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# E-cigarettes – good or bad for your health?

Niel Daniels & Joel Copeland, IFoA e-cigarettes working party

# 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 .....



# Working Party Members

- Niel Daniels (chair) SCOR Life
- Christina Cosma (vice chair) Vitality
- Craig Butler Lloyds Banking Group
- Joel Copeland Lloyds Banking Group
- Ricki Nabeshima SCOR Life
- Mark Paulson Barnett Waddingham
- Nicola Shaw Aviva
- Ian Smithson PwC
- Cillian Tierney Partner Re
- Andrew Wibberley Alea
- Nigel Wright Aviva
- Derek Yach Vitality
- ~~Ben Randall~~ Swiss Re



# Working Party Brief

- Initiated by the IFoA H&C Research Committee after feedback from members
- The Terms of Reference are quite high level
  - 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
- The submission to the H&C conference is perhaps more informative
  - E-cigarette usage has dramatically increased in recent years (2.8 million UK – ASH estimate, 2016). 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.



# 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

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



# 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

At the initial kick off meeting, we decided on 4 key 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 team
  - Modelling the impacts of e-cigarettes on smoking prevalence
  - Modelling the impact of e-cigarette usage on mortality / morbidity



# 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”
  - 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



# Work to date

- Industry survey
- General background
- Modelling thoughts
- Medical studies
- Contents of an e-cigarette
- Public messages

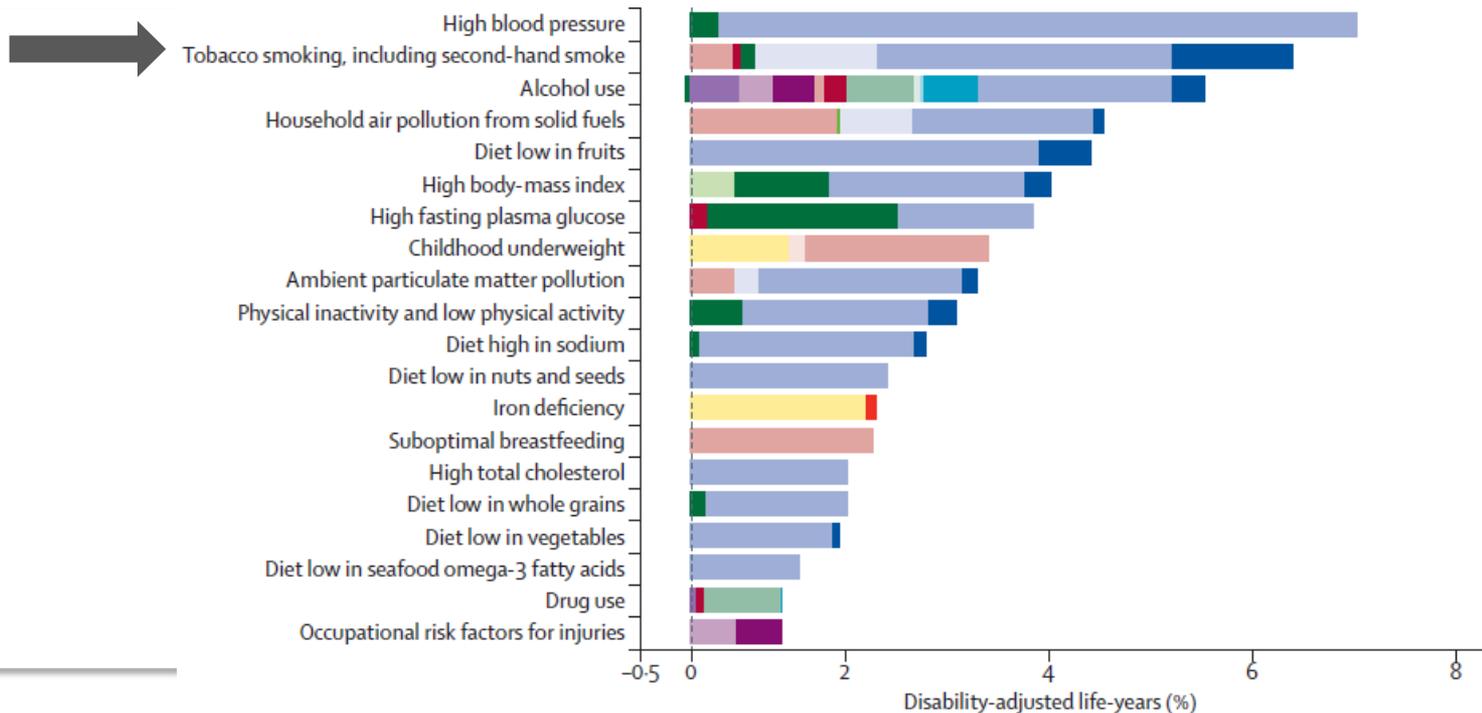


# General background

- 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
- E-cigs deliver the addictive nicotine but without tobacco
  - (“it’s the nicotine that leads to addiction but the tar that kills”)
- 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](https://doi.org/10.1016/S0140-6736(12)11682-4). 2012 Dec 15;380(9859):2224-60.



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# 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.



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# Uncertainty over what is myth & what is reality

## 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*



# 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
- Alternatives
  - Anabasine (urine) or Carboxyhaemoglobin (blood) can confirm no tobacco use + e-cigs
  - Newer saliva tests are coming



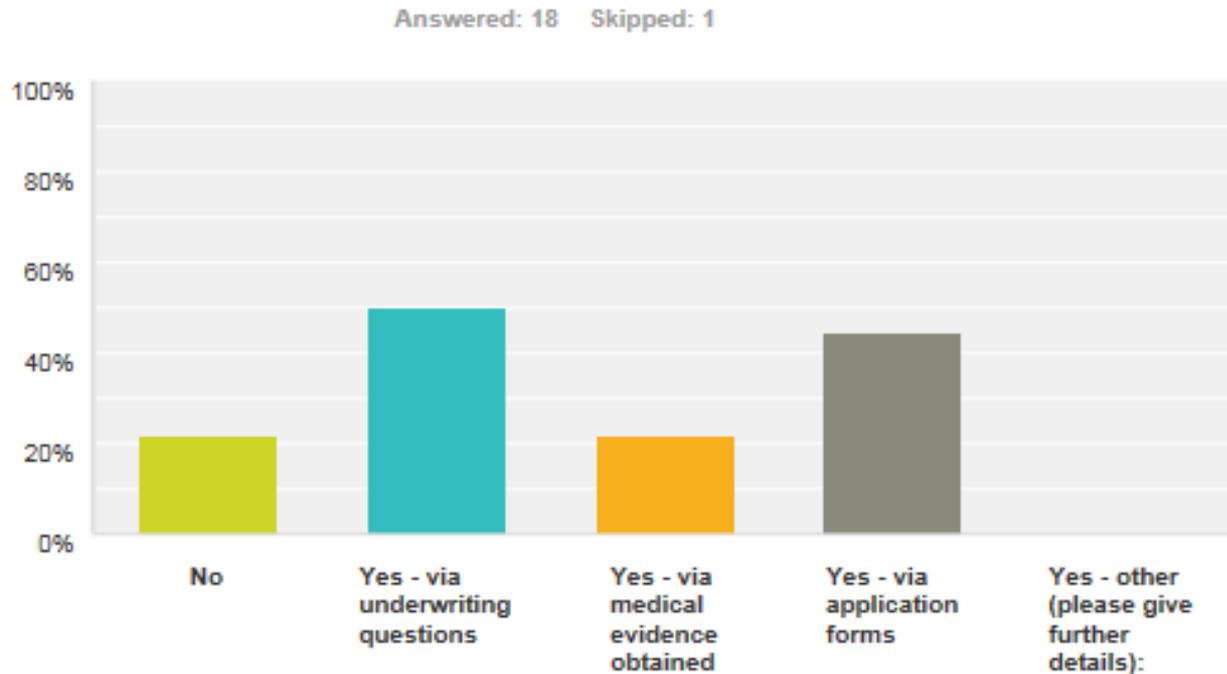
# Industry underwriter survey

- Sent to all the senior UK & Ireland underwriters that we knew
- 19 replies
- Underwriting philosophies – consider e-cigarette smokers as:
  - Non-smokers: 16%
  - Smokers: 84%
- Underwriting position vs research undertaken:
  - Company has official position: 89%
  - Internal research projects into e-cigarettes: 11%



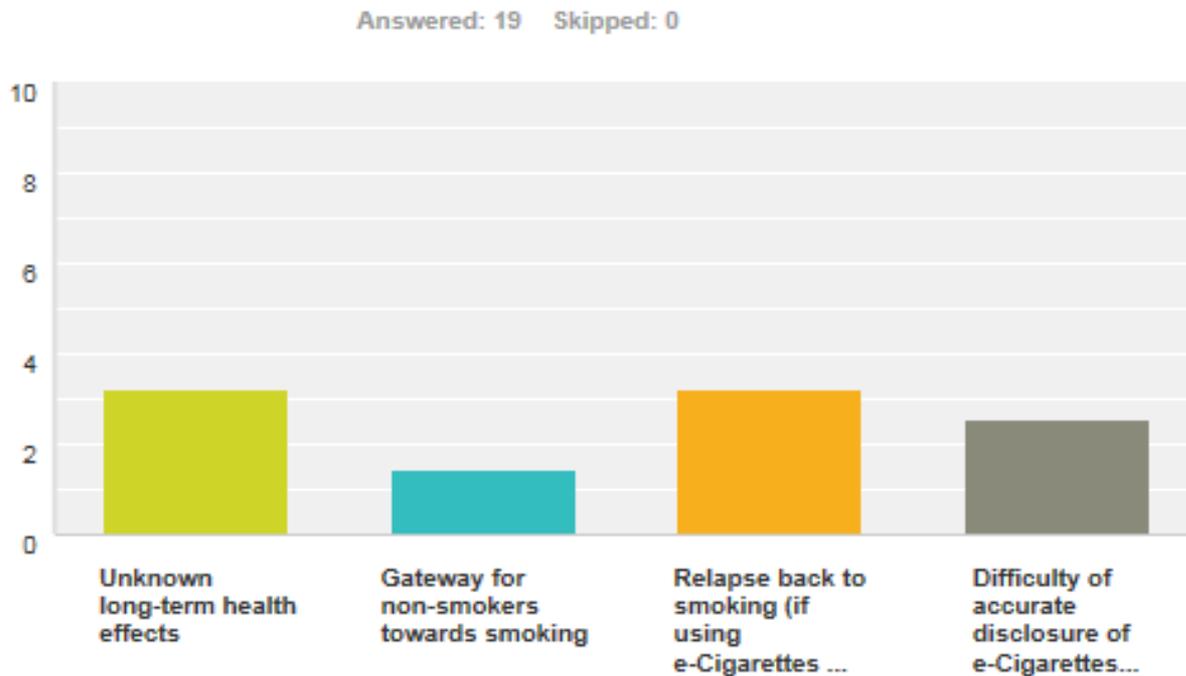
# Industry underwriter survey

- Collecting e-cigarette information through underwriting:



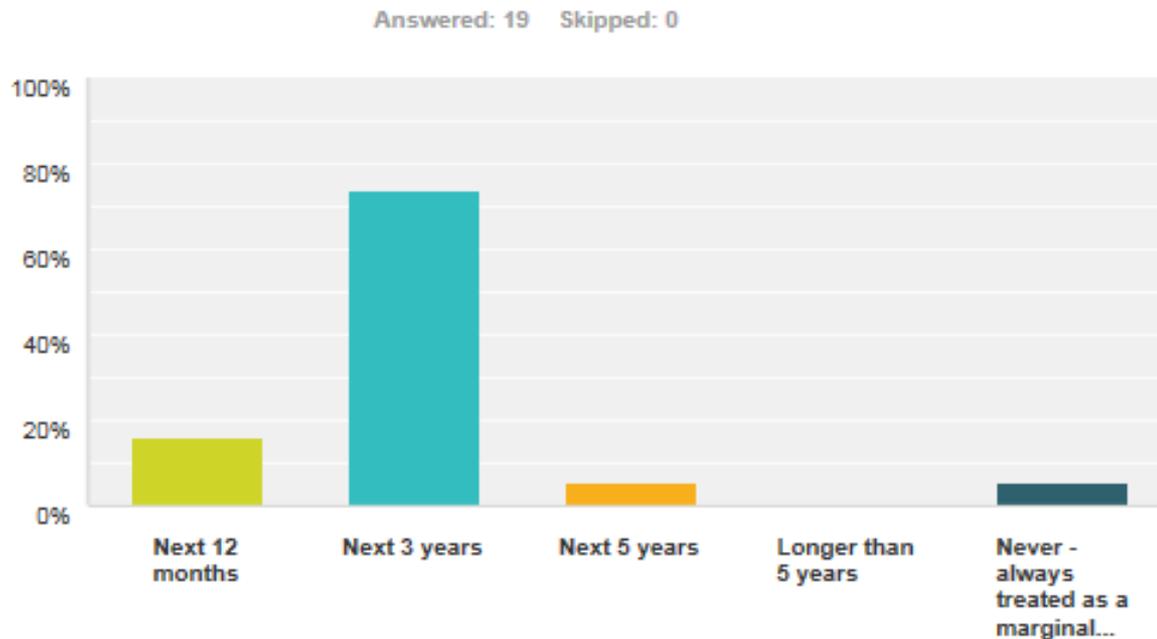
# Industry underwriter survey

- Areas of most concern :



# Industry underwriter survey

- Expectation of a change in attitudes towards e-cigarettes



# Industry underwriter survey

## Comments received:

- “Varied treatment... consistency here would be helpful”
- “Majority of e-cig users are dual users”
- “Longer term studies are required... so many different producers... we all thought tobacco smoking was healthy for many years”
- “Decide a standard industry approach to risk assessment”
- “gateway to use of other drugs ”



# 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

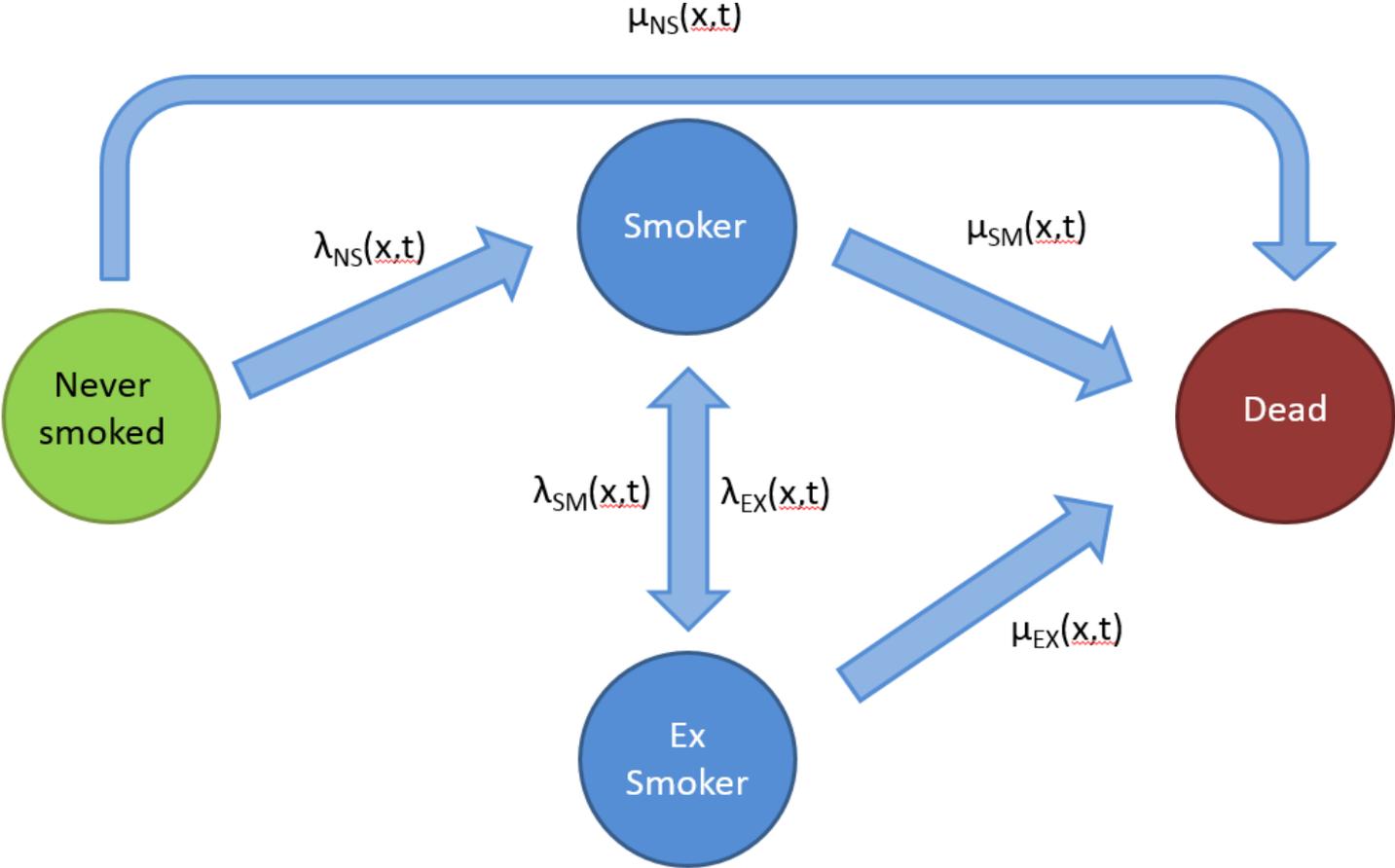


# Modelling the impact of smoking

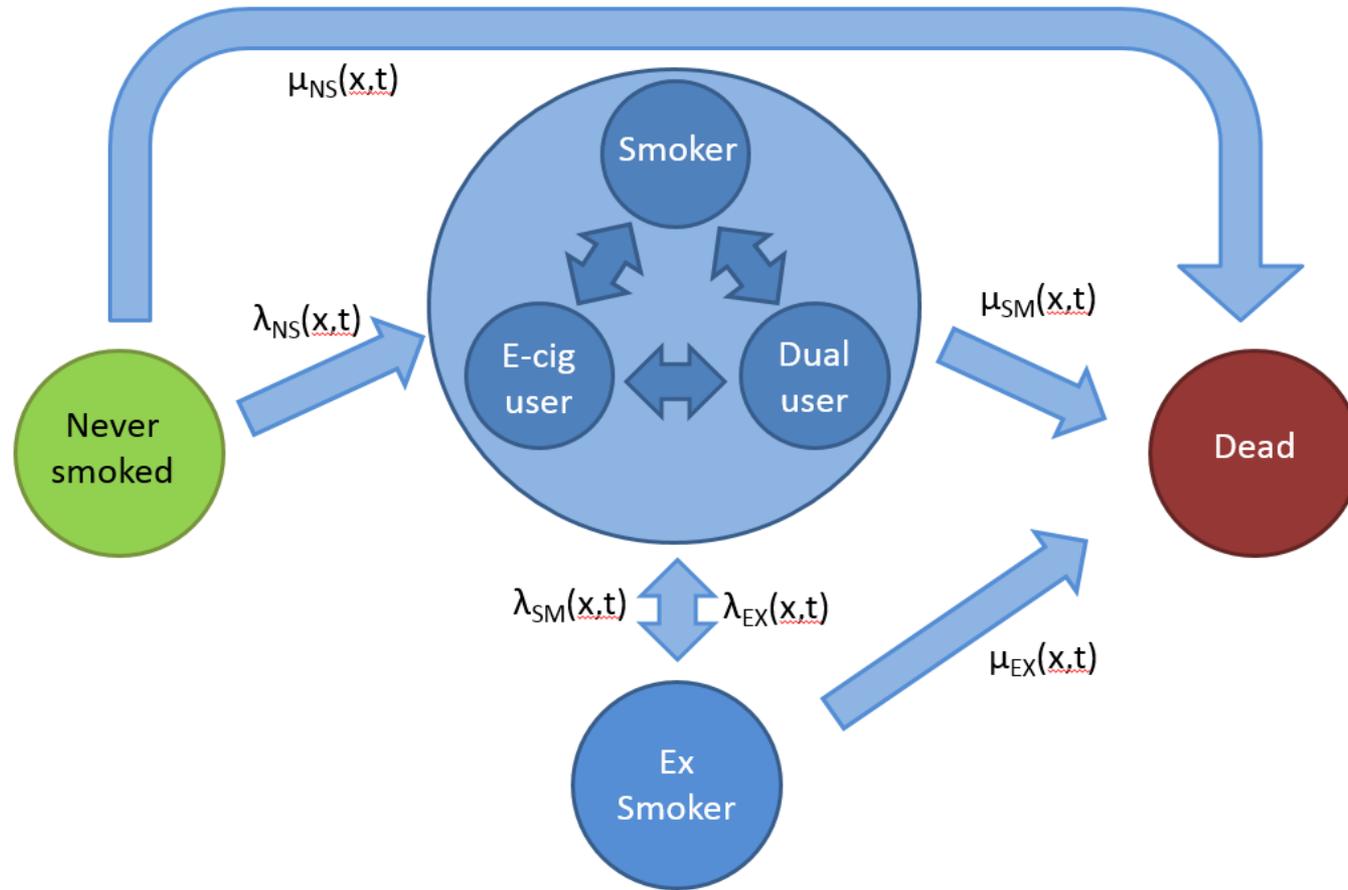
- Combine population data from three sources to split effect of (tobacco) smoking by cause:
  - Deaths by cause
  - Smoking prevalence
  - Relative risk of death by cause group and type of smoker
- Adjust relative risks for e-cigarette users to derive mortality rates
- Problems
  - Lack of data on effect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



# Stakeholder messages

Multiple contradictory positions from different institutions:

- **WHO (2016)**
  - Urgent need to assess risks
- **Public Health England consensus statement (2015)**
  - Agree that e-cigarettes are less harmful than smoking
  - Recommended for use (in cessation of smoking)
- **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



# 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



# 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

- 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 – 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 our first 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](mailto:ndaniels@scor.com)***



# Questions

# Comments

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