




E-cigarette use & smoking cessation in England

Long-term trends from the Smoking Toolkit Study

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DEBRA symposium 30 June 2017

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Aims of this presentation

- To introduce the Smoking Toolkit Study
- To describe long-term trends in England
 - e-cigarette use
 - key performance indicators for tobacco control
 - smoking prevalence
 - smoking cessation rates
 - attempts to stop smoking
 - success of attempts to stop smoking
 - use of other aids to cessation or reduction
- To present a study¹ assessing how far changes in the prevalence of e-cigarette use while smoking and in a quit attempt have been associated with changes in quitting-related behaviours in England

¹BMJ. 2016 Sep 13;354:i4645. doi: 10.1136/bmj.i4645

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What is the Smoking Toolkit Study?

- National surveillance programme that **aims to provide insight into population-wide influences on smoking and cessation**
 - Evaluation of policies and interventions
 - Populations trends and monitoring
 - ‘Real world’ effectiveness of treatments
 - Characterising groups exhibiting different types of smoking and quitting behaviour



What is the Smoking Toolkit Study?

- Each month new sample of ~ 1700 adults (≥ 16) complete computer-assisted household survey with trained interviewer
 - Selected by hybrid between random location and simple quota sampling
 - Sample nationally representative in its socio-demographic composition (Fidler et al. 2011)



What is the Smoking Toolkit Study?

- Established in 2006 and primarily funded by CRUK
- Collected data from over 220,000 people
 - smoking status; smoking patterns; sources of supply of tobacco; use of non-tobacco nicotine products; spending on cigarettes/tobacco; motivation and dependence; social networks; smoking cessation activities; use of smoking cessation aids; receipt of smoking cessation advice; socio-demographic variables; locality
- Sister survey to the Alcohol Toolkit Study
 - respondents also provide data on a range of alcohol consumption and related behaviours, including harm (AUDIT)

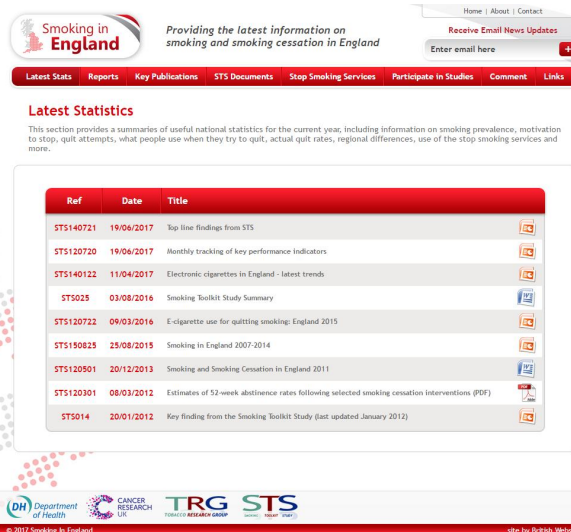


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Smoking in England
Providing the latest information on smoking and smoking cessation in England

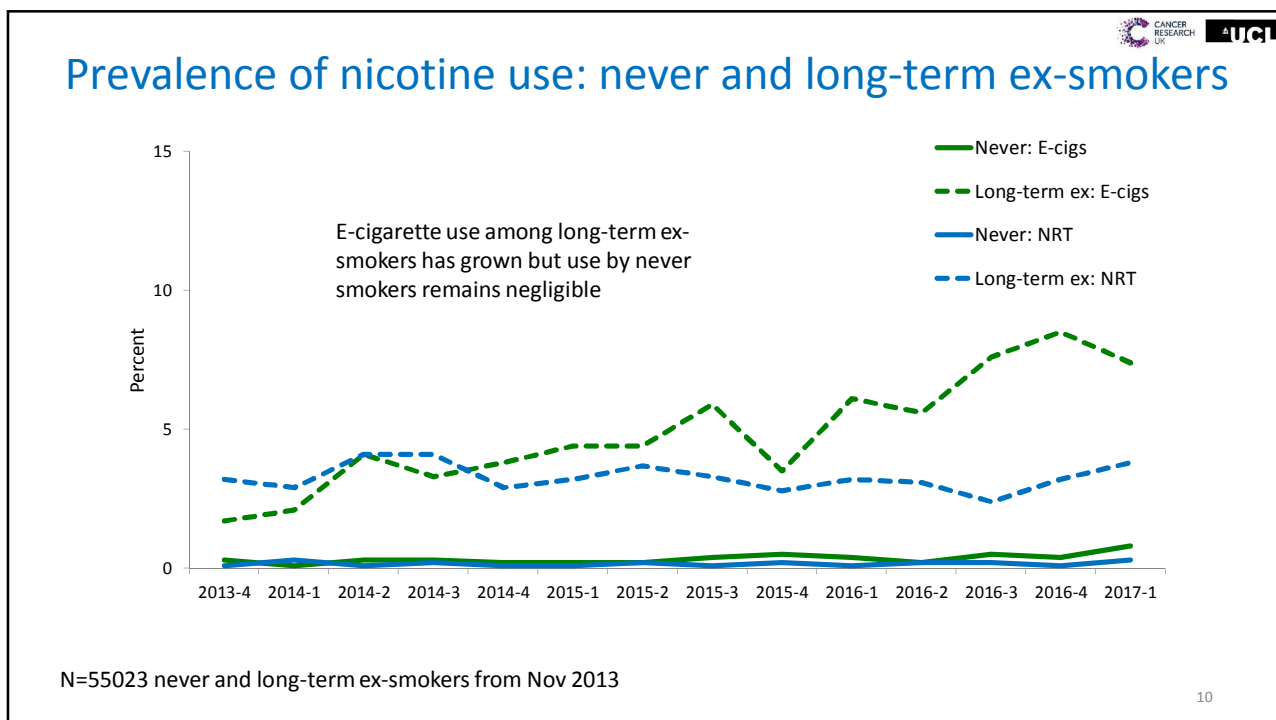
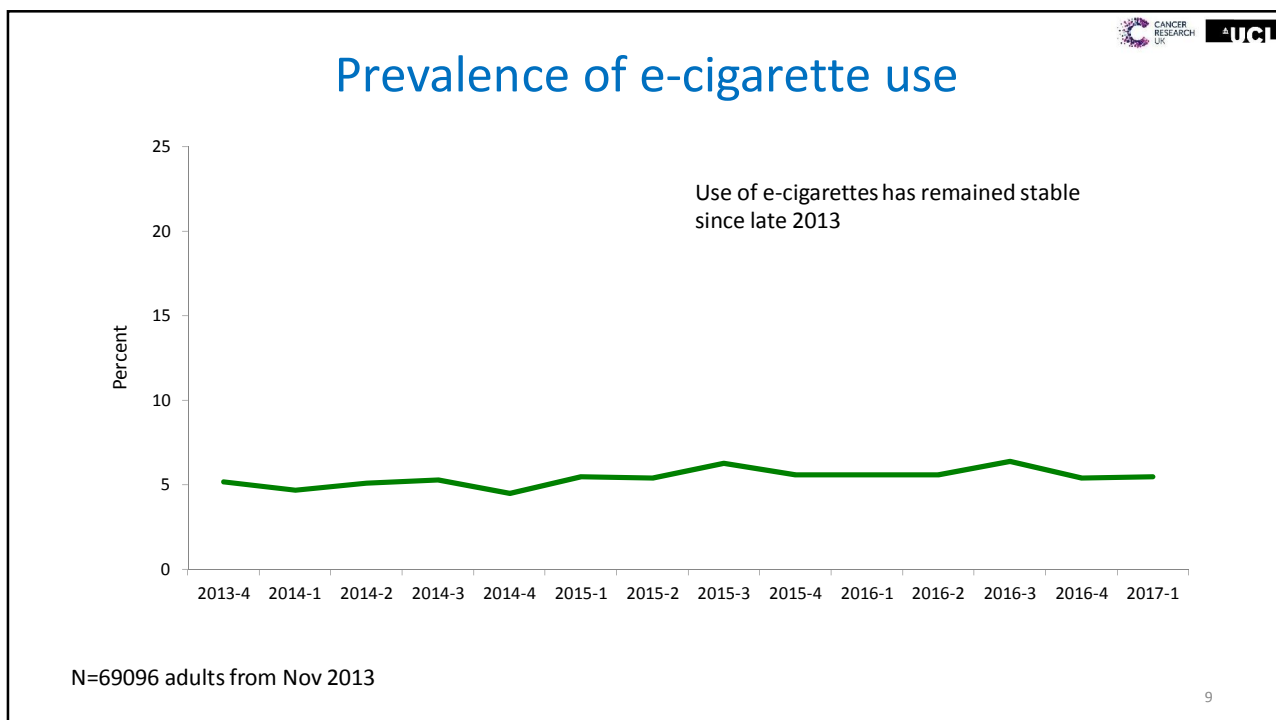
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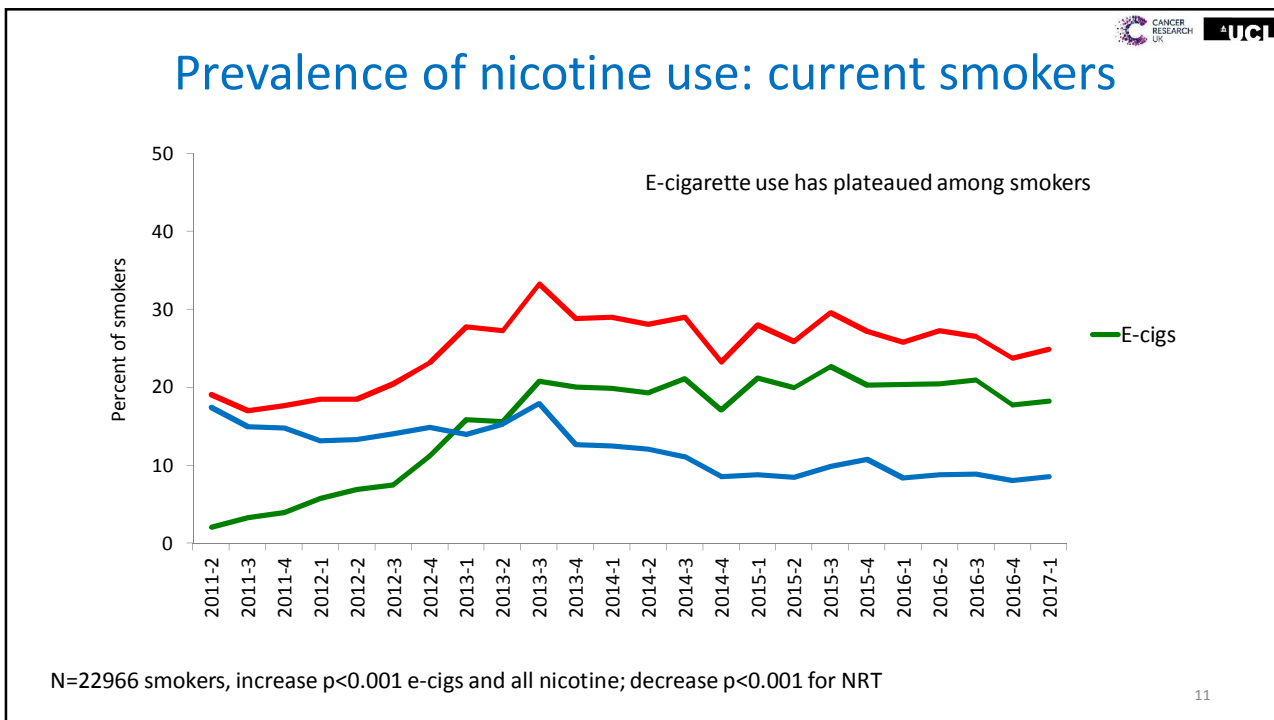
Latest Stats Reports Key Publications STS Documents Stop Smoking Services Participate in Studies Comment Links

Latest Statistics
This section provides a summaries of useful national statistics for the current year, including information on smoking prevalence, motivation to stop, quit attempts, what people use when they try to quit, actual quit rates, regional differences, use of the stop smoking services and more.

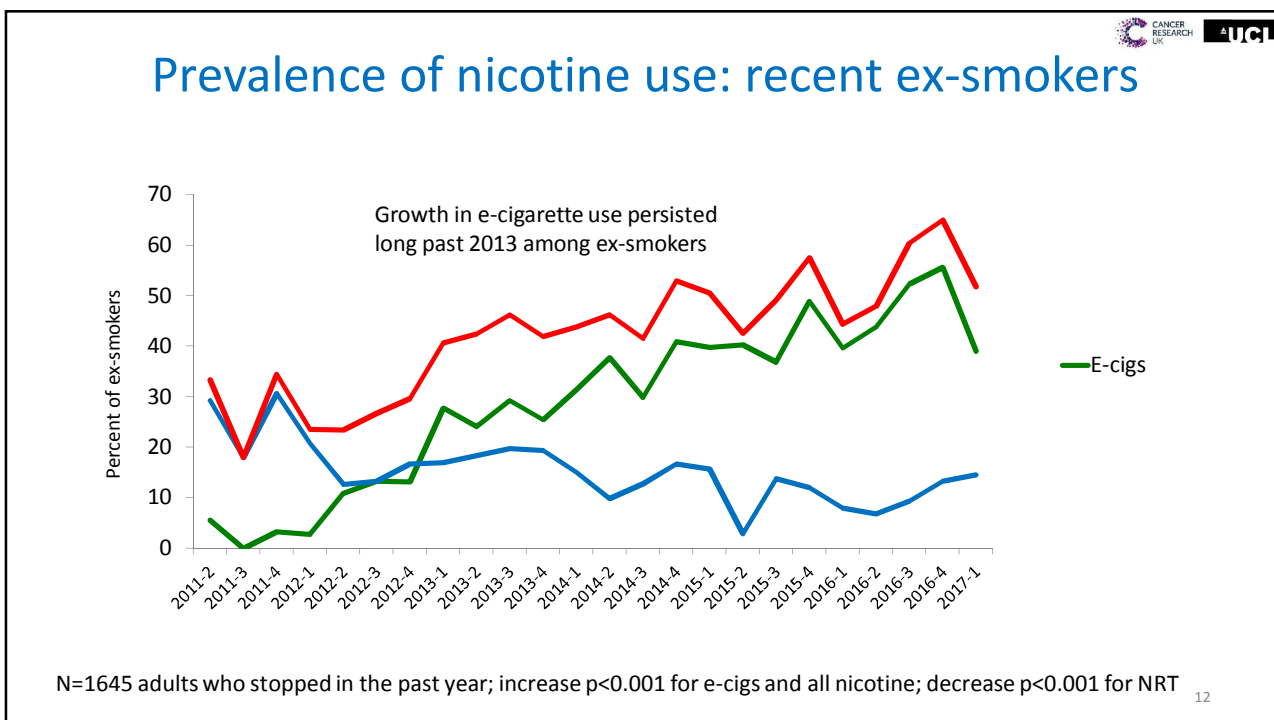
Ref	Date	Title
STS140721	19/06/2017	Top line findings from STS
STS120720	19/04/2017	Monthly tracking of key performance indicators
STS140122	11/04/2017	Electronic cigarettes in England – latest trends
STS025	03/08/2016	Smoking Toolkit Study Summary
STS120722	09/03/2016	E-cigarette use for quitting smoking: England 2015
STS150825	25/08/2015	Smoking in England 2007-2014
STS120501	20/12/2013	Smoking and Smoking Cessation in England 2011
STS120301	08/03/2012	Estimates of 52-week abstinence rates following selected smoking cessation interventions (PDF)
STS014	20/01/2012	Key finding from the Smoking Toolkit Study (last updated January 2012)

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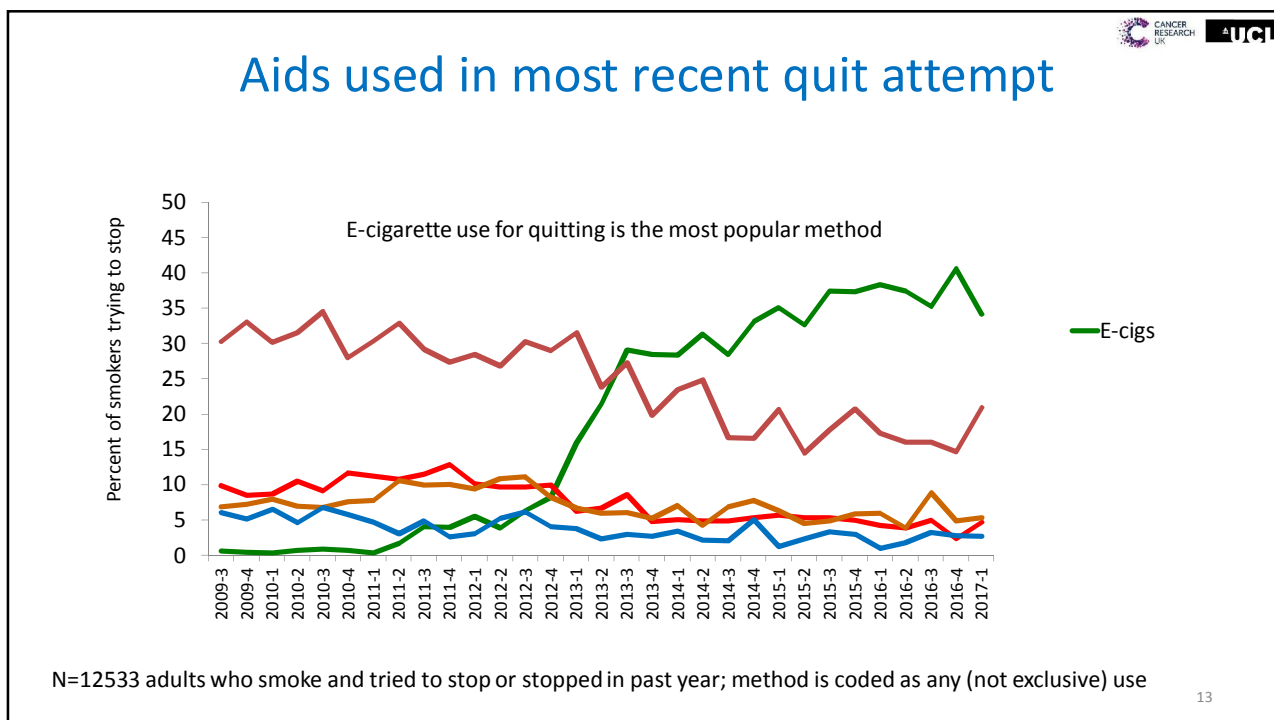




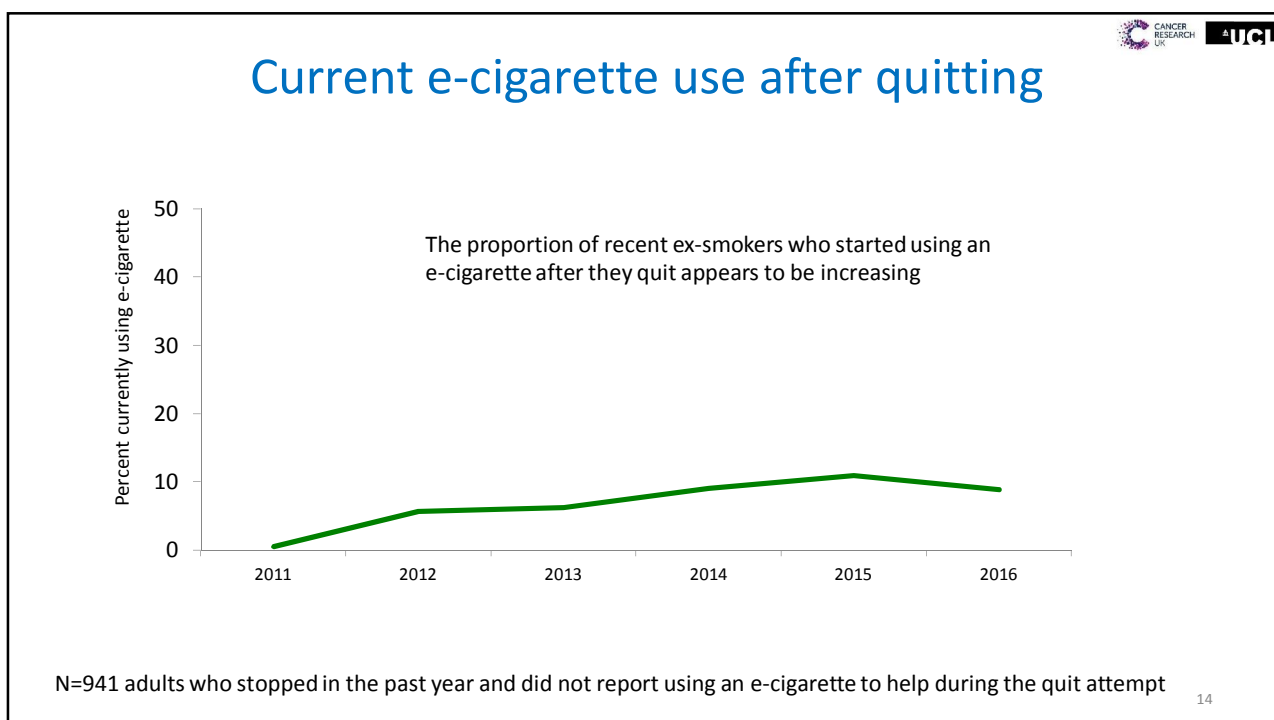
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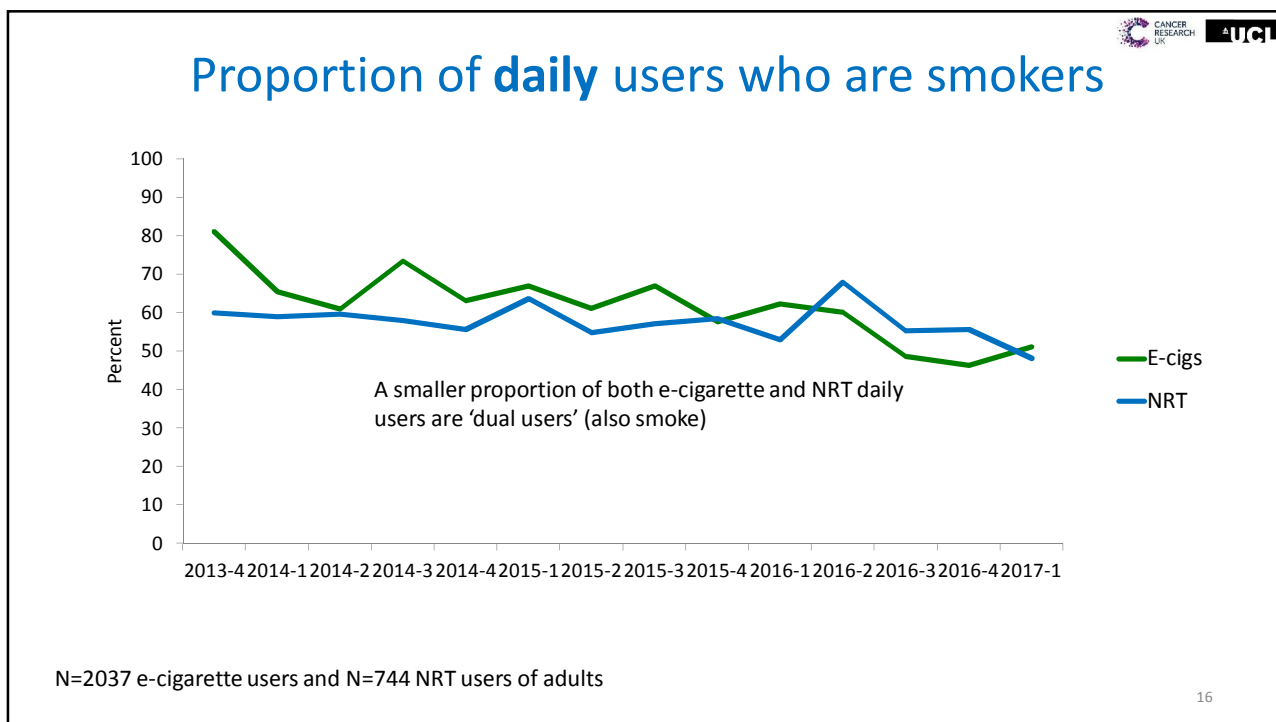
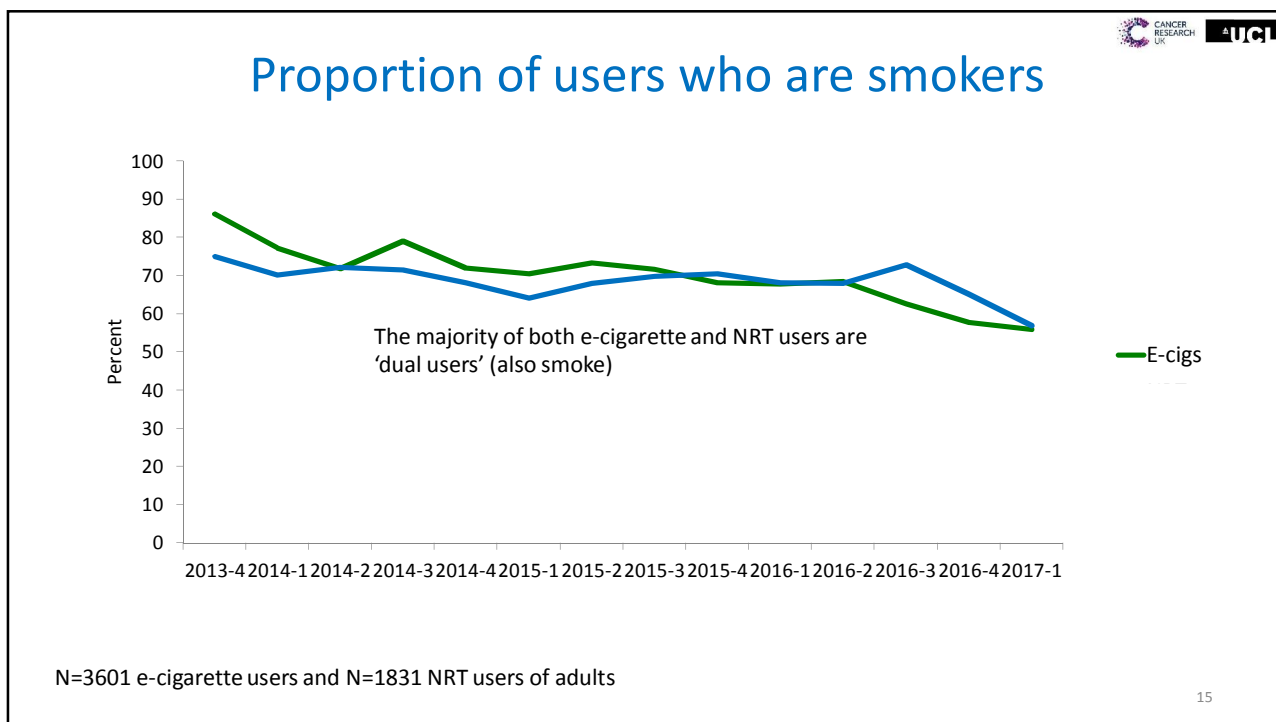
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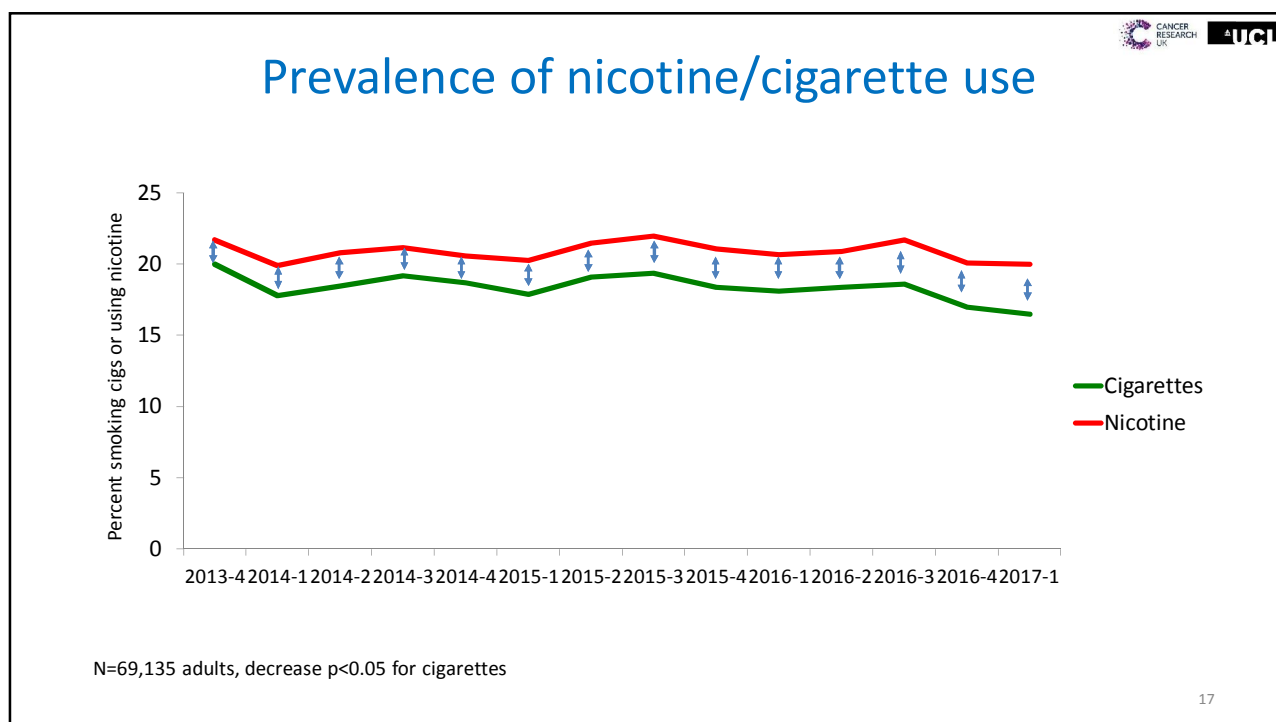


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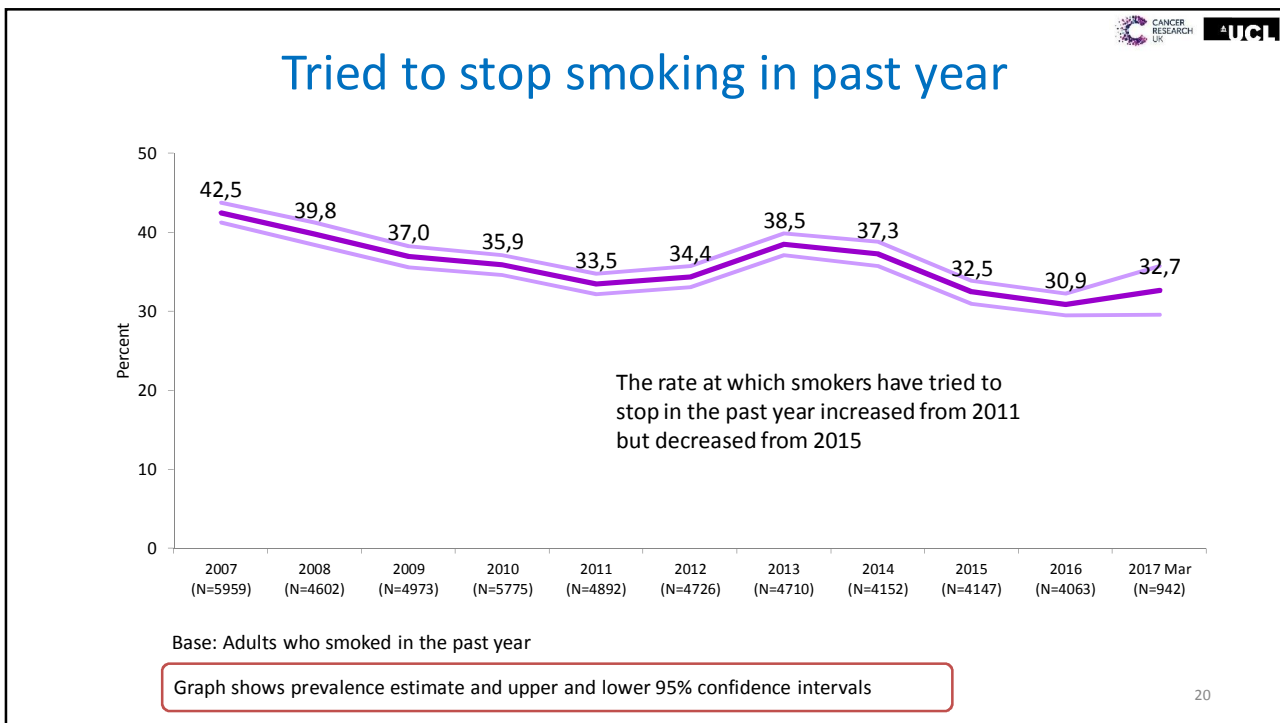
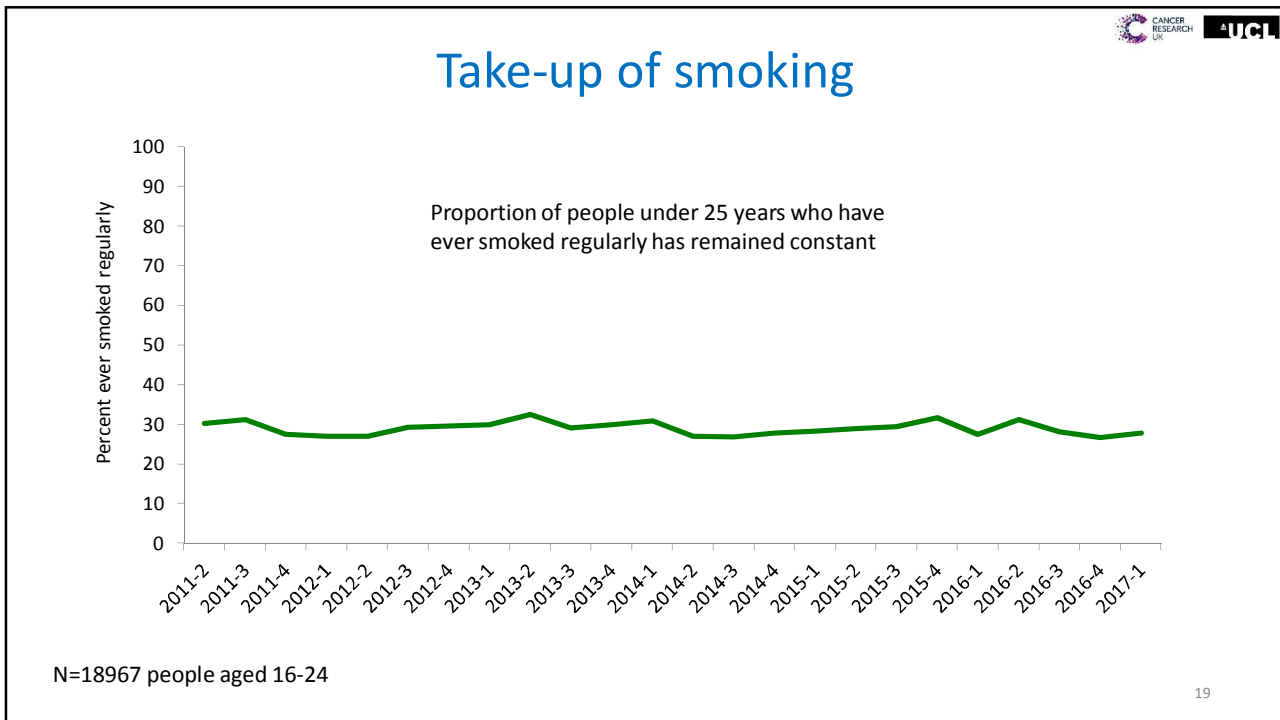
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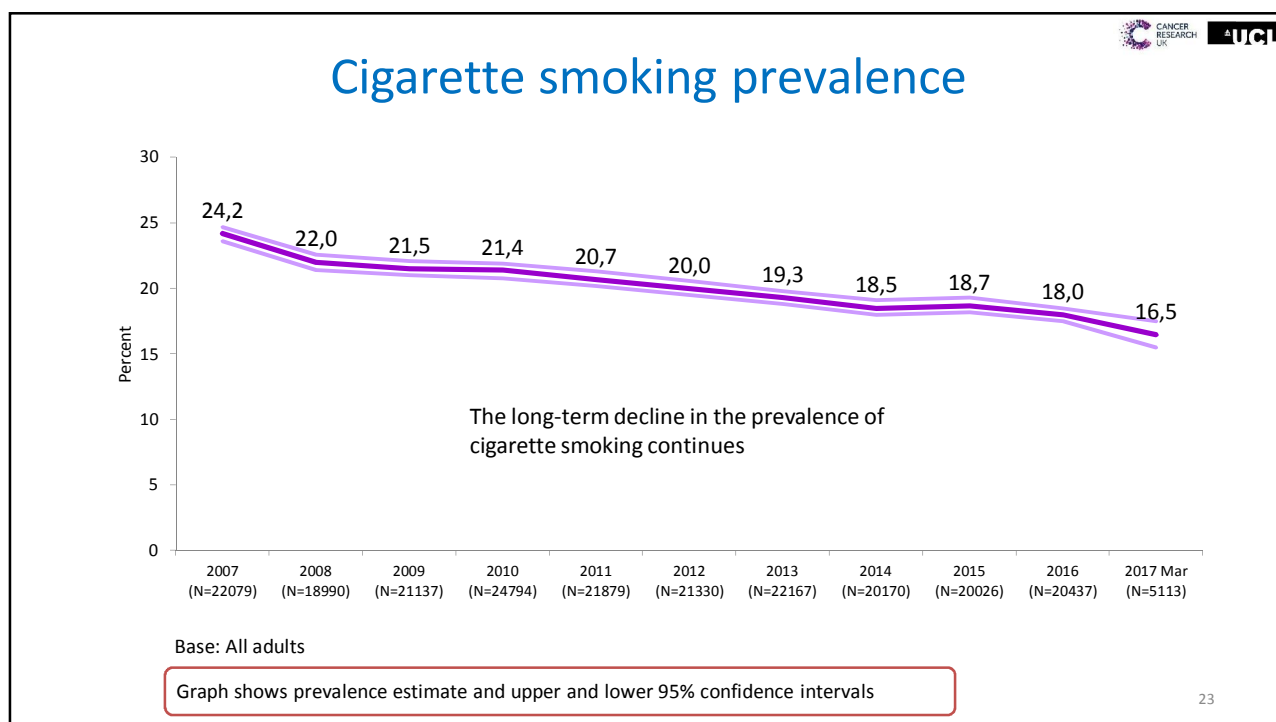


Summary I

- In England, e-cigarette use grew rapidly between 2011 and 2013 – becoming the most popular quitting method – but **overall prevalence** has been relatively stable thereafter
- Overall stability has obscured subgroup trends
 - Use of e-cigarettes by never smokers remains very rare and similar to use of licensed nicotine products
 - Growth in use by current smokers has stalled since 2013
 - Use among ex-smokers appears to be increasing
- The proportion of e-cigarette users who also smoke (dual use) has declined steadily and is similar to licensed nicotine products







Summary II

- There has been a long-term decline in the prevalence of cigarette smoking since 2007
 - including no increase in uptake since 2011
- The trajectories for smoking prevalence and quit attempts appear distinct from that of prevalence of use of e-cigarettes
- Success rates in stopping smoking have increased since 2011



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Wider context

- Divergent claims are being made about whether and how far use of e-cigarettes contribute to or detract from smoking cessation
- Two small RCTs suggest that when used in a quit attempt they improve the chances of success of that quit attempt¹
- One large comparative observational study yields a similar finding²
- Many other studies find that past use of e-cigarettes is associated with a reduced likelihood of quitting in the future³
- None of these studies is able to provide a direct estimate of the population impact and whether it is positive or negative

¹Cochrane Database Syst Rev. 2016 Sep 14;9:CD010216;

²Addiction. 2014 Sep;109(9):1531-40. doi: 10.1111/add.12623.

³Lancet Respir Med. 2016 Feb;4(2):116-28. doi: 10.1016/S2213-2600(15)00521-4



Study design

- Time series analysis (ARIMAX) assessing associations between quarterly changes in input & output measures (preregistered at <https://osf.io/fbgj2/>)
- **Input measures**
 - Prevalence of e-cigarettes use by smokers
 - Prevalence of e-cigarette use in the most recent quit attempt made in the past 12 months
- **Output measures**
 - Success rate of most recent quit attempt made in the past 12 months
 - Prevalence of recent (past 12-month) quit attempts
 - Use of each of several smoking cessation support methods
- **Covariates**
 - Mass media spend
 - Tobacco control policies
 - Cost of smoking



Measures

- **Period:** Nov 2006 to March 2015
- **Sources:**
 - **Smoking Toolkit Study:** Monthly national surveys of representative samples of adults aged 16+ in England aggregated quarterly (approx. 6000 adults, 1200 smokers per quarter)
 - **NHS Information Centre:** Quarterly returns from stop-smoking services, totalling 8 million quit dates
 - **Public Health England:** Covariates

Results: quit success rates

	Analysis of e-cigarette use during a quit attempt*		Analysis of current e-cigarette use†	
	Unadjusted	Fully adjusted	Unadjusted	Fully adjusted
Percentage change per 1% change in the exposure (95% CI), P value				
Use of e-cigarettes in a quit attempt	0.042 (0.018 to 0.065), <0.001	0.058 (0.038 to 0.078), <0.001	NA	NA
Use of e-cigarettes by current smokers	NA	NA	0.076 (–0.002 to 0.155), 0.06	0.098 (0.064 to 0.132), <0.001
Mass media expenditure	—	0.059 (0.020 to 0.097), 0.003	—	0.063 (0.025 to 0.101), 0.001
Total change due to the exposure (95% CI), P value				
Smoking ban (temporary impact in third quarter of 2007)	—	0.022 (–0.224 to 0.268), 0.86	—	0.005 (–0.237 to 0.246), 0.97
Increase in age of sale (temporary impact in fourth quarter of 2007)	—	0.328 (0.081 to 0.574), 0.009	—	0.345 (0.105 to 0.585), 0.005
Move to local authority control (temporary impact in second quarter of 2013)	—	–0.047 (–0.293 to 0.200), 0.71	—	–0.029 (–0.265 to 0.207), 0.81

Results: quit attempt rate

	Unadjusted*	Fully adjusted*
Percentage change per 1% change in the exposure (95% CI), P value		
Use of e-cigarettes	0.023 (–0.037 to 0.083), 0.46	0.025 (–0.035 to 0.085), 0.41
Mass media expenditure	—	–0.008 (–0.039 to 0.022), 0.59
Total change due to the exposure (95% CI), P value		
Smoking ban (temporary impact in third quarter of 2007)	—	–0.017 (–0.138 to 0.103), 0.78
Increase in age of sale (temporary impact in fourth quarter of 2007)	—	–0.037 (–0.159 to 0.083), 0.54
Move to local authority control (temporary impact in second quarter of 2013)	—	0.031 (–0.039 to 0.022), 0.57

Results: use of stop-smoking support



	Stop smoking services		Prescription treatment		NRT over the counter		NRT on prescription	
	Adjusted for smoking prevalence*	Fully adjusted*	Unadjusted†	Fully adjusted†	Unadjusted‡	Fully adjusted‡	Unadjusted§	Fully adjusted§
Percentage change per 1% change in the exposure (95% CI), P value								
Use of e-cigarettes in a quit attempt	-0.012 (-0.091 to 0.067), 0.77	-0.013 (-0.102 to 0.077), 0.78	-0.069 (-0.161 to 0.022), 0.14	-0.070 (-0.152 to 0.013), 0.10	-0.016 (-0.096 to 0.065), 0.70	-0.006 (-0.088 to 0.077), 0.89	-0.036 (-0.137 to 0.015), 0.10	-0.098 (-0.189 to -0.007), 0.04
Mass media expenditure	—	0.013 (0.005 to 0.021), 0.001	—	-0.013 (-0.015 to 0.041), 0.37	—	-0.008 (-0.053 to 0.037), 0.74	—	-0.051 (-0.107 to 0.006), 0.08
Total change due to the exposure (95% CI), P value								
Smoking ban (temporary impact in third quarter of 2007)	—	-0.019 (-0.294 to 0.257), 0.89	—	0.173 (-0.097 to 0.442), 0.21	—	-0.128 (-0.344 to 0.087), 0.24	—	-0.128 (-0.344 to 0.087), 0.24
Increase in age of sale (temporary impact in fourth quarter of 2007)	—	0.011 (-0.219 to 0.238), 0.92	—	0.077 (-0.190 to 0.343), 0.57	—	-0.027 (-0.242 to 0.189), 0.81	—	-0.027 (-0.242 to 0.189), 0.81
Move to local authority (temporary impact in second quarter of 2013)	—	0.034 (-0.162 to 0.230), 0.73	—	0.056 (-0.225 to 0.337), 0.70	—	-0.075 (-0.303 to 0.152), 0.52	—	-0.075 (-0.303 to 0.152), 0.52

Interpretation



- Leads to a population estimate of approx 54,000 short-term and 18,000 long-term additional ex-smokers attributed to e-cigarette use in 2015
 - The results are consistent with e-cigarette use in quit attempts increasing the chances of success by approx. 50% - similar to previous estimates¹
 - The results are not consistent with e-cigarette use decreasing quit attempts or quit success to the extent estimated by Kalkhoran et al²

¹Addiction, 111 (6), 1118-1119; ²Lancet Respir Med. 2016 Feb;4(2):116-28.



Limitations

- Cannot rule out associations being at least partially attributable to unmeasured population trends
- Estimates are subject to margin of error (95% confidence intervals of approx. 50%)
- Measured prevalence of any e-cigarette device
 - Prevalence of different types may be more important



Conclusion

- In England, e-cigarette use grew rapidly between 2011 and 2013 but overall prevalence has been relatively stable thereafter
 - use e-cigarettes by never smokers continues to be very rare
- The proportion of e-cigarette users who also smoke (dual use) has declined steadily
- Changes in prevalence of e-cigarette use in England have been positively associated with the success rates of quit attempts
 - Estimates that in 2015 e-cigarettes may have produced an *additional* 18 000 long-term ex-smokers in England
 - E-cigarettes likely contributor to the continued long-term decline in the prevalence of smoking



Acknowledgments

- Cancer Research UK
 - JB & EB salary
 - Primary funding of data collection for the Smoking Toolkit Study
 - Also, Dept of Health, Pfizer, GSK and J&J at outset
- All collaborators and co-authors
 - particularly Emma Beard and Robert West
- UK Centre for Tobacco and Alcohol Studies
- Ipsos MORI for conducting fieldwork

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Citation: Beard, West, Michie & Brown. BMJ. 2016 Sep 13;354:i4645. doi: 10.1136/bmj.i4645