economic, international, etc)
- Legislation/Regulation/Pubic Health/Public Bodies
 - How legislation may impact on impact / usage / etc
 - Consider public policy (eg of employers)
- Modelling
 - Modelling the impacts of e-cigarettes on smoking prevalence
 - Modelling the impact of e-cigarette usage on mortality / morbidity



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Current impact of e-cigarettes on insurance

- Very differing approaches with regard to how e-cig smokers are rated
 - See survey results
- Lack of tests that can distinguish between use of conventional cigarettes & e-cigarettes
 - But this is changing rapidly
- No clarity on the relative risk of e-cigarette smokers
 - Public Health England quoted them as "95% safer than tobacco"
 - Actively promoted as tool for quitting for first time for 'Stop'tober
 - But limited studies to back this up & all are very short term
- No clarity on the impact of them on quit rates
 - Although public surveys suggest widely used as a quit aid so we would expect quit rates to rise ()
- Fears amongst public over their safety might be hampering take up (& hence aid to quitting)
 - Recent ASH survey suggests only 13% of adults realise e-cigarettes less harmful than smoking
 - This % has been falling in recent years
- Possibility of e-cigarettes being a gateway to smoking



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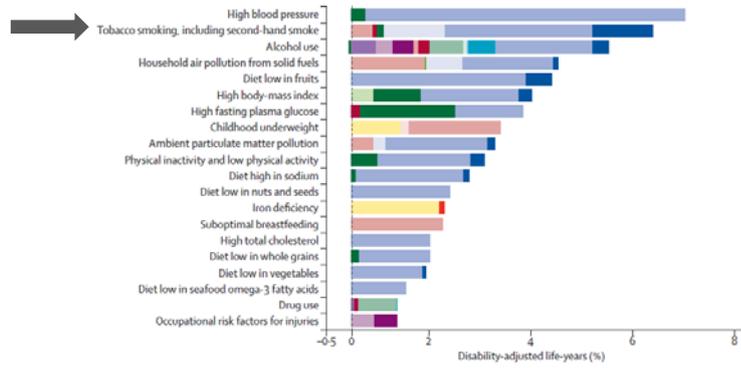
Our work to date

- General background
- Industry underwriter surveys
- Modelling thoughts
- Contents of an e-cigarette
- Public messages
- Review of medical studies

General background

- Smoking is a key cause of death & disease
- General consensus is that e-cigarettes are much safer
 - Public Health England 2015 statement anchored this
 - US health authorities far more negative
- Greater range of e-cigarettes in last 12 months
 - Nicotine vs non-nicotine
 - Heat not burn products
- Significant tobacco firm investment in e-cigs
- Significant opportunity to reduce claims from smokers

Smoking is a leading (preventable) cause of death & disease



BURDEN OF DISEASE ATTRIBUTABLE TO 20 LEADING RISK FACTORS IN 2010, EXPRESSED AS A PERCENTAGE OF GLOBAL DISABILITY-ADJUSTED LIFE-YEARS

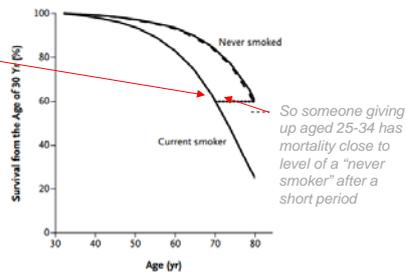
Source: Lim et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet*. 2012 Dec 15;380(9859):2224-60.



Quitting smoking increases life expectancy

LIFE EXPECTANCY INCREASES AMONG SMOKERS WHO QUIT DEPENDING ON AGE

- 25-34: GAIN 10 YEARS
- 35-44: GAIN 9 YEARS
- 45-54: GAIN 6 YEARS
- 55-64: GAIN 4 YEARS



It's in a (protection) insurers' interests to see people quit !

* Reduced-risk products may have equivalent impacts

Sources: Jha et al. 21st-Century Hazards of Smoking and Benefits of Cessation in the United States. *NEJM* 2013. Halpern et al. Impact of smoking status on workplace absenteeism and productivity. *Tobacco Control* 2001.



Lots of uncertainty around the effects...

The negative view

- E-Cigs are unsafe and contain harmful ingredients
- E-Cigs are a gateway to tobacco & other drugs
- E-Cigs cannot support tobacco cessation & only encourage tobacco use
- E-Cigs are associated with tobacco companies with questionable objectives

The positive view

- Toxin concentrations are almost all well below 1/20th that of cigarette smoke (Public Health England, 2015)
- Rise of E-Cigs use has not been accompanied by an increase in cigarette smoking rates (Cancer Research)
- Proportion of those aged 18-24 who smoke continues to fall over the period when E-Cigs use increased (ONS "Adult smoking habits in the UK: 2015")

Scenario testing the different views will give us an understanding of the uncertainty but we are reliant on medical opinion given the lack of historical data



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Life insurers need to distinguish between smokers, ex-smokers and e-cig smokers

- Currently:
 - Cotinine test can not determine if a positive is for conventional or e-cig
 - No ability to accurately distinguish between nicotine and non-nicotine e-cigs
- Alternatives:
 - Anabasine (urine) or Caboxyheamoglobin (blood) can confirm no tobacco use + e-cigs
 - Newer saliva tests are coming



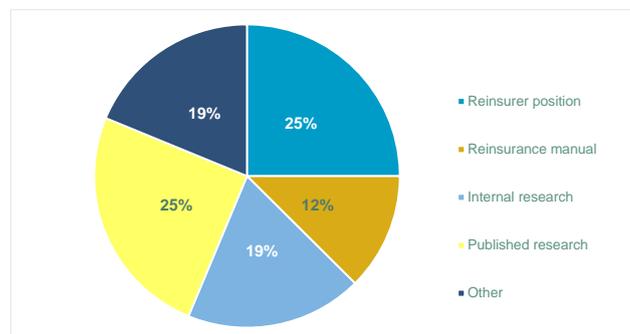
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Industry underwriter surveys

- Over the past year two surveys have been sent to all the senior UK & Ireland underwriters that we knew
 - 1st Survey: 19 replies
 - 2nd Survey: 34 replies
- All respondents have an official company position of e-cigarettes
- Underwriting philosophies – consider e-cigarette smokers as:
 - Smokers: 68%
 - Non-smokers with a rating: 9%
 - Non-smokers without a rating: 9%
 - Other: 15%

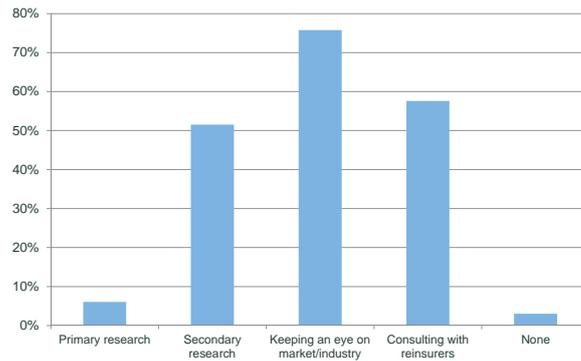
Industry underwriter survey

- Main influence of company position on e-cigarettes



Industry underwriter survey

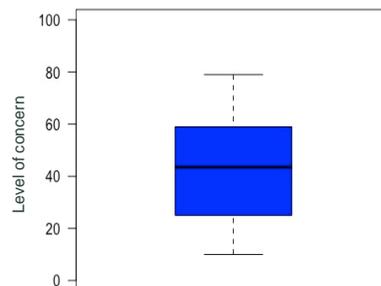
- Level of work companies are undertaking around e-cigarettes



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Industry underwriter survey

- Survey 1 identified the areas of most concern around e-cigarettes:
 - unknown long-term health effects
 - potential to relapse back to smoking (if using as a cessation aid)
- Survey 2 asked respondents to rank their current level of concern around e-cigarettes:



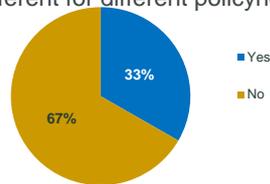
0 = no concern
100 = the most concerned



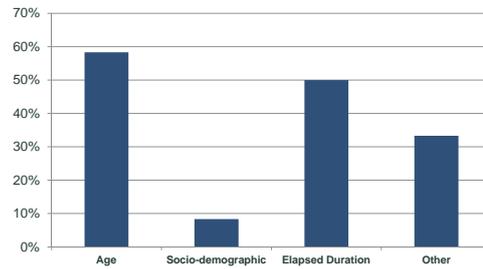
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Industry underwriter survey

- Level of concern is different for different policyholders

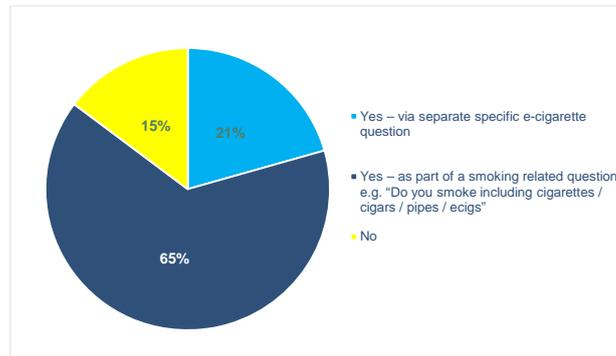


- Factors that influence the level of impact of e-cigarettes



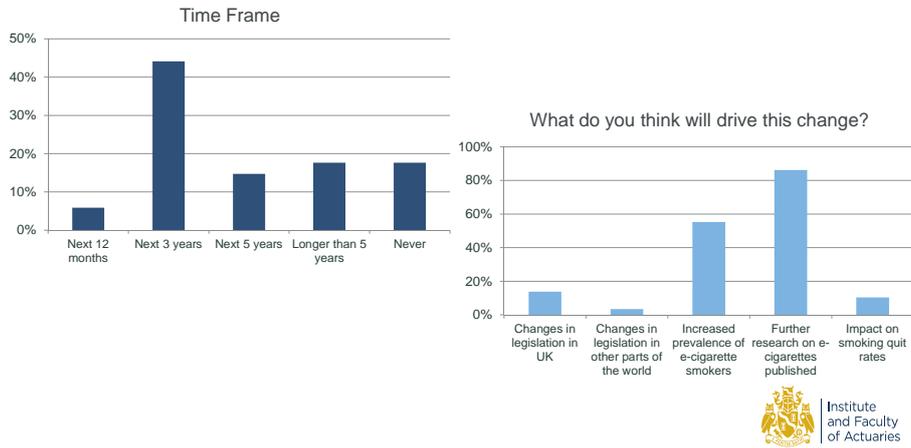
Industry underwriter survey

- Collection of info at application stage on e-cigarettes



Industry underwriter survey

- Expectation of a change in attitudes towards e-cigarettes



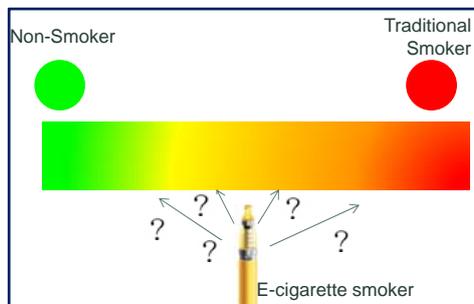
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Industry underwriter survey

- Smoking is no longer binary

"...a new rate will be agreed which is midway between smoker/non smoker rate for vapers and nicotine replacement users or the non-smoker rate will be extended to two years cessation before applying n/s rate."

"Suspect a relaxation in stance on e-cigarettes to allow lower price than traditional tobacco smokers. However don't expect them to be as good a risk as someone who has never smoked tobacco."



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Industry underwriter survey

- Comments received:

"...Whilst lower risks of lung cancer from e-cigarettes, not clear studies on nicotine risks yet"

"It took many years to establish that actual cigarette smoking had harmful affects."

"...the only way we could see changing our position is that evidence clearly and demonstrably showed that e-cig users had same mortality as non or never smokers."

"Biggest issue is the population that use both tobacco and e-cigs."

"If there is any research articles or material you could share that would be really helpful"



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Modelling – aims and approach

- Impact on mortality rates of increased e-cigarette usage (and corresponding reduction in tobacco smoking)
- Resulting impact on protection products' pricing/reserving
 - Current portfolios and future portfolios
- Limited data makes stochastic modelling spurious
- We are using scenario-based deterministic modelling
- Exploring two main routes:
 - Cause of death based model
 - Multi-state model

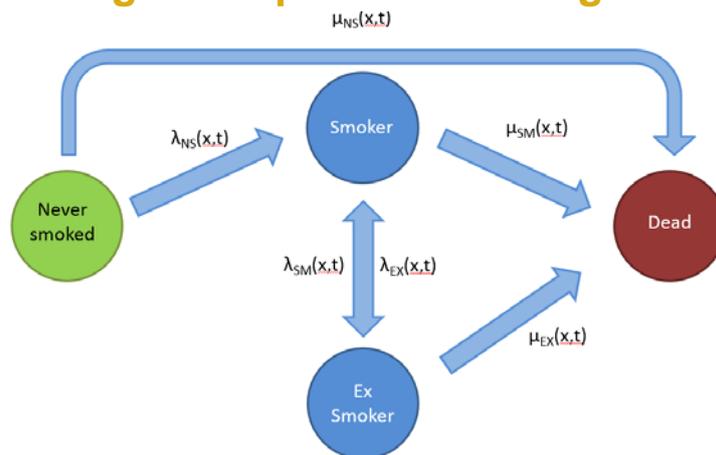


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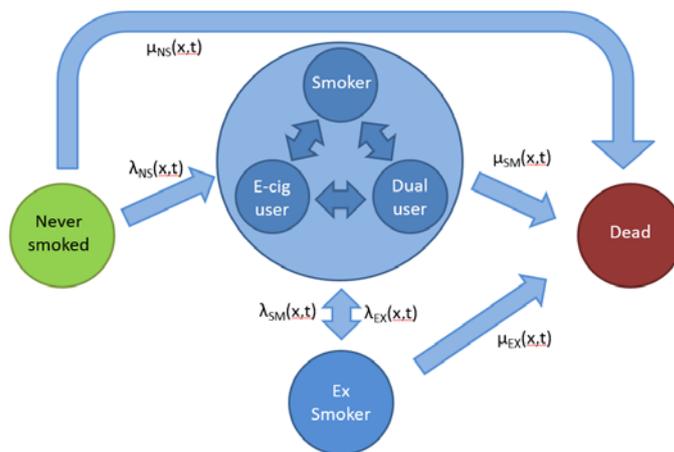
Modelling the impact of smoking

- Combine population data from three sources to split effect of (tobacco) smoking by cause:
 - Deaths by cause
 - Smoking prevalence
 - Relative risk of death by cause group and type of smoker
- Adjust relative risks for e-cigarette users to derive mortality rates
- Problems
 - Lack of data on effect of e-cigarette usage by disease
 - Allowing for scale of smoking (duration, packets per day, dual users)

Modelling the impact of smoking



Modelling the impact of e-cigarettes



Modelling – research

- Key research questions

E-Cigarette Research Questions	Traditional Smoker Research Questions
Prevalence of e-cigarettes	Profile of smokers/ex-smokers/non-smokers – age/sex/region/socio-economic
E-cigarette uptake trends	Factors that impact quit rates
Prevalence of dual usage	Relationship between smoking intensity and smoker mortality
Impact of e-cigarettes on smoking intensity among dual users	Relationship between quit duration and ex-smoker mortality
Impact of e-cigarettes on smoking quit rates	Incidence rates of cancer, COPD, MI, death ... etc. in smokers/ex-smokers/non-smokers
Uptake of e-cigarettes by non-smokers	
Uptake of e-cigarettes by former smokers	
Relapse rates of e-cigarette smokers back to traditional smoking	
Incidence rates of cancer, COPD, MI, death ... etc. in e-cigarette smokers	

Stakeholder messages

Multiple contradictory positions from different institutions:

- **Public Health England consensus statement (2017)**
 - No evidence that “vaping” acts as a gateway to the more harmful habit.
 - E-cigarettes are less harmful than smoking, recommended for use (in cessation of smoking)
- **National Institute for Health and Care Excellence (2017)**
 - Little evidence on the long term benefits or harms of e-cigarettes
- **WHO (2016)**
 - Urgent need to assess risks
- **International Union on TB & lung disease (2016)**
 - Safety not demonstrated; undermines WHO attempt at regulation
- **National Center for Biotechnology Information (2016)**
 - Studies have “failed to raise health concerns”
- **Royal College of Physicians (2016)**
 - Nicotine is not a highly hazardous drug



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Media messages

- BBC programme 2016: E-cigarettes: Miracle or Menace?
 - Cited US studies of flavourings and toxicity. Survival rate of human blood cells in throat to:
 - Tobacco smoke: 6%
 - Menthol flavour vapour: 25%
 - Pina colada flavour vapour: 53%
- Is this a fair comparison?
 - It is arguable that this (and similar) test artificially overuse the liquid flavourings to create formaldehyde



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What is in an e-cigarette?

- Nicotine
- Humectants (dissolving solution)
 - Vegetable Glycerin or Propylene Glycol
- Flavourings



What is in an e-cigarette? – dissolving solutions

- These form 95% of the liquid
- Dosage c. 30-90ml per month
- Vegetable Glycerin and Propylene Glycol
 - Both acknowledged as safe food additives in solid or liquid form by US authorities
 - Vegetable Glycerin :
 - Organic by-product of natural oil production processes
 - Widely used solvent
 - Minor medical applications – pills taken orally
 - Propylene Glycol :
 - Produced from cracking process for oil and natural gas

What is in an e-cigarette? – dissolving solutions

- The consumer's choice: Vegetable Glycerin or Propylene Glycol ?
 - Vegetable Glycerin
 - distinctly sweet, masking other flavours
 - Propylene Glycol
 - thinner consistency, better for e-cigarette mechanics
 - almost tasteless
 - more similar throat "hit" like a regular cigarette
 - some medical side effects including allergic reactions

What is in an e-cigarette? – flavourings

- 500+ liquids available
- Manufacturing largely unregulated and untested
- Diacetyl and Acetylpropionyl – known irritants – found in majority of standard liquids
 - Levels slightly less than US govt occupational hazard levels
 - But far less than traditional cigarettes
 - “Presence in e-cigarette liquids represents an avoidable risk...measures should be taken to eliminate these hazards from products” (Farsalinos et. al 2014, Oxford University Press)

Medical studies

- UK Electronic Cigarette Research Forum studies – UCL study funded by Cancer Research UK
 - Cross sectional study with 181 participants
 - Swapped traditional cigarettes for e-cigarettes or NRT
 - Average usage of e-cigs/NRT of 17 months
 - Analysed saliva and urine to compare body-level exposure to key chemicals
 - E-cig/NRT users found to have significantly lower levels of toxic chemicals/carcinogen
 - Dual users did not show same marked differences

Medical studies

- US National Institute of Environmental Health Sciences (2015)
 - Studied 51 e-cigarette flavour liquids (out of c. 7000 available)
 - Following media stories of diacetyl & contribution to “Popcorn lung”, investigating prevalence of diacetyl and similar chemicals
 - 47 liquids tested included at least one of the at-risk chemicals
 - Diacetyl found in 39 of these
 - Note - diacetyl is in cigarettes in significant quantities higher than e-cigarettes

Medical studies

- Italian Public Health with Universities of Torino & Rome (2014)
 - Study of studies: 480 studies compiled, 27 potential for inclusion, 12 selected for final review (6 cohort, 6 experimental studies)
 - All short term (max 1 year)
 - Impact on smoking cessation and health side effects of e-cigarettes compared to other methods
 - Main conclusions:
 - Similar efficacy of e-cigarettes
 - No major side effects
 - Specific side effects but diminished quickly over time – Mouth/throat irritation, nausea, headache, dry cough

Medical studies

- Dr Lundback presented at European Respiratory Society International Congress 2017 (2017)
 - 15 healthy seldom-smokers recruited
 - Used e-cigs with nicotine one day and without nicotine the other
 - BP, heart rate and arterial stiffness measured at 0, 2 and 4 hours post-use
 - In the period immediately after using e-cigs 'there was a significant increase in blood pressure, heart rate and arterial stiffness' only after using e-cigs with nicotine.
 - Temporary increase (same temporary increase seen in similar studies using normal cigarettes)
 - Authors speculate that chronic exposure to e-cigarettes can cause permanent arterial stiffness, just like 'normal' smoking.

Medical studies – just not long enough !

There are **NO** long-term studies into the health effects of e-cigarettes

- Manzoli et al (2016) continuous study up to 24 months for cohorts of tobacco smokers, e-cigarette smokers and dual users
 - Conclusions limited, but dual users showed a lower level of abstinence when using e-cigarettes
 - Moderate number of smoking-related side effects observed
 - Check-in every 12 months

Next steps

- Much background info collected
- But limited data to either support or challenge the “95% safer” view
- But this view has been widely perpetuated and has become pseudo fact
- Important and needs challenge
- So this is a key next step

- Use of available data to derive input parameters for modelling
 - on relative risk
 - on take up rates / quitting rates
- Develop models
- Present findings at future conference and via a paper

What we want from you

- Volunteers !
 - Actuaries
 - Researchers
 - Underwriters / CMOs
 - To join the working group or to support us

- Feedback on where this should all be heading
 - This is only our second communication to outside of the working group
 - It's vital we get feedback on what we are doing, where we are headed

Offers of support / views / challenge can be sent to ndaniels@scor.com



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Questions

Comments

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