Institution: King's College London		
Unit of Assessment: 4		
Title of case study: King's research drives policy changes on e-cigarettes		
Period when the underpinning research was undertaken: 2012-current		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s):	**Role(s) (e.g. job title):**	**Period(s) employed by submitting HEI:**
Prof Ann McNeill	Professor of Tobacco Addiction	From 01/10/2012
Dr Leonie Brose	Reader	From 16/09/2013
Dr Sara Hitchman	Senior Lecturer	From 17/09/2013
Dr Debbie Robson	Research Fellow	From 22/04/2002
Dr Robert Calder	Research Associate	10/10/2018 – 31/12/2020
Period when the claimed impact occurred: 2015-current		
Is this case study continued from a case study submitted in 2014? N		

1. Summary of the impact (indicative maximum 100 words)

Cigarettes kill over half of their long-term users. Smoking is highly addictive and e-cigarettes and vaping products offer a substantially less harmful alternative, but there has been a heated debate about their use, and wide variation in approaches to regulation. Against a backdrop of controversy and disparate knowledge, King's has provided a much needed body of research to enable an evidence-based approach to policy-making in this area. On the basis of King's primary research on e-cigarette use, Public Health England (PHE) commissioned King's researchers to summarise the evidence on e-cigarettes in four independent reports. These built the foundation for current e-cigarette policy in England and informed steps towards policy change in other countries. The reports have underpinned approaches by organisations such as PHE and the National Institute for Health and Care Excellence (NICE) to support healthcare professionals, smokers and the general public to reduce the harms of tobacco smoking. National training and professional organisations leading national stop-smoking initiatives have used the findings in their guidance around e-cigarettes, which has had a positive impact on stop smoking services and harm-reduction support for smokers. The reports have been integral to the messaging of UK policy strategy documents for 6 years, including a 2019 Green Paper, helping move the country towards the government's stated aim of making the UK smoke-free by 2030. Further afield, King's research has led to the government of New Zealand legalising vaping products in 2018, and recommending their use to quit smoking.

2. Underpinning research (indicative maximum 500 words)

The WHO considers the tobacco epidemic to be one of the biggest public health threats the world has ever faced, killing more than 8,000,000 people per year worldwide. Smoking and exposure to second-hand smoke causes 78,000 deaths per year in England alone. By 2010, e-cigarettes and vaping products had entered the market as a means of delivering the addictive substance in smoking – nicotine - whilst avoiding many of the harmful ingredients of cigarettes. In 2019, about 6% of adults in England (3.1 million) used e-cigarettes, and tobacco use had dropped from 19.8% of adults in 2011 to 13.9% in 2019. The increased usage of e-cigarettes was surrounded by debate, fuelled by misconceptions that nicotine was the harmful ingredient in tobacco, and that these products were simply replacing one harmful addiction with another. In fact, the best available current evidence demonstrates that while both tobacco cigarettes and e-cigarettes can harm health, e-cigarettes are unlikely to exceed 5% of the harms associated with smoking tobacco. In this controversial area, there was an unmet need for robust, meaningful research to cut through

the noise, by addressing the unanswered questions around use and impact of e-cigarettes, to provide an evidence-base for policy decisions and public health recommendations.

King's research found that e-cigarettes use helps tobacco smokers quit smoking. Globally, King's researchers were one of the first groups to study e-cigarette use, creating in 2012 a unique longitudinal internet survey, with six waves to 2019, of tobacco smokers ("smokers"), recent ex-smokers and e-cigarette users ("vapers"). King's researchers recorded the level of e-cigarette use and tobacco smoking for over 1,700 smokers, and found that daily e-cigarette use at the first wave was associated with reduced tobacco smoking and a higher number of attempts to quit smoking altogether during the next year (**1**). King's research further identified important differences between different types of e-cigarettes showing that those using e-cigarettes with a re-fillable liquid tank were more likely to have quit smoking compared to those using disposable or cartridge e-cigarettes (**2**), thereby identifying the type and frequency of e-cigarette use that was associated with the highest likelihood of reduced smoking harm.

King's researchers identified factors influencing smokers switching from smoking tobacco to e-cigarettes. King's research revealed the consequences of widespread misperceptions about the relative harm of e-cigarettes on e-cigarette use: those smokers believing e-cigarettes were not as harmful as tobacco cigarettes were 40% more likely to switch from tobacco to e-cigarettes, the less harmful option (**3**). King's researchers also carried out the first assessment of the level of support for different policy approaches for the availability, advertising and use of e-cigarettes in smoke-free places, showing that 75% of smokers (who would stand to benefit from using nicotine alternatives) supported policies making e-cigarettes more available than traditional cigarettes (**4**). These findings provided valuable insights into the level of knowledge amongst smokers about the harm of e-cigarettes compared to traditional smoking, suggesting that (i) including an educational element to interventions to reduce the harm of smoking would be beneficial; and (ii) that advertising e-cigarettes to smokers could help improve awareness of their potential to reduce smoking-related harm.

King's researchers assessed the likelihood of e-cigarettes encouraging young people to start smoking. A primary element of the debate around e-cigarettes is the concern that young people who did not previously smoke will start vaping and this use of e-cigarettes could increase the risk of tobacco smoking subsequently. In collaboration with Action on Smoking and Health (ASH) King's conducted a longitudinal survey of over 1,000 11–18 year-olds. King's researchers complimented their primary research by synthesising evidence from four UK national surveys of young people. The research found that there were associations in both directions between trying an e-cigarette and trying smoking (**5**), and while about one in ten young people had tried an e-cigarette, current use was low and concentrated among those who had previously smoked tobacco (**6**). These findings are contrary to concerns that e-cigarettes act as a gateway drug to more harmful tobacco consumption.

3. References to the research (indicative maximum of six references)

1. **Brose LS**, **Hitchman SC**, Brown J, West R & **McNeill A**. (2015). Is use of electronic cigarettes while smoking associated with smoking cessation attempts, cessation and reduced cigarette consumption? A survey with a 1-year follow-up. *Addiction*, 110(7), 1160-1168. doi: 10.1111/add.12917

2. **Hitchman SC**, **Brose LS**, Brown J, **Robson D** & **McNeill A**. (2015). Associations between e-cigarette type, frequency of use, and quitting smoking: Findings from a longitudinal online panel survey in Great Britain, *Nicotine and Tobacco Research*, 17(10):1187-94 doi: 10.1093/ntr/ntv078

3. **Brose LS**, Brown J, **Hitchman SC** & **McNeill A**. (2015). Perceived relative harm of electronic cigarettes over time and impact on subsequent use. A survey with 1-year and 2-year follow-ups. *Drug and Alcohol Dependence*, 157, 106–111. doi: 10.1016/j.drugalcdep.2015.10.014

4. **Brose LS**, Partos TR, **Hitchman SC** & **McNeill A**. (2017). Support for e-cigarette policies: A survey of smokers and ex-smokers in Great Britain. *Tobacco Control*, 26(e1): e7-e15. doi:10.1136/tobaccocontrol-2016-052987

5. **East, K**., **Hitchman, S. C**., **Bakolis, I**., Williams, S., Cheeseman, H., Arnott, D., & **McNeill, A**. (2018). The Association Between Smoking and Electronic Cigarette Use in a Cohort of Young People. J Adolesc Health, 62(5), 539-547. doi: 10.1016/j.jadohealth.2017.11.301

6. Bauld, L., MacKintosh, A. M., Ford, A., & **McNeill, A**. (2016). E-Cigarette Uptake Amongst UK Youth: Experimentation, but Little or No Regular Use in Nonsmokers. Nicotine Tob Res, 18(1), 102-103. doi:10.1093/ntr/ntv132

4. Details of the impact (indicative maximum 750 words)

King's researchers produced evidence reports to inform UK public health policy.
Public Health England (PHE) exists to protect and improve the nation's health and wellbeing by providing evidence-based professional, scientific and delivery expertise. Based on King's ground breaking work in the area of vaping (**1,2,3,6**), PHE commissioned the research group to undertake analyses and systematic literature reviews, summarising evidence on e-cigarettes to support policy recommendations. Initially commissioned for one report, which received global attention, King's researchers have subsequently been commissioned for several reports ("King's PHE Reviews") **[A1],** all of which feature King's primary research, enabling the cycle of evidence-based policy in this area. PHE state the first King's PHE review *"attracted international attention and marked a sea change in policy debate. For the first time national policy was underpinned by a comprehensive assessment of the current evidence. The report recommended a regulatory balance protecting children, ensuring products were safe and effective and maximising the public health opportunities. This balance of managing risks and maximising the opportunities has since become the expressed goal of successive governments.* **[A2]**. King's PHE Reviews have informed policy and are the means by which the government monitors the use and impact of e-cigarettes among adults and youth, and identifies areas of interest for future research and policy questions. They both underpin and are a requisite of the UK government's Tobacco Control Plan for England, [A3], authored by the Department of Health and Social Care aiming to support harm reduction with alternative forms of nicotine such as e-cigarettes **[A4]**.

King's research influenced NICE pathways for stop smoking services.
The National Institute for Health and Care Excellence (NICE) guidance on stop smoking services recommends that health and social care workers in primary care and community settings offer advice to every person over 12 who smokes. NICE advice therefore affects about 7 million smokers in England alone, and all professional stop smoking services and practitioners. The NICE pathway makes recommendations for stop smoking services **[B].** It was informed by King's primary research (**1**) and the King's 2018 PHE evidence review **[A1]**, now including recommendations on e-cigarettes as a harm-reduction strategy, based on the findings that e-cigarettes are substantially less harmful than smoking and that many people have found them helpful to quit smoking. The recommendations are also underpinned by King's research into smoking and e-cigarette use in young people which shows that using e-cigarettes was largely confined to those who had ever smoked tobacco, with a low proportion of young people who had never smoked tobacco using e-cigarettes (**5,6**).

National UK training for stop smoking services is underpinned by King's research.
The National Centre for Smoking Cessation and Training (NCSCT) is the main provider of training to practitioners offering stop smoking support in the UK, following standards which the NICE pathway mandates must be upheld in stop smoking services **[B]**. Evidence from the 2015 and 2018 King's reviews underpins the NCSCT stop smoking practitioner training, which now includes a section on e-cigarettes **[C1, C2].** Since September 2015, 16,092 health and social care professionals have accessed the online training and passed the assessment. The NCSCT also includes the 2018 King's PHE Review as a resource for stop smoking service professionals and since 2016 over 55,000 health and social care professionals have accessed it through the NCSCT alone **[A1, C2].** The NCSCT have produced guidance on e-cigarettes 'Electronic cigarettes: A briefing for stop smoking services' in partnership with PHE, informed by King's PHE Reviews for PHE **[C3].** This briefing recommends that practitioners *'be open to e-cigarette use in people keen to try them; especially in those who have tried and failed to stop smoking using licensed stop smoking medicines'.* It further includes reference to King's primary research on the characteristics of e-cigarette use associated with reduced smoking, such as daily use of re-fillable tank products

(2). The briefing can be freely downloaded from the website and over 2,000 hard copies have been distributed at NCSCT face-to-face training courses for health and social care professionals **[C2, C3]**. Additionally, in 2018 the NCSCT produced a series of five public health information films for PHE, 'E-cigarette safety: the facts explained' to counter misperceptions about the harms of e-cigarettes highlighted in King's research (3) one of which features King's researcher McNeill, and has had more than 400,000 views **[C4]**.

The Royal College of General Practitioners (RCGP) position statement on e-cigarettes **[D]** directs UK GPs to the King's 2015 PHE Review and to the NCSCT training as means to inform GPs in the use of e-cigarettes as part of a harm-reduction approach.

Better success rates indicated by these new training approaches are underpinned by King's research. Statistics from NHS Digital showed that in 2018 - 2019, stop smoking services supported 236,175 attempts to stop smoking. Attempts to stop smoking in which clients used e-cigarettes have achieved the highest self-reported quit rates compared with prescription medication, and Nicotine Replacement Therapy, indicating that the revisions of training based on King's research has saved countless lives **[E].** NCSCT said about the impact of King's research: *'It is clear that the KCL evidence reviews have made an enormous and valuable contribution to our stop smoking services, and to the NCSCT in terms of the training and resources that we provide. We are very grateful to them, and are confident this has positively impacted and supported a great number of health and social care professionals in this area, and consequently to their patients who smoke'* **[C2]**.

King's research underpins PHE recommendations and policies on e-cigarettes in public places. Based on King's PHE Reviews, PHE have issued advice on the use of e-cigarettes in the workplace and public spaces to help employers and organisations develop their own policies. They state that 'e-cigarettes have significant potential to help reduce tobacco use and the serious harm it causes to smokers, those around them and wider society. Recognition of this should be at the centre of policies on e-cigarette use in public places and workplaces' **[F1]**. Hospitals in England, including their grounds, have become smoke-free in line with NICE guidance. Whether to allow e-cigarettes/vaping on hospital sites is not consistent across trusts but the large number that do permit vaping and explicitly support the use of e-cigarettes, have frequently based their decision on the evidence provided by King's **[F2]**. In particular, mental health trusts, which have large numbers of patients who smoke, have found smoke free policies allowing vaping very helpful **[F3, F4, F5]**. A recent survey showed that e-cigarettes are available in 91% of mental health trusts **[F6]**.

King's research informs UK Government policy.
The 2019 Government Green Paper 'Advancing our health: prevention in the 2020s' **[G1]** cites the 2018 King's PHE Review, stating that e-cigarettes are a helpful contribution to a harm reduction strategy in smokers, and recommending their use thus *'We are setting an ambition to go 'smoke-free' in England by 2030. This includes an ultimatum for industry to make smoked tobacco obsolete by 2030, with smokers quitting or moving to reduced risk products like e-cigarettes.'* King's PHE Reviews are regularly quoted in the House of Lords as being key document for reviewing the impact of current e-cigarette regulations [e.g. **G2**]. Also, King's researchers have regularly developed evidence for Parliament with the campaigning charity ASH, an organisation which aims to influence tobacco control policies by understanding and communicating research findings important to the UK policy environment, and which provides the secretariat for the All Party Parliamentary Group on Smoking and Health **[F5]**.

King's research informed calls for revision of policies on e-cigarettes in New Zealand
New Zealand was one of several countries that originally put in place stringent e-cigarette and vaping restrictions. On the basis of King's PHE Reviews the New Zealand Ministry of Health recommended that the government support smokers to switch to significantly less harmful nicotine alternatives. This was instrumental in New Zealand legalising nicotine vaping products in 2018. The work is referenced in the Ministry of Health's recommendation to the consultation **[H1]** and on the Ministry of Health's website **[H2].**

5. Sources to corroborate the impact (indicative maximum of 10 references)

A. Evidence to corroborate the impact of Kings' PHE Reviews
A1 Public Health England Evidence Reviews 2015, 2016, 2018, 2019, 2020 (update)
A2 Public Health England Testimonial – Martin Dockrell
A3 UK Government Tobacco Control Plan
A4 Delivery plan

B. NICE Pathway: Stop smoking interventions and services NICE Evidence (2018)

C. Evidence to corroborate how King's research informed stop smoking services
C1 NCSCT training for healthcare professionals
C2 NCSCT testimonial from Andy McEwen
C3 NCSCT briefing on E-cigarettes
C4 NCSCT short film example

D.RCGP position statement

E. NHS statistics on "unlicensed therapies" for stopping smoking

F. Evidence to corroborate how King's research has underpinned recommendations and policies on the use of E-cigarettes in public places
F1 Public Health England advice on the use of e-cigarettes in public places
F2 Examples of NHS Trust smoke free policies x 3, Sheffield, Surrey and Southern, and Science and Technology committee report
F3 South London and Maudsley smoke free lead, Mary Yates, testimonial.
F4 Mental Health Smoking Partnership briefing: Use of electronic cigarettes by people with mental health problems
F5 Action on Smoking and Health (ASH) testimonial
F6 ASH survey of mental health trusts

G. Evidence to corroborate how King's research has underpinned UK government policies
G1 UK Green Paper, Advancing our health: prevention in the 2020s
G2 House of Lords debate Nov 2020

H. Evidence to corroborate how King's research has informed the New Zealand Ministry of Health's recommendations on the use of e-cigarettes
H1 Ministry of Health consultation
H2 Three Vaping Facts factsheets on Ministry of Health Website: Vaping vs smoking; Vaping to quit smoking; The facts of vaping.