BMJ Open

Factors and motivations associated with use of e-cigarette among primary care patients in a prospective cohort study: e-TAC study protocol.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-011488
Article Type:	Protocol
Date Submitted by the Author:	11-Feb-2016
Complete List of Authors:	Kinouani, Shérazade; Université de Bordeaux, Département de médecine générale Castéra, Philippe; Université de Bordeaux, Département de médecine générale Laporte, Catherine; Université d'Auvergne, Département de médecine générale Pétrègne, François; Université de Bordeaux, Département de médecine générale Gay, Bernard; Université de Bordeaux, Département de médecine générale
Primary Subject Heading:	Smoking and tobacco
Secondary Subject Heading:	General practice / Family practice
Keywords:	Electronic cigarette, smoking, socioeconomic factors, cohort study, primary health care

TITLE: Factors and motivations associated with use of e-cigarette among primary care patients in a prospective cohort study: *e*-TAC study protocol.

AUTHORS: Kinouani Shérazade[1,2,3], Castéra Philippe[1] , Laporte Catherine[4,5], Pétrègne François[1], Gay Bernard[1]

Kinouani Shérazade

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

[2] Univ. Bordeaux, U897, F-33000 Bordeaux, France

[3] INSERM, Neuroepidemiology U897, F-33000, Bordeaux, France

sherazade.kinouani@u-bordeaux.fr

Castéra Philippe

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

philippe.castera@u-bordeaux.fr

Laporte Catherine

[4]Department of General Medicine, Faculty of Medicine, Clermont-Ferrand, France

[5]Clermont Université, Université d'Auvergne, EA 7280, NPsy-Sydo (Neuro-Psycho-pharmacologie des Systèmes Dopaminergiques sous-corticaux), Clermont-Ferrand, France

catherinelaporte63@gmail.com

Pétrègne François

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

francois.petregne@u-bordeaux.fr

Gay Bernard

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

bernard.gay@u-bordeaux.fr

Corresponding author

Kinouani Shérazade

Université de Bordeaux

Département de Médecine générale

146, rue Léo Saignat

Case 148

33076 Bordeaux Cedex France

sherazade.kinouani@u-bordeaux.fr

Phone: + (33)6.10.29.68.47

The Corresponding author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence on a worldwide basis to the BMJ Publishing Group Ltd to permit this article (if accepted) to be published in BMJ editions and any other BMJPGL products and sublicences such use and exploit all subsidiary rights, as set out in our licence. She is the lead author. So, she affirms that this manuscript is an honest, accurate and transparent account of the study taking place and that no important aspects of the study have been omitted.

ABSTRACT

Introduction: While the relationship between electronic cigarette use and smoking has often been studied, the association between electronic cigarette use and socioeconomic factors has received less attention. We aim to describe the relationship between the consumption of psychoactive products (in particular: smoking) or some socioeconomic factors and the evolution over one year of the electronic cigarette use in primary health care.

Methods and analysis: *e*-TAC is a prospective multi-site cohort study, including 473 patients at baseline and carrying out in general practices in the Aquitaine area (France). The volunteer patients participated in the study regardless of their initial reason for consultation. They filled out a self-administered questionnaire at baseline and will also do so after 12 months by phone, email or letter. The study will focus on the factors that explain the experimentation with or the current use of the electronic cigarette, as well as factors associated with their evolutions over time using multivariable logistic regression modeling or Cox regression modeling.

Ethics and dissemination: This study received ethical approval from the University of Bordeaux committee for the protection of persons. It was also approved by the National Commission for Data Processing and Freedoms. Findings will be submitted for publication in peer-reviewed journals and we will disseminate them by presentations at national or international conferences.

KEYWORDS

Electronic cigarette, smoking, socioeconomic factors, cohort study, primary health care.

WORD COUNT: 2863 words

STRENGTHS AND LIMITATIONS OF THIS STUDY

-It is a study in primary care so the findings will be close to the real conditions of electronic cigarette use in the general population.

-To the best of our knowledge, it is the first study about the electronic cigarette use carrying out in general practices in France.

-The trainees' involvement in the recruitment of patients will probably improve the feasibility of the study. Thanks to their involvement and enthusiasm, the study will not represent an excessive workload for their supervisors.

-The study will focus on socioeconomic factors that may determine the use of electronic cigarettes. It will describe their use based not only on smoking but also on the consumption of alcohol and cannabis. When relevant, it will also examine this use in subgroups of the French population. These factors and sub-group analyses have received little attention to date.

-The selection bias will be reduced by the online questionnaire proposed at 12 months. Furthermore, to minimize loss to follow up, three forms of communications will be used: letter, e-mail and phone.

- A strategy of missing data management is planned with multiple imputation. Sensitivity analyses will be performed to compare the results with complete data and those after multiple imputation.

-Data collection by self-reporting on a questionnaire in the GP waiting rooms involves the risk of a social desirability bias.

-This is a prospective study on a small sample so the sample size of 473 subjects and a 1-year follow-up period were established for reasons of feasibility. Causal relations can't be inferred.

INTRODUCTION

Electronic cigarettes (or e-cigarettes) are battery-operated devices that provide an aerosol for inhalation that sometimes contains nicotine. Their use is increasing worldwide and mainly concerns smokers [1-5]. Although their long-term health effects are unknown, their use might be less harmful than smoking according to experimental studies although this remains to be confirmed in clinical research studies [6–8].

While the relationship between smoking and electronic cigarette use has been studied several times, the relationship between electronic cigarette use and socioeconomic factors such as education level or occupational category are less clear [1, 4, 9–19].

The main reason reported for electronic cigarette use is the desire to stop smoking [9, 11, 14, 16, 18, 20–24]. However, other reasons are sometimes declared, particularly in young adults: the desire to use a product delivering nicotine but which is less harmful than smoking, curiosity, the search for a new experience, the lower cost compared to smoking, the feeling of regulating one's use, etc.[11, 23–28]. To our knowledge, no prospective studies specifically focusing on electronic cigarette use among the elderly or people with chronic diseases have been published, nor have any on electronic cigarette use among people using several products such as alcohol, tobacco and cannabis.

According to the Health Barometer study, 26% of the French population had tried an electronic cigarette and 6% were current users in 2014 [29]. As in many other countries, electronic cigarettes are mainly used by smokers and former smokers. According to these authors, the socioeconomic factors associated with the electronic cigarette use among smokers in France were: income level, occupational status and socio-professional category [29].

The main objective of this study is to describe among experimenters of at least one substance (tobacco, alcohol, cannabis, or electronic cigarette) the factors associated with the evolution of electronic cigarette use over 12 months: factors associated with the transition from non-use

to experimentation; factors associated with the transition from experimentation to current use; factors associated with cessation of use. The secondary objective is to describe the factors associated with experimentation and current use of electronic cigarettes. The third objective is to describe the frequency of motivations reported for electronic cigarette use and those associated with the most common motivations.

METHODS AND ANALYSIS

The *e*-TAC study is a multicenter, prospective, observational cohort study currently that has been underway for one year in Aquitaine, South-West France.

Recruitment

The recruitment is almost finished and took place from May until October 2015 in eight general practices. It was performed in two steps: first, recruitment of general practices; second, recruitment of eligible patients.

Recruitment of general practices

Each general practice trainee in Bordeaux University does an internship in three different GPs offices for at least six months. An e-mail describing the *e*-TAC project was sent to all 430 trainees in their second or third year of specialization in Bordeaux University at the beginning of March 2015. Trainees who intended to do their internship from May to October 2015 and willing to help recruit patients during this period were invited to contact the first author (SK). Another author (BG) also talked to the trainees about the *e*-TAC project during general practice courses at the end of March 2015. The trainees' recruitment is explained in Figure 1. Fifteen volunteer trainees contacted SK. She selected five of them as *e*-TAC investigators on the basis of their motives and internship locations. The steering committee decided that the

study should take place only in two locations per trainee so that they could continue to learn general practice without being overloaded by the requirements of the study. At the beginning of March 2015, SK sent an e-mail to all GPs who usually were training supervisors in general practice in Aquitaine in order to explain the study to them. The e-mail also informed them that some future trainees would be participating as investigators. After the meetings between SK and the five selected trainees, she sent a new e-mail to inform the 10 supervisors concerned that their future students were willing to participate. She proposed a phone conversation to talk about it and obtain their oral agreement. Two training supervisors of the same trainee refused to participate. In the end, 4 trainees and their 8 training supervisors in general practice accepted to participate. Patient recruitment was conducted by these 4 trainees and their 8 supervisors. These 8 private general practices are the investigation centers of the study.

Recruitment of patients

Eligible patients were then recruited. The target population was patients followed by GPs. The sample consisted of patients who met the following inclusion criteria: older than 18 years; agree to participate by signing and dating a consent form; must understand French; be able to fill in a questionnaire on paper; must attend a consultation in one of the 8 investigation centers regardless of the reason for the consultation; must have completed the self-administered questionnaire for inclusion (totally or partly); must have smoked tobacco or drunk alcohol or used cannabis or used an electronic cigarette at least once in their lifetime. Patients under guardianship or trusteeship for property were excluded. Patients seen at home visits were excluded. People who had never used tobacco or alcohol or cannabis or who had never used electronic cigarette were also excluded.

A large poster and flyers announced the study in the waiting rooms of the investigation centers. The questionnaires were available in the waiting rooms with detailed letters of

information and consent forms. If they requested it, the patients received a full explanation of the study from the trainees. They had previously learned with SK how to explain the study to patients and were already familiar with the various documents for the patients. Each volunteer patient filled in a consent form and a questionnaire and then put them in two separate boxes in the waiting room.

Data collection

All data were collected on a declarative basis. Baseline data were collected from May to October 2015 using a self-administered paper questionnaire designed by SK, PC and BG. It was amended by a specialist in social communication who had validated it in a pilot study. The design and process for validating the baseline paper questionnaire is shown in an additional file (see supplementary file 1 online).

Follow-up data will be collected on average 12 months later, from May to October 2016. A link to an online questionnaire will be sent to all patients who agreed to give their e-mails for inclusion. Reminders will be sent out once a week in the absence of answers. After 4 reminders or in the absence of an e-mail address, the follow-up questionnaire will be sent by post with a postage-paid envelope. In the absence of any answer by e-mail or by post, patients having given a phone number will be contacted by phone by trainees. They will be asked to say how they wish to receive the follow-up questionnaire and if they still wish to participate. If they no longer wish to participate, the reasons for non-participation will be requested. Trainees will call patients in blind without knowing their characteristics at baseline. Inclusion and follow-up are illustrated in Figure 2.

Each patient received an identification number at baseline that was written on the questionnaire and the consent form. Once both forms were in the two separate boxes, the analysis of baseline data became anonymous.

Outcomes and covariates

The main outcome is the evolution of electronic cigarette use over 12 months. This evolution will be studied in three ways: transition from non-use to experimented use at 12 months; transition from experimented use to current use at 12 months; transition from current use to cessation at 12 months. Experimented use is defined as reporting use at least once in a lifetime. Current use is defined as reporting ongoing use at the time of the survey, either occasionally or regularly. Experimentation and current use will be explored through two binary variables.

Six exposure factors will be studied: 1) demographic factors at baseline such as age (continuous variable), living in rural or urban area and sex; 2) factors related to smoking, the use of alcohol or cannabis, collected at baseline and after 12 months (see supplementary file 2 online). Nicotine dependence will be explored by the Cigarette Dependence Scale-5 (CDS-5) developed by Jean-François Etter. It was preferred to the Fagerström test for Nicotine Dependence owing to its better psychometric properties [30–32]. The first three questions of the Alcohol Use DIsorders Test (AUDIT) will be used to explore the problematic use of alcohol [33, 34]. The problematic use of cannabis in the 12 months prior to the survey will be explored by 5 questions from the Cannabis Abuse Screening Test (CAST). This tool was developed in 2002 by the "*Observatoire Français des Drogues et des Toxicomanies*", a national non-profit public interest group with a scientific mission. Its psychometric properties have mostly been studied among adolescents [35–37]; 3) socioeconomic factors at baseline (categorical variables): occupational status, education level, marital status, housing status and current opinion of one's own financial situation; 4) presence of chronic diseases at baseline and at 12 months: migraine, hypertension, diabetes, cardiovascular diseases, sleep disorders,

asthma, other respiratory diseases, cancer; 5) motivations for taking part in the electronic cigarette experiment, collected at baseline and at 12 months (multiple choice question); 6) motivations for current electronic cigarette use at baseline at 12 months (multiple choice question).

Statistical analysis

All estimates will be calculated on the total sample and in sub-group if relevant: young adults (18-30 years), women of childbearing age (18 to 50 years old), the elderly (75 years and more), people with at least a chronic disease, people who use at least two of the following products: alcohol, tobacco, cannabis. Simple descriptive statistics will be used to describe each variable at baseline or 12 months: mean, standard deviation, median for continuous variables; number and proportion for categorical or binary variables.

Three comparisons will be made to answer the main objective. The first will compare non-users who will have evolved into experimented users to non-users whose status is unchanged at 12 months. The second will compare experimented users at baseline who become current users in 12 months to experimented users whose status is unchanged. The third will compare current users at baseline who have stopped their use at 12 months to those whose status is unchanged.

Three others comparisons will be made to answer the second objective. These comparisons will be performed at baseline and then at 12 months. First, the experimenters of the electronic cigarette will be compared with non-users. They will then be compared to current users. Third, non-users will be compared to current users. In the end, the prevalence of the various motivations for electronic cigarette use will be estimated for experimentation and then for current use with their 95% confidence intervals. The factors associated with the most common motivations for each use will be analyzed.

Univariate and multivariate analyses will also be performed. The Student t-test or the non-parametric test will be used for univariate analysis of continuous variables. Univariate comparison of proportions will be performed using the chi-square test. Fisher's exact test will be used when the theoretical count in cells is less than 5. Multivariate comparisons will be performed by modeling with logistic regression with fixed effects or Cox regression. Patients with missing data on their electronic cigarette use at baseline will not be included in the models. Stratified analyses by age, sex or smoking status will also be carried out if relevant. Significance will be set to .05 and all tests will be two-tailed.

Sample size calculation

Since several hypotheses are studied, it was difficult to calculate a minimum sample size. The relationship between smoking and electronic cigarette will also be analyzed. According to the literature, a difference of at least 7.8% could be expected in current electronic cigarette use between current smokers and non-smokers [29, 38-40]. A sample of at least 280 participants would detect this difference with a power of 80% power and $\alpha = 0.05$.

The prevalence of experimentation of electronic cigarette use in studies ranges from 2.7 to 50.6% [15, 41]. The prevalence of use in the last 30 days ranges from 1.2 to 41% [15, 20]. According to the Health Barometer study, the prevalence of experimentation and current use in 2014 were respectively 26% and 6% in France [29]. It was necessary to include at least 385 participants in the study to estimate the prevalence of different types of electronic cigarette use with an accuracy of 5% and a confidence level of 95%. Finally, the aim was set for at least 385 subjects at the end of follow-up. Assuming an attrition rate of 40% between the beginning and the end of the study, at least 539 patients need to be included by the end of the recruitment stage. We managed to include 473 patients in October 2015.

Pilot study

A pilot study was conducted in April 2015 for one week in two general practices in Aquitaine that did not participate in the study. The two trainees in each pilot center explained the project to patients and asked them to complete the questionnaire as if they were actually going to participate in the study. Questionnaires, consent forms and information letters were available in the waiting rooms. At the end of the consultation, the trainees asked the patients to fill in a new short questionnaire. It assessed the clearness, accuracy and shortness of the information letter and the first questionnaire with Likert scales ranging from strongly agree to strongly disagree. The final option allowed patients to make free comments. The patients agreed to participate in the study (19 participants for 24 proposed questionnaires). The main reason for exclusion was the absence of information about guardianship or trusteeship for property. Minor changes were made to the letters and questionnaire based on this pilot study.

ETHICS AND DISSEMINATION

Each patient gave a written consent before to be included. The study protocol was approved by the local committee for the protection of persons of Bordeaux University (approval number: 2015-A00778-41). It was also approved by the National Commission for Data Processing and Freedoms (approval number: 1838811).

Findings will be introduced in different national or international conferences. We intend to submit our findings in peer-reviewed journals.

ACKNOWLEDGEMENTS

We thank Aurélie Lazès-Charmetant, a specialist in social communication, for revising the questionnaire and Ray Cooke for copyediting the manuscript.

FUNDING

This study was funded by the College of Aquitaine general practitioners/teachers. This sponsor had no influence on the study design, the collection, analysis or interpretation of data, on the writing of the manuscript or on the decision to submit it for a publication.

COMPETING INTERESTS

The authors have read and understood BMJ policy on declaration of interests and declare that they have no competing interests. All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

AUTHORS' CONTRIBUTIONS

SK is the principal investigator who conceived the study. SK, PC and BG contributed to the study design. FP was one of training supervisors who undertook patient recruitment. SK and CL wrote the manuscript. All authors read and approved the final version.

ETHICS APPROVAL

The Bordeaux University committee for the protection of persons and the National Commission for Data Processing and Freedoms.

DATA SHARING

Data will be available for all authors from the end of the cohort study by emailing the corresponding author.

REFERENCES

1. King BA, Patel R, Nguyen KH, et al. Trends in awareness and use of electronic cigarettes among US adults, 2010–2013. Nicotine Tob Res 2015;17(2):219–27.
2. King BA, Alam S, Promoff G, et al. Awareness and ever-use of electronic cigarettes among U.S. adults, 2010-2011. Nicotine Tob Res 2013;15(9):1623–7.
3. Gravely S, Fong GT, Cummings KM, et al. Awareness, trial, and current use of electronic cigarettes in 10 countries: findings from the ITC Project. Int J Environ Res Public Health 2014;11(11):11691–704.
4. Martínez-Sánchez JM, Ballbè M, Fu M, et al. Electronic cigarette use among adult population: a cross-sectional study in Barcelona, Spain (2013–2014). BMJ Open 2014;4(8):e005894.
5. Vardavas CI, Filippidis FT, Agaku IT. Determinants and prevalence of e-cigarette use throughout the European Union: a secondary analysis of 26 566 youth and adults from 27 countries. Tob Control 2015;24(5):442-8.
6. Hajek P, Etter JF, Benowitz N, et al. Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit: Electronic cigarettes: a review. Addiction 2014;109(11):1801–10.
7. Farsalinos KE, Polosa R. Safety evaluation and risk assessment of electronic cigarettes as tobacco cigarette substitutes: a systematic review. Ther Adv Drug Saf 2014;5(2):67–86.
8. Oh AY, Kacker A. Do electronic cigarettes impart a lower potential disease burden than conventional tobacco cigarettes? Review on e-cigarette vapor versus tobacco smoke. The Laryngoscope 2014;124(12):2702–6.
9. Pokhrel P, Little MA, Fagan P, et al. Correlates of use of electronic cigarettes versus nicotine replacement therapy for help with smoking cessation. Addict Behav 2014;39(12):1869–73.

10. Pearson JL, Richardson A, Niaura RS, et al. e-Cigarette Awareness, Use, and Harm Perceptions in US Adults. Am J Public Health 2012;102(9):1758–66.

11. Rutten LJF, Blake KD, Agunwamba AA, et al. Use of e-cigarettes among current smokers: associations among reasons for use, quit intentions, and current tobacco use. Nicotine Tob Res 2015;17(10):1228-34.

12. Giovenco DP, Lewis MJ, Delnevo CD. Factors associated with e-cigarette use: a national population survey of current and former smokers. Am J Prev Med 2014;47(4):476–80.

13. Czoli CD, Hammond D, White CM. Electronic cigarettes in Canada: prevalence of use and perceptions among youth and young adults. Can J Public Health 2014;105(2):e97–102.

14. Brown J, West R, Beard E, et al. Prevalence and characteristics of e-cigarette users in Great Britain: Findings from a general population survey of smokers. Addict Behav 2014;39(6):1120–5.

15. Regan AK, Promoff G, Dube SR, et al. Electronic nicotine delivery systems: adult use and awareness of the "e-cigarette" in the USA. Tob Control 2013;22(1):19–23.

16. Popova L, Ling PM. Alternative tobacco product use and smoking cessation: a national study. Am J Public Health 2013;103(5):923–30.

17. Gallus S, Lugo A, Pacifici R, et al. E-cigarette awareness, use, and harm perceptions in Italy: a national representative survey. Nicotine Tob Res 2014;16(12):1541–8.

18. Berg CJ, Haardoerfer R, Escoffery C, et al. Cigarette users' interest in using or switching to electronic nicotine delivery systems for smokeless tobacco for harm reduction, cessation, or novelty: a cross-sectional survey of US adults. Nicotine Tob Res 2015;17(2):245–55.

19. Adkison SE, O'Connor RJ, Bansal-Travers M, et al. Electronic nicotine delivery systems: international tobacco control four-country survey. Am J Prev Med 2013;44(3):207–15.

20. Ramo DE, Young-Wolff KC, Prochaska JJ. Prevalence and correlates of electronic-cigarette use in young adults: Findings from three studies over five years. Addict Behav 2015;41:142–7.

21. Christensen T, Welsh E, Faseru B. Profile of e-cigarette use and its relationship with cigarette quit attempts and abstinence in Kansas adults. Prev Med 2014;69C:90–4.

22. Goniewicz ML, Lingas EO, Hajek P. Patterns of electronic cigarette use and user beliefs about their safety and benefits: an internet survey. Drug Alcohol Rev 2013;32(2):133–40.

23. Dawkins L, Turner J, Roberts A, et al. "Vaping" profiles and preferences: an online survey of electronic cigarette users. Addiction 2013;108(6):1115–25.

24. Etter JF, Bullen C. Electronic cigarette: users profile, utilization, satisfaction and perceived efficacy. Addiction 2011;106(11):2017–28.

25. Schmidt L, Reidmohr A, Harwell TS, et al. Prevalence and reasons for initiating use of electronic cigarettes among adults in Montana, 2013. Prev Chronic Dis. Published Online First: 20 November 2014. doi: 10.5888/pcd11.140283

26. Pokhrel P, Herzog TA, Muranaka N, et al. Young adult e-cigarette users' reasons for liking and not liking e-cigarettes: a qualitative study. Psychol Health 2015;1–35.

27. Kong G, Morean ME, Cavallo DA, et al. Reasons for electronic cigarette experimentation and discontinuation among adolescents and young adults. Nicotine Tob Res 2015;17(7):847-54.

28. Pepper JK, Ribisl KM, Emery SL, et al. Reasons for starting and stopping electronic cigarette use. Int J Environ Res Public Health 2014;11(10):10345–61.

29. Andler R, Guignard R, Wilquin JL, et al. Electronic cigarette use in France in 2014. Int J Public Health. Published Online First: 21 December 2015. doi: 10.1007/s00038-015-0773-9.

30. Etter JF, Le Houezec J, Perneger TV. A self-administered questionnaire to measure dependence on cigarettes: the Cigarette Dependence Scale. Neuropsychopharmacology 2003;28(2):359–70.

31. Etter JF. A comparison of the content-, construct- and predictive validity of the cigarette dependence scale and the Fagerström test for nicotine dependence. Drug Alcohol Depend 2005;77(3):259–68.

32. Etter JF, Le Houezec J, Huguelet P, et al. Testing the Cigarette Dependence Scale in 4 samples of daily smokers: psychiatric clinics, smoking cessation clinics, a smoking cessation website and in the general population. Addict Behav 2009;34(5):446–50.

33. Bush K, Kivlahan DR, McDonell MB, et al. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. Arch Intern Med 1998;158(16):1789–95.

34. Gache P, Michaud P, Landry U, et al. The Alcohol Use Disorders Identification Test (AUDIT) as a screening tool for excessive drinking in primary care: reliability and validity of a French version. Alcohol Clin Exp Res 2005;29(11):2001–7.

35. Legleye S, Piontek D, Kraus L. Psychometric properties of the Cannabis Abuse Screening Test (CAST) in a French sample of adolescents. Drug Alcohol Depend 2011;113(2–3):229–35.

36. Legleye S, Piontek D, Kraus L, et al. A validation of the Cannabis Abuse Screening Test (CAST) using a latent class analysis of the DSM-IV among adolescents. Int J Methods Psychiatr Res 2013;22(1):16–26.

37. Legleye S, Kraus L, Piontek D, et al. Validation of the Cannabis Abuse Screening Test in a sample of cannabis inpatients. Eur Addict Res 2012;18(4):193–200.

38. Wang B, King BA, Corey CG, et al. Awareness and use of non-conventional tobacco products among U.S. students, 2012. Am J Prev Med 2014;47(2 Suppl 1):S36–52.

39. Choi K, Forster JL. Beliefs and experimentation with electronic cigarettes: a prospective analysis among young adults. Am J Prev Med 2014;46(2):175–8.

40. Goniewicz ML, Zielinska-Danch W. Electronic cigarette use among teenagers and young adults in Poland. Pediatrics 2012;130(4):e879–85.

41. Hendricks PS, Cases MG, Thorne CB, et al. Hospitalized smokers' expectancies for electronic cigarettes versus tobacco cigarettes. Addict Behav 2015;41:106–11.

FIGURES LEGENDS:

Figure 1: Flow chart of trainee recruitment in *e*-TAC study (France).

Figure 2: Data collection in *e*-TAC study (France).

SUPPLEMENTARY MATERIAL:

Supplementary file 1: design and validation of baseline questionnaire.

supplementary_file1.pdf

Supplementary file 2: Data collected on factors related to smoking, use of alcohol or cannabis in e-TAC study (France).

supplementary_file2.pdf

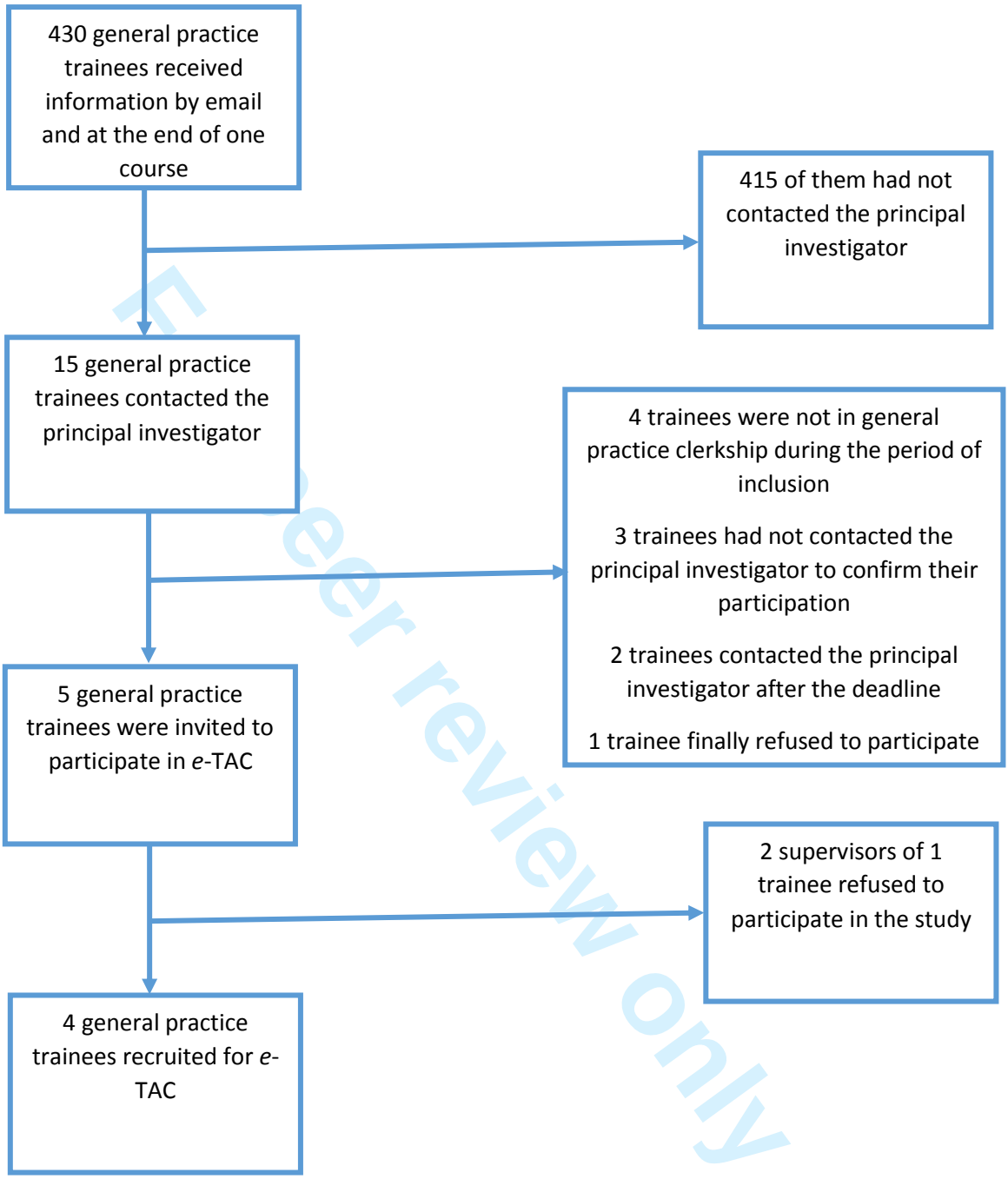

Figure 1: Flow chart of trainee recruitment in *e*-TAC study (France).

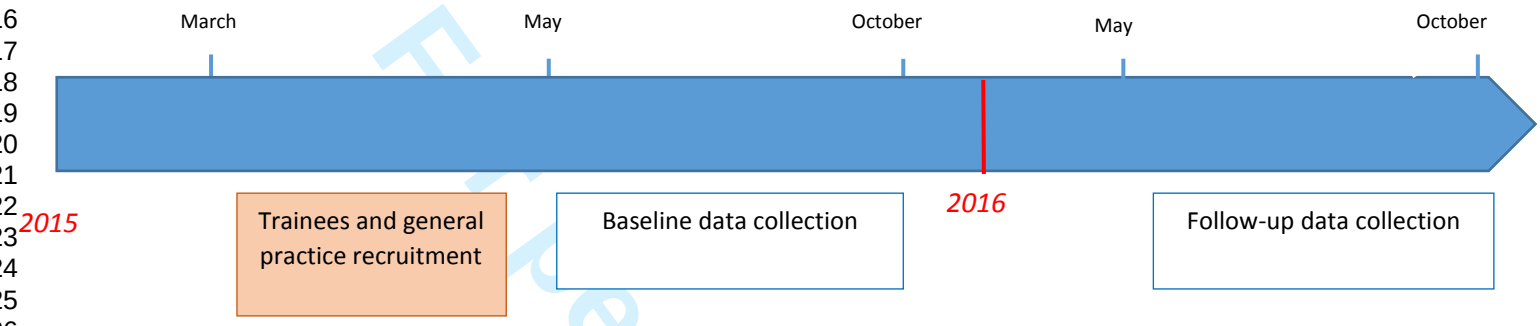

Figure 2: data collection in *e*-TAC study (France).

Supplementary file 1: design and validation of baseline questionnaire

The baseline questionnaire was initially developed with reference to the literature, particularly regarding the definitions of experimentation and current use of electronic cigarettes. Some questions were formulated identically to those already in the Health Barometer 2014 study in order to have comparable data. The Health Barometer 2014 study is a descriptive cross-national study which focused in part on the use of electronic cigarettes in the French general population. The questions about smoking, alcohol use or cannabis use included are provided by scores validated in primary care: Cigarette dependence scale-5 (CDS-5), Alcohol use disorders test (AUDIT) and Cannabis abuse screening test (CAST). Questions exploring socioeconomic factors were chosen with the help of three general practitioners working on the theme of health social inequalities in France: Drs Claire Rondet, Sophia Chatelard and Alan Charissou.

The first version of the questionnaire was submitted to the expertise of a specialist in social communication to assess its comprehensibility. She proposed modifications that were validated by the steering committee of the study.

Then, the questionnaire was used in a pilot study to assess its feasibility and acceptability to patients. The pilot study was performed in two general practices in April 2015 for 1 week. It was described in the article. Further changes were made to the questionnaire, the information letter and display by the steering committee after this pilot study.

The same process is planned between February and April 2016 for the follow-up questionnaire.

Supplementary file 2: Data collected on factors related to smoking, use of alcohol or cannabis in e-TAC study (France).

Products studied	Issues	Notices
Smoking	Have you ever tried smoking tobacco (cigarettes, cigars, pipes, rolling tobacco, cigarillos, hookah, etc.) at least once in your life? Yes □ No □	
	How old were you when you tried to smoke tobacco for the first time? .... years	
	Have you smoked tobacco in the last 30 days? Yes □ No □	
	Are you a current smoker (daily or occasionally)? No, I have never smoked □ No, I'm a former smoker □ Yes □	
	On average, how often do you smoke tobacco? Everyday □ Less than once /day □ Less than once/week □ Less than once/month □	
	Please rate your addiction to cigarettes on a scale of 0–100 I am not addicted to cigarettes at all □ I am extremely addicted to cigarettes=100 □	**CDS-5**
	On average, how many cigarettes do you smoke per day? 0-5 cigarettes/day □ 6-10 cigarettes/day □ 11-20 cigarettes/day □ 21-29 cigarettes/day □ 30 cigarettes/day or more □	
	Usually, how soon after waking up do you smoke your first cigarette? 0-5 minutes □ 6-15 minutes □ 16-30 minutes □ 21-29 minutes □ 61 minutes or more □	
	For you, quitting smoking for good would be Impossible □ Very difficult □ Fairly difficult □ Fairly easy □ Very easy □	
	Please indicate whether you agree with each of the following statements: *"after a few hours without smoking, I feel an irresistible urge to smoke"* Totally disagree □ Somewhat disagree □ Fairly difficult □ Neither agree nor disagree □ Somewhat agree □ Fully agree □	

	Are you using the electronic cigarette while continuing smoking? Yes and I mostly use electronic cigarettes as tobacco □ Yes and I also often use electronic cigarettes as tobacco □ Yes I smoke more often than using the electronic cigarette □ No, I do not use electronic cigarettes □	
	Do you want to quit smoking? No □ Yes and I am trying to stop □ Yes but in the year □ Yes but later □ I do not know □	
Alcohol	How often do you have a drink containing alcohol (wine, beer, whiskey, vodka, tequila, etc.)? Never □ Once a month or less □ Two to four times a month □ Two or three times a week □ Four or more times a week □	
	How many drinks containing alcohol do you have on a typical day when you are drinking? 1 or 2 □ 3 or 4 □ 5 or 6 □ 7 to 9 □ 10 or more □	**AUDIT-C**
	How often do you have six or more drinks on one occasion? Never □ Once a month or less □ Monthly □ Weekly □ Daily or almost daily □	
	Have you been drunk in the last 12 months? Yes □ No □	
Cannabis	Have you ever used cannabis at least once in your life (hash, marijuana, etc.)? Yes □ No □	
	How old were you when you used cannabis for the first time? … years	
	Have you used cannabis in the last 12 months? Yes □ No □	
	How many times have you used it in the last 12 months? … times	
	Have you smoked cannabis when you were alone in the last 12 months? Yes □ No □	
	Have you had memory problems when you smoked cannabis in the last 12 months? Yes □ No □	**CAST**
	Have friends or family members told you that you should reduce or stop your cannabis use in the last 12 months? Yes □ No □	

	Have you tried to reduce or stop your cannabis use without succeeding in the last 12 months? Yes □ No □	
	Have you had problems because of your cannabis use (argument, fight, accident, poor results at school, etc.) in the last 12 months? Yes □ No □	

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Factors and motivations associated with use of e-cigarette among primary care patients in a prospective cohort study: e-TAC study protocol.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-011488.R1
Article Type:	Protocol
Date Submitted by the Author:	06-Apr-2016
Complete List of Authors:	Kinouani, Shérazade; Université de Bordeaux, Département de médecine générale Castéra, Philippe; Université de Bordeaux, Département de médecine générale Laporte, Catherine; Université d'Auvergne, Département de médecine générale Pétrègne, François; Université de Bordeaux, Département de médecine générale Gay, Bernard; Université de Bordeaux, Département de médecine générale
Primary Subject Heading:	Smoking and tobacco
Secondary Subject Heading:	General practice / Family practice
Keywords:	Electronic cigarette, smoking, socioeconomic factors, cohort study, primary health care

TITLE: Factors and motivations associated with use of e-cigarette among primary care patients in a prospective cohort study: *e*-TAC study protocol.

AUTHORS: Kinouani Shérazade[1,2,3], Castéra Philippe[1] , Laporte Catherine[4,5], Pétrègne François[1], Gay Bernard[1]

Kinouani Shérazade

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

[2] Univ. Bordeaux, U897, F-33000 Bordeaux, France

[3] INSERM, Neuroepidemiology U897, F-33000, Bordeaux, France

sherazade.kinouani@u-bordeaux.fr

Castéra Philippe

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

philippe.castera@u-bordeaux.fr

Laporte Catherine

[4]Department of General Medicine, Faculty of Medicine, Clermont-Ferrand, France

[5]Clermont Université, Université d'Auvergne, EA 7280, NPsy-Sydo (Neuro-Psycho-pharmacologie des Systèmes Dopaminergiques sous-corticaux), Clermont-Ferrand, France

catherinelaporte63@gmail.com

Pétrègne François

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

francois.petregne@u-bordeaux.fr

Gay Bernard

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

bernard.gay@u-bordeaux.fr

Corresponding author

Kinouani Shérazade

Université de Bordeaux

Département de Médecine générale

146, rue Léo Saignat

Case 148

33076 Bordeaux Cedex France

sherazade.kinouani@u-bordeaux.fr

Phone: + (33)6.10.29.68.47

The Corresponding author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence on a worldwide basis to the BMJ Publishing Group Ltd to permit this article (if accepted) to be published in BMJ editions and any other BMJPGL products and sublicences such use and exploit all subsidiary rights, as set out in our licence. She is the lead author. So, she affirms that this manuscript is an honest, accurate and transparent account of the study taking place and that no important aspects of the study have been omitted.

ABSTRACT

Introduction: While the relationship between electronic cigarette use and smoking has often been studied, the association between electronic cigarette use and socioeconomic factors has received less attention. This is a study protocol aiming to describe the relationship between the consumption of psychoactive products (in particular: smoking) or some socioeconomic factors and the evolution of the use of electronic cigarette in primary health care over one year.

Methods and analysis: *e*-TAC is a prospective multi-site cohort study, including 473 patients at baseline and carrying out in general practices in the Aquitaine area (France). The volunteer patients participated in the study regardless of their initial reason for consultation. They filled out a self-administered questionnaire at baseline and will also do so after 12 months by phone, email or letter. The study will focus on the factors that explain the experimentation with or the current use of the electronic cigarette, as well as factors associated with their evolutions over time using multivariate logistic regression modeling or Cox regression modeling.

Ethics and dissemination: This study received ethical approval from the University of Bordeaux committee for the protection of persons. It was also approved by the National Commission for Data Processing and Freedoms. Findings will be submitted for publication in peer-reviewed journals and we will disseminate them by presentations at national or international conferences.

KEYWORDS

Electronic cigarette, smoking, socioeconomic factors, cohort study, primary health care.

WORD COUNT: 2961 words

STRENGTHS AND LIMITATIONS OF THIS STUDY

-To the best of our knowledge, it is the first cohort study about the electronic cigarette use carrying out in general practices in France.

-The trainees' involvement in the recruitment of patients will probably improve the feasibility of the study. Thanks to their involvement and enthusiasm, the study will not represent an excessive workload for their supervisors.

-The study will focus on socioeconomic factors that may determine the use of electronic cigarettes. It will describe their use based not only on smoking but also on the consumption of alcohol and cannabis. When relevant, it will also examine this use in subgroups of the French population. These factors and sub-group analyses have received little attention to date.

-The selection bias will be reduced by the online questionnaire proposed at 12 months. Furthermore, to minimize loss to follow up, three forms of communications will be used: letter, e-mail and phone.

-This is a prospective study on a small sample so the sample size of 473 subjects and a 1-year follow-up period were established for reasons of feasibility. Causal relations can't be inferred.

INTRODUCTION

Electronic cigarettes (or e-cigarettes) are battery-operated devices that provide an aerosol for inhalation that sometimes contains nicotine. Their use is increasing worldwide and mainly concerns smokers [1-5]. Although their long-term health effects are unknown, their use might be less harmful than smoking according to experimental studies although this remains to be confirmed in clinical research studies [6–8].

While the relationship between smoking and electronic cigarette use has been studied several times, the relationship between electronic cigarette use and socioeconomic factors such as education level or occupational category are less clear [1, 4, 9–19].

The main reason reported for electronic cigarette use is the desire to stop smoking [9, 11, 14, 16, 18, 20–24]. However, other reasons are sometimes declared, particularly in young adults: the desire to use a product delivering nicotine but which is less harmful than smoking, curiosity, the search for a new experience, the lower cost compared to smoking, the feeling of regulating one's use, etc.[11, 23–28]. To our knowledge, no prospective studies specifically focusing on electronic cigarette use among the elderly or people with chronic diseases have been published, nor have any on electronic cigarette use among people using several products such as alcohol, tobacco and cannabis.

The Health Barometer study is a repeated French cross-sectional survey carried out over the phone. Samples were taken among a random representative French population aged 15–75 years. According to this study, 26% of the French population had tried an electronic cigarette and 6% were current users in 2014 [29]. As in many other countries, electronic cigarettes were mainly used by smokers and former smokers. According to these authors, the socioeconomic factors associated with the electronic cigarette use among smokers in France were: income level, occupational status and socio-professional category [29].

The main objective of this study is to describe among experimenters of at least one substance (tobacco, alcohol, cannabis, or electronic cigarette) the factors associated with the evolution of electronic cigarette use over 12 months: factors associated with the transition from non-use to experimentation; factors associated with the transition from experimentation to current use; factors associated with cessation of use. The secondary objective is to describe the factors associated with experimentation and current use of electronic cigarettes. The third objective is to describe the frequency of motivations reported for electronic cigarette use and those associated with the most common motivations.

METHODS AND ANALYSIS

The *e*-TAC study is a multicenter, prospective, observational cohort study currently that has been underway for one year in Aquitaine, South-West France.

Recruitment

The recruitment is almost finished and took place from May until October 2015 in eight general practices. It was performed in two steps: first, recruitment of general practices; second, recruitment of eligible patients.

Recruitment of general practices

Each general practice trainee in Bordeaux University does an internship in three different GPs offices for at least six months. An e-mail describing the *e*-TAC project was sent to all 430 trainees in their second or third year of specialization in Bordeaux University at the beginning of March 2015. Trainees who intended to do their internship from May to October 2015 and willing to help recruit patients during this period were invited to contact the first author (SK). Another author (BG) also talked to the trainees about the *e*-TAC project during general

practice courses at the end of March 2015. The trainees' recruitment is explained in Figure 1. Fifteen volunteer trainees contacted SK. She selected five of them as *e*-TAC investigators on the basis of their motives and internship locations. The steering committee decided that the study should take place only in two locations per trainee so that they could continue to learn general practice without being overloaded by the requirements of the study. SK sent the study protocol by email to trainees and then, she met each of them in individual interviews. She explained to them the protocol and answered to their requests during this meeting. SK also organized a meeting with the five trainees and taught them how to explain the study to the patients. She showed them the various documents for the patients and trained them to inform patients during a role-play.

At the beginning of March 2015, SK sent an e-mail to all GPs who usually were training supervisors in general practice in Aquitaine in order to explain the study to them. The e-mail also informed them that some future trainees would be participating as investigators. After the meetings between SK and the five selected trainees, she sent a new e-mail to inform the 10 supervisors concerned that their future students were willing to participate. She proposed a phone conversation to talk about it and obtain their oral agreement. Two training supervisors of the same trainee refused to participate. In the end, 4 trainees and their 8 training supervisors in general practice accepted to participate. Patient recruitment was conducted by these 4 trainees and their 8 supervisors. These 8 private general practices are the investigation centers of the study.

Recruitment of patients

Eligible patients were then recruited. The target population was patients followed by GPs. The sample consisted of patients who met the following inclusion criteria: older than 18 years; agree to participate by signing and dating a consent form; must understand French; be

able to fill in a questionnaire on paper; must attend a consultation in one of the 8 investigation centers regardless of the reason for the consultation; must have completed the self-administered questionnaire for inclusion (totally or partly); must have smoked tobacco or drunk alcohol or used cannabis or used an electronic cigarette at least once in their lifetime. Patients under guardianship or trusteeship for property were excluded. Patients seen at home visits were excluded.

A large poster and flyers announced the study in the waiting rooms of the investigation centers. The questionnaires were available in the waiting rooms with detailed letters of information and consent forms. If they requested it, the patients received a full explanation of the study from the trainees. Each volunteer patient filled in a consent form and a questionnaire and then put them in two separate boxes in the waiting room.

Data collection

All data were collected on a declarative basis. Baseline data were collected from May to October 2015 using a self-administered paper questionnaire designed by SK, PC and BG. It was amended by a specialist in social communication who had validated it in a pilot study. The design and process for validating the baseline paper questionnaire is shown in an additional file (see supplementary file 1 online). Before the start of the study, the first author sent an Excel® file to the students and taught them how to transcribe data collected with the paper questionnaire. She also checked the quality of data collection and resolved the trainees' problems by conference call once a month during the study.

Follow-up data will be collected by the same trainees on average 12 months later, from May to October 2016. A link to an online questionnaire will be sent to all patients who agreed to give their e-mails for inclusion with Mailchimp®. This questionnaire will be created with LimeSurvey® software. Reminders will be sent out once a week in the absence of answers.

After 4 reminders or in the absence of an e-mail address, the follow-up questionnaire will be sent by post with a postage-paid envelope. In the absence of any answer by e-mail or by post, patients having given a phone number will be contacted by phone by trainees. They will be asked to say how they wish to receive the follow-up questionnaire and if they still wish to participate. If they no longer wish to participate, the reasons for non-participation will be requested. Trainees will call patients in blind without knowing their characteristics at baseline. Inclusion and follow-up are illustrated in Figure 2.

Each patient received an identification number at baseline that was written on the questionnaire and the consent form. Once both forms were in the two separate boxes, the analysis of baseline data became anonymous.

Outcomes and covariates

The main outcome is the evolution of electronic cigarette use over 12 months. This evolution will be studied in three ways: transition from non-use to experimented use at 12 months; transition from experimented use to current use at 12 months; transition from current use to cessation at 12 months. Experimented use is defined as reporting use at least once in a lifetime. Current use is defined as reporting ongoing use at the time of the survey, either occasionally or regularly. Experimentation and current use will be explored through two binary variables.

Six exposure factors will be studied: 1) demographic factors at baseline such as age (continuous variable), living in rural or urban area and sex; 2) factors related to smoking, the use of alcohol or cannabis, collected at baseline and after 12 months (see supplementary file 2 online). Nicotine dependence will be explored by the Cigarette Dependence Scale-5 (CDS-5) developed by Jean-François Etter. It was preferred to the Fagerström test for Nicotine Dependence owing to its better psychometric properties [30–32]. The first three questions of

the Alcohol Use DIsorders Test (AUDIT) will be used to explore the problematic use of alcohol [33, 34]. The problematic use of cannabis in the 12 months prior to the survey will be explored by 5 questions from the Cannabis Abuse Screening Test (CAST). This tool was developed in 2002 by the "*Observatoire Français des Drogues et des Toxicomanies*", a national non-profit public interest group with a scientific mission. Its psychometric properties have mostly been studied among adolescents [35–37]; 3) socioeconomic factors at baseline (categorical variables): occupational status, education level, marital status, housing status and current opinion of one's own financial situation; 4) presence of chronic diseases at baseline and at 12 months: migraine, hypertension, diabetes, cardiovascular diseases, sleep disorders, asthma, other respiratory diseases, cancer; 5) motivations for taking part in the electronic cigarette experiment, collected at baseline and at 12 months (multiple choice question); 6) motivations for current electronic cigarette use at baseline at 12 months (multiple choice question).

Statistical analysis

All estimates will be calculated on the total sample and in sub-group if relevant: young adults (18-30 years), premenopausal women (18 to 50 years old), the elderly (75 years and more), people with at least a chronic disease, people who use at least two of the following products: alcohol, tobacco, cannabis. Simple descriptive statistics will be used to describe each variable at baseline or 12 months: mean, standard deviation, median for continuous variables; number and proportion for categorical or binary variables.

Three comparisons will be made to answer the main objective. The first will compare non-users who will have evolved into experimented users to non-users whose status is unchanged at 12 months. The second will compare experimented users at baseline who become current users in 12 months to experimented users whose status is unchanged. The third will compare

current users at baseline who have stopped their use at 12 months to those whose status is unchanged.

Three others comparisons will be made to answer the second objective. These comparisons will be performed at baseline and then at 12 months. First, the experimenters of the electronic cigarette will be compared with non-users. They will then be compared to current users. Third, non-users will be compared to current users. In the end, the prevalence of the various motivations for electronic cigarette use will be estimated for experimentation and then for current use with their 95% confidence intervals. The factors associated with the most common motivations for each use will be analyzed.

Univariate and multivariate analyses will also be performed. The Student t-test or the non-parametric test will be used for univariate analysis of continuous variables. Univariate comparison of proportions will be performed using the chi-square test. Fisher's exact test will be used when the theoretical count in cells is less than 5. Multivariate comparisons will be performed by modeling with Cox regression for the main objective and logistic regression with fixed effects for the second objective. Patients with missing data on their electronic cigarette use at baseline will not be included in the models. Stratified analyses by age, sex or smoking status will also be carried out if relevant. Significance will be set to .05 and all tests will be two-tailed.

A strategy of missing data management is planned with multiple imputation. Sensitivity analyses will be performed to compare the results with complete data and those after multiple imputation.

Sample size calculation

Since several hypotheses are studied, it was difficult to calculate a minimum sample size. The relationship between smoking and electronic cigarette will also be analyzed. According to the

literature, a difference of at least 7.8% could be expected in current electronic cigarette use between current smokers and non-smokers [29, 38-40]. A sample of at least 280 participants would detect this difference with a power of 80% power and $\alpha = 0.05$.

The prevalence of experimentation of electronic cigarette use in studies ranges from 2.7 to 50.6% [15, 41]. The prevalence of use in the last 30 days ranges from 1.2 to 41% [15, 20]. According to the Health Barometer study, the prevalence of experimentation and current use in 2014 were respectively 26% and 6% [29].

It was necessary to include at least 385 participants in the study to estimate the prevalence of different types of electronic cigarette use with an accuracy of 5% and a confidence level of 95%. Finally, the aim was set for at least 385 subjects at the end of follow-up. Assuming an attrition rate of 40% between the beginning and the end of the study, at least 539 patients need to be included by the end of the recruitment stage. We managed to include 473 patients in October 2015.

Pilot study

A pilot study was conducted in April 2015 for one week in two general practices in Aquitaine that did not participate in the study. The two trainees in each pilot center explained the project to patients and asked them to complete the questionnaire as if they were actually going to participate in the study. Questionnaires, consent forms and information letters were available in the waiting rooms. At the end of the consultation, the trainees asked the patients to fill in a new short questionnaire. It assessed the clearness, accuracy and shortness of the information letter and the first questionnaire with Likert scales ranging from strongly agree to strongly disagree. The final option allowed patients to make free comments. The patients agreed to participate in the study (19 participants for 24 proposed questionnaires). The main reason for

exclusion was the absence of information about guardianship or trusteeship for property. Minor changes were made to the letters and questionnaire based on this pilot study.

ETHICS AND DISSEMINATION

Each patient gave a written consent before to be included. The study protocol was approved by the local committee for the protection of persons of Bordeaux University (approval number: 2015-A00778-41). It was also approved by the National Commission for Data Processing and Freedoms (approval number: 1838811).

Findings will be introduced in different national or international conferences. We intend to submit our findings in peer-reviewed journals.

ACKNOWLEDGEMENTS

We thank Aurélie Lazès-Charmetant, a specialist in social communication, for revising the questionnaire and Ray Cooke for copyediting the manuscript. We thank the eight training supervisors: Dr Allaire-Sauquet, Dr Carre, Dr Farcinelli, Dr Farina, Dr Gainard, Dr Jourde, Dr Labadie-Monnier, Dr Petrègne.

FUNDING

This study was funded by the College of Aquitaine general practitioners/teachers. This sponsor had no influence on the study design, the collection, analysis or interpretation of data, on the writing of the manuscript or on the decision to submit it for a publication.

COMPETING INTERESTS

The authors have read and understood BMJ policy on declaration of interests and declare that they have no competing interests. All authors have completed the ICMJE uniform disclosure

form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

AUTHORS' CONTRIBUTIONS

SK is the principal investigator who conceived the study. SK, PC and BG contributed to the study design. FP was one of training supervisors who undertook patient recruitment. SK and CL wrote the manuscript. All authors read and approved the final version.

ETHICS APPROVAL

The Bordeaux University committee for the protection of persons and the National Commission for Data Processing and Freedoms.

DATA SHARING

Data will be available for all authors from the end of the cohort study by emailing the corresponding author.

REFERENCES

1. King BA, Patel R, Nguyen KH, et al. Trends in awareness and use of electronic cigarettes among US adults, 2010–2013. Nicotine Tob Res 2015;17(2):219–27.

2. King BA, Alam S, Promoff G, et al. Awareness and ever-use of electronic cigarettes among U.S. adults, 2010-2011. Nicotine Tob Res 2013;15(9):1623–7.

3. Gravely S, Fong GT, Cummings KM, et al. Awareness, trial, and current use of electronic cigarettes in 10 countries: findings from the ITC Project. Int J Environ Res Public Health 2014;11(11):11691–704.

4. Martínez-Sánchez JM, Ballbè M, Fu M, et al. Electronic cigarette use among adult population: a cross-sectional study in Barcelona, Spain (2013–2014). BMJ Open 2014;4(8):e005894.

5. Vardavas CI, Filippidis FT, Agaku IT. Determinants and prevalence of e-cigarette use throughout the European Union: a secondary analysis of 26 566 youth and adults from 27 countries. Tob Control 2015;24(5):442-8.

6. Hajek P, Etter JF, Benowitz N, et al. Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit: Electronic cigarettes: a review. Addiction 2014;109(11):1801–10.

7. Farsalinos KE, Polosa R. Safety evaluation and risk assessment of electronic cigarettes as tobacco cigarette substitutes: a systematic review. Ther Adv Drug Saf 2014;5(2):67–86.

8. Oh AY, Kacker A. Do electronic cigarettes impart a lower potential disease burden than conventional tobacco cigarettes? Review on e-cigarette vapor versus tobacco smoke. Laryngoscope 2014;124(12):2702–6.

9. Pokhrel P, Little MA, Fagan P, et al. Correlates of use of electronic cigarettes versus nicotine replacement therapy for help with smoking cessation. Addict Behav 2014;39(12):1869–73.

10. Pearson JL, Richardson A, Niaura RS, et al. e-Cigarette Awareness, Use, and Harm Perceptions in US Adults. Am J Public Health 2012;102(9):1758–66.

11. Rutten LJF, Blake KD, Agunwamba AA, et al. Use of e-cigarettes among current smokers: associations among reasons for use, quit intentions, and current tobacco use. Nicotine Tob Res 2015;17(10):1228-34.

12. 12. Giovenco DP, Lewis MJ, Delnevo CD. Factors associated with e-cigarette use: a national population survey of current and former smokers. Am J Prev Med 2014;47(4):476–80.

13. 13. Czoli CD, Hammond D, White CM. Electronic cigarettes in Canada: prevalence of use and perceptions among youth and young adults. Can J Public Health 2014;105(2):e97–102.

14. 14. Brown J, West R, Beard E, et al. Prevalence and characteristics of e-cigarette users in Great Britain: Findings from a general population survey of smokers. Addict Behav 2014;39(6):1120–5.

15. 15. Regan AK, Promoff G, Dube SR, et al. Electronic nicotine delivery systems: adult use and awareness of the "e-cigarette" in the USA. Tob Control 2013;22(1):19–23.

16. 16. Popova L, Ling PM. Alternative tobacco product use and smoking cessation: a national study. Am J Public Health 2013;103(5):923–30.

17. 17. Gallus S, Lugo A, Pacifici R, et al. E-cigarette awareness, use, and harm perceptions in Italy: a national representative survey. Nicotine Tob Res 2014;16(12):1541–8.

18. 18. Berg CJ, Haardoerfer R, Escoffery C, et al. Cigarette users' interest in using or switching to electronic nicotine delivery systems for smokeless tobacco for harm reduction, cessation, or novelty: a cross-sectional survey of US adults. Nicotine Tob Res 2015;17(2):245–55.

19. 19. Adkison SE, O'Connor RJ, Bansal-Travers M, et al. Electronic nicotine delivery systems: international tobacco control four-country survey. Am J Prev Med 2013;44(3):207–15.

20. 20. Ramo DE, Young-Wolff KC, Prochaska JJ. Prevalence and correlates of electronic-cigarette use in young adults: Findings from three studies over five years. Addict Behav 2015;41:142–7.

21. 21. Christensen T, Welsh E, Faseru B. Profile of e-cigarette use and its relationship with cigarette quit attempts and abstinence in Kansas adults. Prev Med 2014;69C:90–4.

22. 22. Goniewicz ML, Lingas EO, Hajek P. Patterns of electronic cigarette use and user beliefs about their safety and benefits: an internet survey. Drug Alcohol Rev 2013;32(2):133–40.

23. Dawkins L, Turner J, Roberts A, et al. “Vaping” profiles and preferences: an online survey of electronic cigarette users. Addiction 2013;108(6):1115–25.

24. Etter JF, Bullen C. Electronic cigarette: users profile, utilization, satisfaction and perceived efficacy. Addiction 2011;106(11):2017–28.

25. Schmidt L, Reidmohr A, Harwell TS, et al. Prevalence and reasons for initiating use of electronic cigarettes among adults in Montana, 2013. Prev Chronic Dis. Published Online First: 20 November 2014. doi: 10.5888/pcd11.140283

26. Pokhrel P, Herzog TA, Muranaka N, et al. Young adult e-cigarette users’ reasons for liking and not liking e-cigarettes: a qualitative study. Psychol Health 2015;1–35.

27. Kong G, Morean ME, Cavallo DA, et al. Reasons for electronic cigarette experimentation and discontinuation among adolescents and young adults. Nicotine Tob Res 2015;17(7):847-54.

28. Pepper JK, Ribisl KM, Emery SL, et al. Reasons for starting and stopping electronic cigarette use. Int J Environ Res Public Health 2014;11(10):10345–61.

29. Andler R, Guignard R, Wilquin JL, et al. Electronic cigarette use in France in 2014. Int J Public Health. Published Online First: 21 December 2015. doi: 10.1007/s00038-015-0773-9.

30. Etter JF, Le Houezec J, Perneger TV. A self-administered questionnaire to measure dependence on cigarettes: the Cigarette Dependence Scale. Neuropsychopharmacology 2003;28(2):359–70.

31. Etter JF. A comparison of the content-, construct- and predictive validity of the cigarette dependence scale and the Fagerström test for nicotine dependence. Drug Alcohol Depend 2005;77(3):259–68.

32. Etter JF, Le Houezec J, Huguelet P, et al. Testing the Cigarette Dependence Scale in 4 samples of daily smokers: psychiatric clinics, smoking cessation clinics, a smoking cessation website and in the general population. Addict Behav 2009;34(5):446–50.

33. Bush K, Kivlahan DR, McDonell MB, et al. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. Arch Intern Med 1998;158(16):1789–95.

34. Gache P, Michaud P, Landry U, et al. The Alcohol Use Disorders Identification Test (AUDIT) as a screening tool for excessive drinking in primary care: reliability and validity of a French version. Alcohol Clin Exp Res 2005;29(11):2001–7.

35. Legleye S, Piontek D, Kraus L. Psychometric properties of the Cannabis Abuse Screening Test (CAST) in a French sample of adolescents. Drug Alcohol Depend 2011;113(2–3):229–35.

36. Legleye S, Piontek D, Kraus L, et al. A validation of the Cannabis Abuse Screening Test (CAST) using a latent class analysis of the DSM-IV among adolescents. Int J Methods Psychiatr Res 2013;22(1):16–26.

37. Legleye S, Kraus L, Piontek D, et al. Validation of the Cannabis Abuse Screening Test in a sample of cannabis inpatients. Eur Addict Res 2012;18(4):193–200.

38. Wang B, King BA, Corey CG, et al. Awareness and use of non-conventional tobacco products among U.S. students, 2012. Am J Prev Med 2014;47(2 Suppl 1):S36–52.

39. Choi K, Forster JL. Beliefs and experimentation with electronic cigarettes: a prospective analysis among young adults. Am J Prev Med 2014;46(2):175–8.

40. Goniewicz ML, Zielinska-Danch W. Electronic cigarette use among teenagers and young adults in Poland. Pediatrics 2012;130(4):e879–85.

41. Hendricks PS, Cases MG, Thorne CB, et al. Hospitalized smokers' expectancies for electronic cigarettes versus tobacco cigarettes. Addict Behav 2015;41:106–11.

FIGURES LEGENDS:

Figure 1: Flow chart of trainee recruitment in *e*-TAC study (France).

Figure 2: Data collection in *e*-TAC study (France).

SUPPLEMENTARY MATERIAL:

Supplementary file 1: design and validation of baseline questionnaire.

supplementary_file1.pdf

Supplementary file 2: Data collected on factors related to smoking, use of alcohol or cannabis in e-TAC study (France).

supplementary_file2.pdf

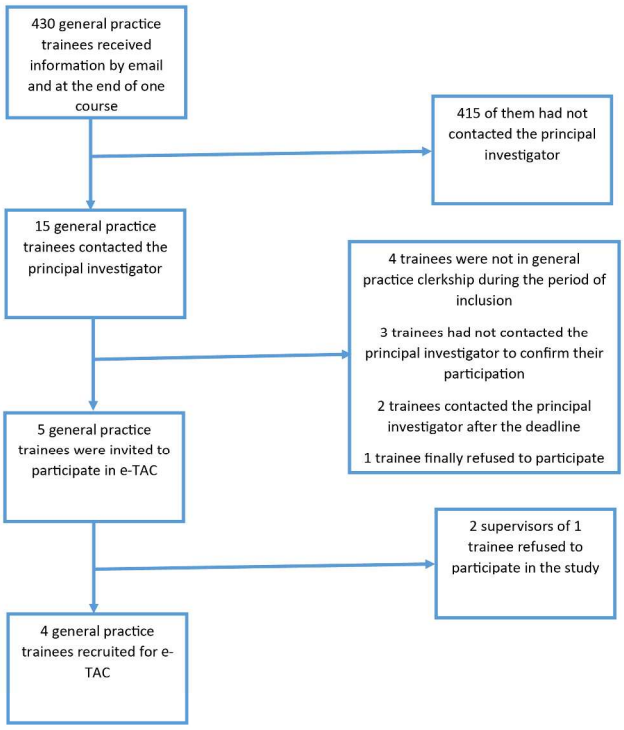

Figure 1: Flow chart of trainee recruitment in *e*-TAC study (France).

Figure 1: Flow chart of trainee recruitment in e-TAC study (France).
210x297mm (300 x 300 DPI)

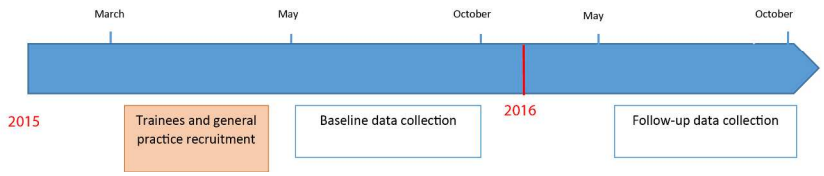

Figure 2: data collection in *e*-TAC study (France).

Figure 2: Data collection in e-TAC study (France).
210x297mm (300 x 300 DPI)

Supplementary file 1: design and validation of baseline questionnaire

The baseline questionnaire was initially developed with reference to the literature, particularly regarding the definitions of experimentation and current use of electronic cigarettes. Some questions were formulated identically to those already in the Health Barometer 2014 study in order to have comparable data. The Health Barometer 2014 study is a descriptive cross-national study which focused in part on the use of electronic cigarettes in the French general population. The questions about smoking, alcohol use or cannabis use included are provided by scores validated in primary care: Cigarette dependence scale-5 (CDS-5), Alcohol use disorders test (AUDIT) and Cannabis abuse screening test (CAST). Questions exploring socioeconomic factors were chosen with the help of three general practitioners working on the theme of health social inequalities in France: Drs Claire Rondet, Sophia Chatelard and Alan Charissou.

The first version of the questionnaire was submitted to the expertise of a specialist in social communication to assess its comprehensibility. She proposed modifications that were validated by the steering committee of the study.

Then, the questionnaire was used in a pilot study to assess its feasibility and acceptability to patients. The pilot study was performed in two general practices in April 2015 for 1 week. It was described in the article. Further changes were made to the questionnaire, the information letter and display by the steering committee after this pilot study.

The same process is planned between February and April 2016 for the follow-up questionnaire.

Supplementary file 2: Data collected on factors related to smoking, use of alcohol or cannabis in e-TAC study (France).

Products studied	Issues	Notices
Smoking	Have you ever tried smoking tobacco (cigarettes, cigars, pipes, rolling tobacco, cigarillos, hookah, etc.) at least once in your life? Yes □ No □	
	How old were you when you tried to smoke tobacco for the first time? .... years	
	Have you smoked tobacco in the last 30 days? Yes □ No □	
	Are you a current smoker (daily or occasionally)? No, I have never smoked □ No, I'm a former smoker □ Yes □	
	On average, how often do you smoke tobacco? Everyday □ Less than once /day □ Less than once/week □ Less than once/month □	
	Please rate your addiction to cigarettes on a scale of 0–100 I am not addicted to cigarettes at all □ I am extremely addicted to cigarettes=100 □	**CDS-5**
	On average, how many cigarettes do you smoke per day? 0-5 cigarettes/day □ 6-10 cigarettes/day □ 11-20 cigarettes/day □ 21-29 cigarettes/day □ 30 cigarettes/day or more □	
	Usually, how soon after waking up do you smoke your first cigarette? 0-5 minutes □ 6-15 minutes □ 16-30 minutes □ 21-29 minutes □ 61 minutes or more □	
	For you, quitting smoking for good would be Impossible □ Very difficult □ Fairly difficult □ Fairly easy □ Very easy □	
	Please indicate whether you agree with each of the following statements: *"after a few hours without smoking, I feel an irresistible urge to smoke"* Totally disagree □ Somewhat disagree □ Fairly difficult □ Neither agree nor disagree □ Somewhat agree □ Fully agree □	

	Are you using the electronic cigarette while continuing smoking? Yes and I mostly use electronic cigarettes as tobacco □ Yes and I also often use electronic cigarettes as tobacco □ Yes I smoke more often than using the electronic cigarette □ No, I do not use electronic cigarettes □	
	Do you want to quit smoking? No □ Yes and I am trying to stop □ Yes but in the year □ Yes but later □ I do not know □	
Alcohol	How often do you have a drink containing alcohol (wine, beer, whiskey, vodka, tequila, etc.)? Never □ Once a month or less □ Two to four times a month □ Two or three times a week □ Four or more times a week □	
	How many drinks containing alcohol do you have on a typical day when you are drinking? 1 or 2 □ 3 or 4 □ 5 or 6 □ 7 to 9 □ 10 or more □	**AUDIT-C**
	How often do you have six or more drinks on one occasion? Never □ Once a month or less □ Monthly □ Weekly □ Daily or almost daily □	
	Have you been drunk in the last 12 months? Yes □ No □	
Cannabis	Have you ever used cannabis at least once in your life (hash, marijuana, etc.)? Yes □ No □	
	How old were you when you used cannabis for the first time? … years	
	Have you used cannabis in the last 12 months? Yes □ No □	
	How many times have you used it in the last 12 months? … times	
	Have you smoked cannabis when you were alone in the last 12 months? Yes □ No □	
	Have you had memory problems when you smoked cannabis in the last 12 months? Yes □ No □	**CAST**
	Have friends or family members told you that you should reduce or stop your cannabis use in the last 12 months? Yes □ No □	

	Have you tried to reduce or stop your cannabis use without succeeding in the last 12 months? Yes □ No □	
	Have you had problems because of your cannabis use (argument, fight, accident, poor results at school, etc.) in the last 12 months? Yes □ No □	

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Factors and motivations associated with use of e-cigarette among primary care patients in a prospective cohort study: e-TAC study protocol.

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2016-011488.R2
Article Type:	Protocol
Date Submitted by the Author:	27-Apr-2016
Complete List of Authors:	Kinouani, Shérazade; Université de Bordeaux, Département de médecine générale Castéra, Philippe; Université de Bordeaux, Département de médecine générale Laporte, Catherine; Université d'Auvergne, Département de médecine générale Pétrègne, François; Université de Bordeaux, Département de médecine générale Gay, Bernard; Université de Bordeaux, Département de médecine générale
Primary Subject Heading:	Smoking and tobacco
Secondary Subject Heading:	General practice / Family practice
Keywords:	Electronic cigarette, smoking, socioeconomic factors, cohort study, primary health care

TITLE: Factors and motivations associated with use of e-cigarette among primary care patients in a prospective cohort study: *e*-TAC study protocol.

AUTHORS: Kinouani Shérazade[1,2,3], Castéra Philippe[1] , Laporte Catherine[4,5], Pétrègne François[1], Gay Bernard[1]

Kinouani Shérazade

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

[2] Univ. Bordeaux, U897, F-33000 Bordeaux, France

[3] INSERM, Neuroepidemiology U897, F-33000, Bordeaux, France

sherazade.kinouani@u-bordeaux.fr

Castéra Philippe

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

philippe.castera@u-bordeaux.fr

Laporte Catherine

[4]Department of General Medicine, Faculty of Medicine, Clermont-Ferrand, France

[5]Clermont Université, Université d'Auvergne, EA 7280, NPsy-Sydo (Neuro-Psycho-pharmacologie des Systèmes Dopaminergiques sous-corticaux), Clermont-Ferrand, France

catherinelaporte63@gmail.com

Pétrègne François

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

francois.petregne@u-bordeaux.fr

Gay Bernard

[1] Department of General Practice, Univ. Bordeaux, F-33000 Bordeaux, France

bernard.gay@u-bordeaux.fr

Corresponding author

Kinouani Shérazade

Université de Bordeaux

Département de Médecine générale

146, rue Léo Saignat

Case 148

33076 Bordeaux Cedex France

sherazade.kinouani@u-bordeaux.fr

Phone: + (33)6.10.29.68.47

The Corresponding author has the right to grant on behalf of all authors and does grant on behalf of all authors, an exclusive licence on a worldwide basis to the BMJ Publishing Group Ltd to permit this article (if accepted) to be published in BMJ editions and any other BMJPGL products and sublicences such use and exploit all subsidiary rights, as set out in our licence. She is the lead author. So, she affirms that this manuscript is an honest, accurate and transparent account of the study taking place and that no important aspects of the study have been omitted.

ABSTRACT

Introduction: While the relationship between electronic cigarette use and smoking has often been studied, the association between electronic cigarette use and socioeconomic factors has received less attention. This is a study protocol aiming to describe the relationship between the consumption of psychoactive products (in particular: smoking) or some socioeconomic factors and the evolution of the use of electronic cigarette in primary health care over one year.

Methods and analysis: *e*-TAC is a prospective multi-site cohort study, including 473 patients at baseline and carrying out in general practices in the Aquitaine area (France). The volunteer patients participated in the study regardless of their initial reason for consultation. They filled out a self-administered questionnaire at baseline and will also do so after 12 months by phone, email or letter. The study will focus on the factors that explain the experimentation with or the current use of the electronic cigarette, as well as factors associated with their evolutions over time using multivariate logistic regression modeling or Cox regression modeling.

Ethics and dissemination: This study received ethical approval from the University of Bordeaux committee for the protection of persons. It was also approved by the National Commission for Data Processing and Freedoms. Findings will be submitted for publication in peer-reviewed journals and we will disseminate them by presentations at national or international conferences.

KEYWORDS

Electronic cigarette, smoking, socioeconomic factors, cohort study, primary health care.

WORD COUNT: 2990 words

STRENGTHS AND LIMITATIONS OF THIS STUDY

-To the best of our knowledge, it is the first cohort study about the electronic cigarette use carrying out in general practices in France.

-The trainees' involvement in the recruitment of patients will probably improve the feasibility of the study. Thanks to their involvement and enthusiasm, the study will not represent an excessive workload for their supervisors.

-The study will focus on socioeconomic factors that may determine the use of electronic cigarettes. It will describe their use based not only on smoking but also on the consumption of alcohol and cannabis. When relevant, it will also examine this use in subgroups of the French population. These factors and sub-group analyses have received little attention to date.

-The selection bias will be reduced by the online questionnaire proposed at 12 months. Furthermore, to minimize loss to follow up, three forms of communications will be used: letter, e-mail and phone.

-This is a prospective study on a small sample so the sample size of 473 subjects and a 1-year follow-up period were established for reasons of feasibility. Causal relations can't be inferred.

INTRODUCTION

Electronic cigarettes (or e-cigarettes) are battery-operated devices that provide an aerosol for inhalation that sometimes contains nicotine. Their use is increasing worldwide and mainly concerns smokers [1-5]. Although their long-term health effects are unknown, their use might be less harmful than smoking according to experimental studies although this remains to be confirmed in clinical research studies [6–8].

While the relationship between smoking and electronic cigarette use has been studied several times, the relationship between electronic cigarette use and socioeconomic factors such as education level or occupational category are less clear [1, 4, 9–19].

The main reason reported for electronic cigarette use is the desire to stop smoking [9, 11, 14, 16, 18, 20–24]. However, other reasons are sometimes declared, particularly in young adults: the desire to use a product delivering nicotine but which is less harmful than smoking, curiosity, the search for a new experience, the lower cost compared to smoking, the feeling of regulating one's use, etc.[11, 23–28]. To our knowledge, no prospective studies specifically focusing on electronic cigarette use among the elderly or people with chronic diseases have been published, nor have any on electronic cigarette use among people using several products such as alcohol, tobacco and cannabis.

The Health Barometer study is a repeated French cross-sectional survey carried out over the phone. Samples were taken among a random representative French population aged 15–75 years. According to this study, 26% of the French population had tried an electronic cigarette and 6% were current users in 2014 [29]. As in many other countries, electronic cigarettes were mainly used by smokers and former smokers. According to these authors, the socioeconomic factors associated with the electronic cigarette use among smokers in France were: income level, occupational status and socio-professional category [29].

The main objective of this study is to describe among experimenters of at least one substance (tobacco, alcohol, cannabis, or electronic cigarette) the factors associated with the evolution of electronic cigarette use over 12 months: factors associated with the transition from non-use to experimentation; factors associated with the transition from experimentation to current use; factors associated with cessation of use. The secondary objective is to describe the factors associated with experimentation and current use of electronic cigarettes. The third objective is to describe the frequency of motivations reported for electronic cigarette use and those associated with the most common motivations.

METHODS AND ANALYSIS

The *e*-TAC study is a multicenter, prospective, observational cohort study currently that has been underway for one year in Aquitaine, South-West France.

Recruitment

The recruitment is almost finished and took place from May until October 2015 in eight general practices. It was performed in two steps: first, recruitment of general practices; second, recruitment of eligible patients.

Recruitment of general practices

Each general practice trainee in Bordeaux University does an internship in three different GPs offices for at least six months. An e-mail describing the *e*-TAC project was sent to all 430 trainees in their second or third year of specialization in Bordeaux University at the beginning of March 2015. Trainees who intended to do their internship from May to October 2015 and willing to help recruit patients during this period were invited to contact the first author (SK). Another author (BG) also talked to the trainees about the *e*-TAC project during general

practice courses at the end of March 2015. The trainees' recruitment is explained in Figure 1. Fifteen volunteer trainees contacted SK. She selected five of them as *e*-TAC research ambassadors on the basis of their motives and internship locations. The steering committee decided that the study should take place only in two locations per trainee so that they could continue to learn general practice without being overloaded by the requirements of the study. SK sent the study protocol by email to trainees and then, she met each of them in individual interviews. She explained to them the protocol and answered to their requests during this meeting. SK also organized a meeting with the five trainees and taught them how to explain the study to the patients. She showed them the various documents for the patients and trained them to inform patients during a role-play.

At the beginning of March 2015, SK sent an e-mail to all GPs who usually were training supervisors in general practice in Aquitaine in order to explain the study to them. The e-mail also informed them that some future trainees would be participating as research ambassadors. After the meetings between SK and the five selected trainees, she sent a new e-mail to inform the 10 supervisors concerned that their future students were willing to participate. She proposed a phone conversation to talk about it and obtain their oral agreement. Two training supervisors of the same trainee refused to participate. In the end, 4 trainees and their 8 training supervisors in general practice accepted to participate. Patient recruitment was conducted by these 4 research ambassadors and their 8 supervisors. These 8 private general practices are the investigation centers of the study.

Recruitment of patients

Eligible patients were then recruited. The target population was patients followed by GPs. The sample consisted of patients who met the following inclusion criteria: older than 18 years; agree to participate by signing and dating a consent form; must understand French; be

able to fill in a questionnaire on paper; must attend a consultation in one of the 8 investigation centers regardless of the reason for the consultation; must have completed the self-administered questionnaire for inclusion (totally or partly); must have smoked tobacco or drunk alcohol or used cannabis or used an electronic cigarette at least once in their lifetime. Patients under guardianship or trusteeship for property were excluded. Patients seen at home visits were excluded.

A large poster and flyers announced the study in the waiting rooms of the investigation centers. The questionnaires were available in the waiting rooms with detailed letters of information and consent forms. If they requested it, the patients received a full explanation of the study from the trainees. Each volunteer patient filled in a consent form and a questionnaire and then put them in two separate boxes in the waiting room.

Data collection

All data were collected on a declarative basis. Baseline data were collected from May to October 2015 using a self-administered paper questionnaire designed by SK, PC and BG. It was amended by a specialist in social communication who had validated it in a pilot study. The design and process for validating the baseline paper questionnaire is shown in an additional file (see supplementary file 1 online). Before the start of the study, the first author sent an Excel® file to the students and taught them how to transcribe data collected with the paper questionnaire. She also checked the quality of data collection and resolved the trainees' problems by conference call once a month during the study.

Follow-up data will be collected by the same trainees on average 12 months later, from May to October 2016. A link to an online questionnaire will be sent to all patients who agreed to give their e-mails for inclusion with Mailchimp®. This questionnaire will be created with LimeSurvey® software. Reminders will be sent out once a week in the absence of answers.

After 4 reminders or in the absence of an e-mail address, the follow-up questionnaire will be sent by post with a postage-paid envelope. In the absence of any answer by e-mail or by post, patients having given a phone number will be contacted by phone by trainees. They will be asked to say how they wish to receive the follow-up questionnaire and if they still wish to participate. If they no longer wish to participate, the reasons for non-participation will be requested. Trainees will call patients in blind without knowing their characteristics at baseline. Inclusion and follow-up are illustrated in Figure 2.

Each patient received an identification number at baseline that was written on the questionnaire and the consent form. Once both forms were in the two separate boxes, the analysis of baseline data became anonymous.

Outcomes and covariates

The main outcome is the evolution of electronic cigarette use over 12 months. This evolution will be studied in three ways: transition from non-use to experimented use at 12 months; transition from experimented use to current use at 12 months; transition from current use to cessation at 12 months. Experimented use is defined as reporting use at least once in a lifetime. Current use is defined as reporting ongoing use at the time of the survey, either occasionally or regularly. Experimentation and current use will be explored through two binary variables.

Six exposure factors will be studied: 1) demographic factors at baseline such as age (continuous variable), living in rural or urban area and sex; 2) factors related to smoking, the use of alcohol or cannabis, collected at baseline and after 12 months (see supplementary file 2 online). Nicotine dependence will be explored by the Cigarette Dependence Scale-5 (CDS-5) developed by Jean-François Etter. It was preferred to the Fagerström test for Nicotine Dependence owing to its better psychometric properties [30–32]. The first three questions of

the Alcohol Use DIsorders Test (AUDIT) will be used to explore the problematic use of alcohol [33, 34]. The problematic use of cannabis in the 12 months prior to the survey will be explored by 5 questions from the Cannabis Abuse Screening Test (CAST). This tool was developed in 2002 by the "*Observatoire Français des Drogues et des Toxicomanies*", a national non-profit public interest group with a scientific mission. Its psychometric properties have mostly been studied among adolescents [35–37]; 3) socioeconomic factors at baseline (categorical variables): occupational status, education level, marital status, housing status and current opinion of one's own financial situation; 4) presence of chronic diseases at baseline and at 12 months: migraine, hypertension, diabetes, cardiovascular diseases, sleep disorders, asthma, other respiratory diseases, cancer; 5) motivations for taking part in the electronic cigarette experiment, collected at baseline and at 12 months (multiple choice question); 6) motivations for current electronic cigarette use at baseline at 12 months (multiple choice question).

Statistical analysis

All estimates will be calculated on the total sample and in sub-group if relevant: young adults (18-30 years), premenopausal women (18 to 50 years old), the elderly (75 years and more), people with at least a chronic disease, people who use at least two of the following products: alcohol, tobacco, cannabis. Simple descriptive statistics will be used to describe each variable at baseline or 12 months: mean, standard deviation, median for continuous variables; number and proportion for categorical or binary variables.

Three comparisons will be made to answer the main objective. The first will compare non-users who will have evolved into experimented users to non-users whose status is unchanged at 12 months. The second will compare experimented users at baseline who become current users in 12 months to experimented users whose status is unchanged. The third will compare

current users at baseline who have stopped their use at 12 months to those whose status is unchanged.

Three others comparisons will be made to answer the second objective. These comparisons will be performed at baseline and then at 12 months. First, the experimenters of the electronic cigarette will be compared with non-users. They will then be compared to current users. Third, non-users will be compared to current users. In the end, the prevalence of the various motivations for electronic cigarette use will be estimated for experimentation and then for current use with their 95% confidence intervals. The factors associated with the most common motivations for each use will be analyzed.

Univariate and multivariate analyses will also be performed. The Student t-test or the non-parametric test will be used for univariate analysis of continuous variables. Univariate comparison of proportions will be performed using the chi-square test. Fisher's exact test will be used when the theoretical count in cells is less than 5. Multivariate comparisons will be performed by modeling with Cox regression for the main objective and logistic regression with fixed effects for the second objective. Patients with missing data on their electronic cigarette use at baseline will not be included in the models. Stratified analyses by age, sex or smoking status will also be carried out if relevant. Significance will be set to .05 and all tests will be two-tailed.

A strategy of missing data management is planned with multiple imputation. Sensitivity analyses will be performed to compare the results with complete data and those after multiple imputation.

Sample size calculation

Since several hypotheses are studied, it was difficult to calculate a minimum sample size. The relationship between smoking and electronic cigarette will also be analyzed. According to the

literature, a difference of at least 7.8% could be expected in current electronic cigarette use between current smokers and non-smokers [29, 38-40]. A sample of at least 280 participants would detect this difference with a power of 80% power and $\alpha = 0.05$.

The prevalence of experimentation of electronic cigarette use in studies ranges from 2.7 to 50.6% [15, 41]. The prevalence of use in the last 30 days ranges from 1.2 to 41% [15, 20]. According to the Health Barometer study, the prevalence of experimentation and current use in 2014 were respectively 26% and 6% [29].

It was necessary to include at least 385 participants in the study to estimate the prevalence of different types of electronic cigarette use with an accuracy of 5% and a confidence level of 95%. Finally, the aim was set for at least 385 subjects at the end of follow-up. Assuming an attrition rate of 40% between the beginning and the end of the study, at least 539 patients need to be included by the end of the recruitment stage. We managed to include 473 patients in October 2015.

Pilot study

A pilot study was conducted in April 2015 for one week in two general practices in Aquitaine that did not participate in the study. The two trainees in each pilot center explained the project to patients and asked them to complete the questionnaire as if they were actually going to participate in the study. Questionnaires, consent forms and information letters were available in the waiting rooms. At the end of the consultation, the trainees asked the patients to fill in a new short questionnaire. It assessed the clearness, accuracy and shortness of the information letter and the first questionnaire with Likert scales ranging from strongly agree to strongly disagree. The final option allowed patients to make free comments. The patients agreed to participate in the study (19 participants for 24 proposed questionnaires). The main reason for

exclusion was the absence of information about guardianship or trusteeship for property. Minor changes were made to the letters and questionnaire based on this pilot study.

ETHICS AND DISSEMINATION

Each patient gave a written consent before to be included. The study protocol was approved by the local committee for the protection of persons of Bordeaux University (approval number: 2015-A00778-41). It was also approved by the National Commission for Data Processing and Freedoms (approval number: 1838811).

Findings will be introduced in different national or international conferences. We intend to submit our findings in peer-reviewed journals.

ACKNOWLEDGEMENTS

We thank Aurélie Lazès-Charmetant, a specialist in social communication, for revising the questionnaire and Ray Cooke for copyediting the manuscript. We thank the eight investigators: Dr Allaire-Sauquet, Dr Carre, Dr Farcinelli, Dr Farina, Dr Gainard, Dr Jourde, Dr Labadie-Monnier, Dr Petrègne. We thank our four research ambassadors and their colleagues who participate to the study: Alice Sane, Anne-Laure Cutuli, Marc Delbos, Nicolas Germemont, Charlotte Rychen and Benjamin Soen.

FUNDING

This study was funded by the College of Aquitaine general practitioners/teachers. This sponsor had no influence on the study design, the collection, analysis or interpretation of data, on the writing of the manuscript or on the decision to submit it for a publication.

COMPETING INTERESTS

The authors have read and understood BMJ policy on declaration of interests and declare that they have no competing interests. All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

AUTHORS' CONTRIBUTIONS

SK is the principal investigator who conceived the study. SK, PC and BG contributed to the study design. FP was one of training supervisors who undertook patient recruitment. SK and CL wrote the manuscript. All authors read and approved the final version.

ETHICS APPROVAL

The Bordeaux University committee for the protection of persons and the National Commission for Data Processing and Freedoms.

DATA SHARING

Data will be available for all authors from the end of the cohort study by emailing the corresponding author.

REFERENCES

1. King BA, Patel R, Nguyen KH, et al. Trends in awareness and use of electronic cigarettes among US adults, 2010–2013. Nicotine Tob Res 2015;17:219–27.

2. King BA, Alam S, Promoff G, et al. Awareness and ever-use of electronic cigarettes among U.S. adults, 2010-2011. Nicotine Tob Res 2013;15:1623–7.

3. Gravely S, Fong GT, Cummings KM, et al. Awareness, trial, and current use of electronic cigarettes in 10 countries: findings from the ITC Project. Int J Environ Res Public Health 2014;11:11691–704.

4. Martínez-Sánchez JM, Ballbè M, Fu M, et al. Electronic cigarette use among adult population: a cross-sectional study in Barcelona, Spain (2013–2014). BMJ Open 2014;4:e005894.

5. Vardavas CI, Filippidis FT, Agaku IT. Determinants and prevalence of e-cigarette use throughout the European Union: a secondary analysis of 26 566 youth and adults from 27 countries. Tob Control 2015;24:442-8.

6. Hajek P, Etter JF, Benowitz N, et al. Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit: Electronic cigarettes: a review. Addiction 2014;109:1801–10.

7. Farsalinos KE, Polosa R. Safety evaluation and risk assessment of electronic cigarettes as tobacco cigarette substitutes: a systematic review. Ther Adv Drug Saf 2014;5(2):67–86.

8. Oh AY, Kacker A. Do electronic cigarettes impart a lower potential disease burden than conventional tobacco cigarettes? Review on e-cigarette vapor versus tobacco smoke. Laryngoscope 2014;124:2702–6.

9. Pokhrel P, Little MA, Fagan P, et al. Correlates of use of electronic cigarettes versus nicotine replacement therapy for help with smoking cessation. Addict Behav 2014;39:1869–73.

10. Pearson JL, Richardson A, Niaura RS, et al. e-Cigarette Awareness, Use, and Harm Perceptions in US Adults. Am J Public Health 2012;102:1758–66.

11. Rutten LJF, Blake KD, Agunwamba AA, et al. Use of e-cigarettes among current smokers: associations among reasons for use, quit intentions, and current tobacco use. Nicotine Tob Res 2015;17:1228-34.

12. 12. Giovenco DP, Lewis MJ, Delnevo CD. Factors associated with e-cigarette use: a national population survey of current and former smokers. Am J Prev Med 2014;47:476–80.

13. 13. Czoli CD, Hammond D, White CM. Electronic cigarettes in Canada: prevalence of use and perceptions among youth and young adults. Can J Public Health 2014;105:e97–102.

14. 14. Brown J, West R, Beard E, et al. Prevalence and characteristics of e-cigarette users in Great Britain: Findings from a general population survey of smokers. Addict Behav 2014;39:1120–5.

15. 15. Regan AK, Promoff G, Dube SR, et al. Electronic nicotine delivery systems: adult use and awareness of the "e-cigarette" in the USA. Tob Control 2013;22:19–23.

16. 16.Popova L, Ling PM. Alternative tobacco product use and smoking cessation: a national study. Am J Public Health 2013;103:923–30.

17. 17. Gallus S, Lugo A, Pacifici R, et al. E-cigarette awareness, use, and harm perceptions in Italy: a national representative survey. Nicotine Tob Res 2014;16:1541–8.

18. 18. Berg CJ, Haardoerfer R, Escoffery C, et al. Cigarette users' interest in using or switching to electronic nicotine delivery systems for smokeless tobacco for harm reduction, cessation, or novelty: a cross-sectional survey of US adults. Nicotine Tob Res 2015;17:245–55.

19. 19. Adkison SE, O'Connor RJ, Bansal-Travers M, et al. Electronic nicotine delivery systems: international tobacco control four-country survey. Am J Prev Med 2013;44:207–15.

20. 20. Ramo DE, Young-Wolff KC, Prochaska JJ. Prevalence and correlates of electronic-cigarette use in young adults: Findings from three studies over five years. Addict Behav 2015;41:142–7.

21. 21. Christensen T, Welsh E, Faseru B. Profile of e-cigarette use and its relationship with cigarette quit attempts and abstinence in Kansas adults. Prev Med 2014;69:90–4.

22. 22. Goniewicz ML, Lingas EO, Hajek P. Patterns of electronic cigarette use and user beliefs about their safety and benefits: an internet survey. Drug Alcohol Rev 2013;32:133–40.

23. Dawkins L, Turner J, Roberts A, et al. “Vaping” profiles and preferences: an online survey of electronic cigarette users. Addiction 2013;108:1115–25.

24. Etter JF, Bullen C. Electronic cigarette: users profile, utilization, satisfaction and perceived efficacy. Addiction 2011;106:2017–28.

25. Schmidt L, Reidmohr A, Harwell TS, et al. Prevalence and reasons for initiating use of electronic cigarettes among adults in Montana, 2013. Prev Chronic Dis. Published Online First: 20 November 2014. doi: 10.5888/pcd11.140283

26. Pokhrel P, Herzog TA, Muranaka N, et al. Young adult e-cigarette users’ reasons for liking and not liking e-cigarettes: a qualitative study. Psychol Health 2015;1–35.

27. Kong G, Morean ME, Cavallo DA, et al. Reasons for electronic cigarette experimentation and discontinuation among adolescents and young adults. Nicotine Tob Res 2015;17:847-54.

28. Pepper JK, Ribisl KM, Emery SL, et al. Reasons for starting and stopping electronic cigarette use. Int J Environ Res Public Health 2014;11:10345–61.

29. Andler R, Guignard R, Wilquin JL, et al. Electronic cigarette use in France in 2014. Int J Public Health. Published Online First: 21 December 2015. doi: 10.1007/s00038-015-0773-9.

30. Etter JF, Le Houezec J, Perneger TV. A self-administered questionnaire to measure dependence on cigarettes: the Cigarette Dependence Scale. Neuropsychopharmacology 2003;28:359–70.

31. Etter JF. A comparison of the content-, construct- and predictive validity of the cigarette dependence scale and the Fagerström test for nicotine dependence. Drug Alcohol Depend 2005;77:259–68.

32. Etter JF, Le Houezec J, Huguelet P, et al. Testing the Cigarette Dependence Scale in 4 samples of daily smokers: psychiatric clinics, smoking cessation clinics, a smoking cessation website and in the general population. Addict Behav 2009;34:446–50.

33. Bush K, Kivlahan DR, McDonell MB, et al. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. Arch Intern Med 1998;158:1789–95.

34. Gache P, Michaud P, Landry U, et al. The Alcohol Use Disorders Identification Test (AUDIT) as a screening tool for excessive drinking in primary care: reliability and validity of a French version. Alcohol Clin Exp Res 2005;29:2001–7.

35. Legleye S, Piontek D, Kraus L. Psychometric properties of the Cannabis Abuse Screening Test (CAST) in a French sample of adolescents. Drug Alcohol Depend 2011;113:229–35.

36. Legleye S, Piontek D, Kraus L, et al. A validation of the Cannabis Abuse Screening Test (CAST) using a latent class analysis of the DSM-IV among adolescents. Int J Methods Psychiatr Res 2013;22:16–26.

37. Legleye S, Kraus L, Piontek D, et al. Validation of the Cannabis Abuse Screening Test in a sample of cannabis inpatients. Eur Addict Res 2012;18:193–200.

38. Wang B, King BA, Corey CG, et al. Awareness and use of non-conventional tobacco products among U.S. students, 2012. Am J Prev Med 2014;47(2 Suppl 1):S36–52.

39. Choi K, Forster JL. Beliefs and experimentation with electronic cigarettes: a prospective analysis among young adults. Am J Prev Med 2014;46:175–8.

40. Goniewicz ML, Zielinska-Danch W. Electronic cigarette use among teenagers and young adults in Poland. Pediatrics 2012;130:e879–85.

41. Hendricks PS, Cases MG, Thorne CB, et al. Hospitalized smokers' expectancies for electronic cigarettes versus tobacco cigarettes. Addict Behav 2015;41:106–11.

FIGURES LEGENDS:

Figure 1: Flow chart of trainee recruitment in *e*-TAC study (France).

Figure 2: Data collection in *e*-TAC study (France).

SUPPLEMENTARY MATERIAL:

Supplementary file 1: design and validation of baseline questionnaire.

supplementary_file1.pdf

Supplementary file 2: Data collected on factors related to smoking, use of alcohol or cannabis in e-TAC study (France).

supplementary_file2.pdf

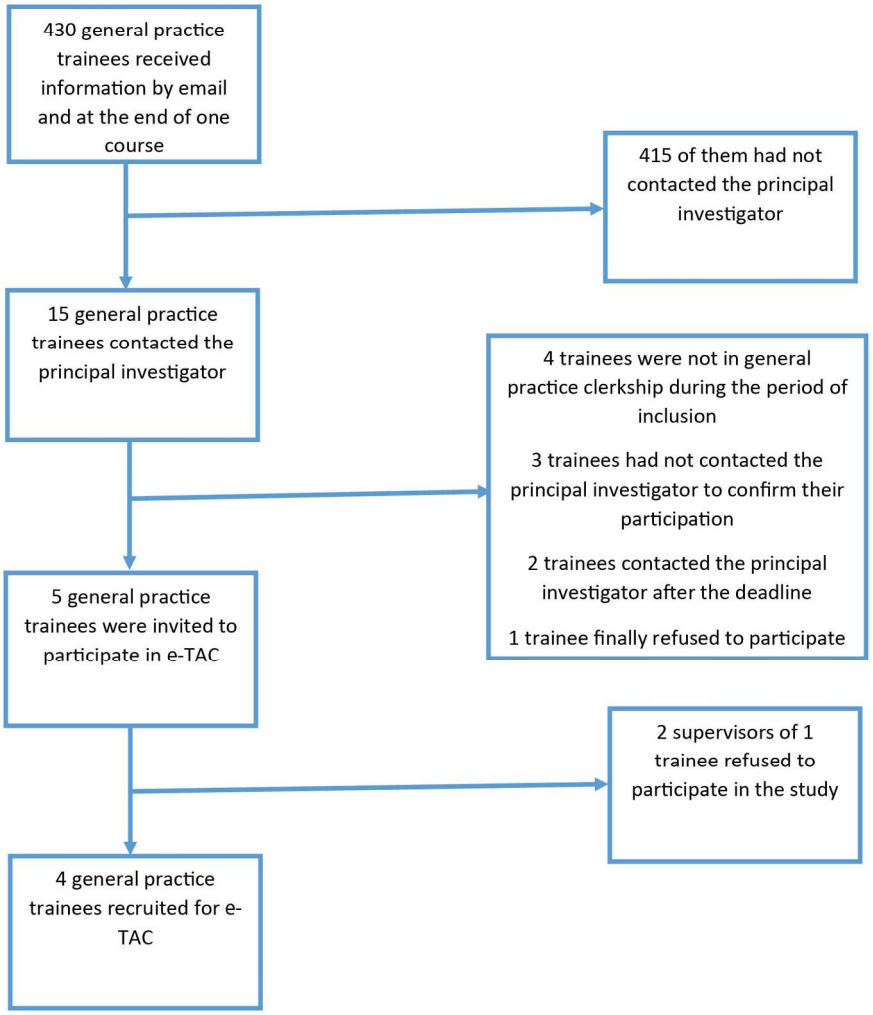

Figure 1: Flow chart of trainee recruitment in e-TAC study (France).
176x203mm (300 x 300 DPI)

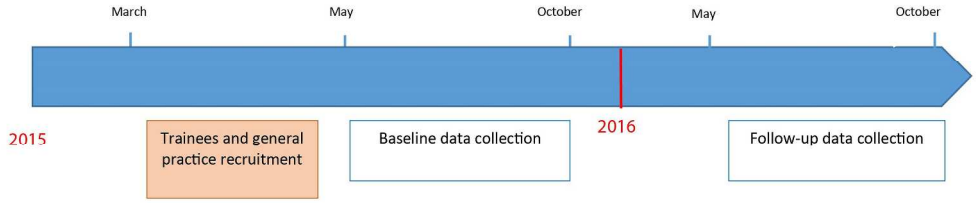

Figure 2: Data collection in e-TAC study (France).
364x90mm (300 x 300 DPI)

Supplementary file 1: design and validation of baseline questionnaire

The baseline questionnaire was initially developed with reference to the literature, particularly regarding the definitions of experimentation and current use of electronic cigarettes. Some questions were formulated identically to those already in the Health Barometer 2014 study in order to have comparable data. The Health Barometer 2014 study is a descriptive cross-national study which focused in part on the use of electronic cigarettes in the French general population. The questions about smoking, alcohol use or cannabis use included are provided by scores validated in primary care: Cigarette dependence scale-5 (CDS-5), Alcohol use disorders test (AUDIT) and Cannabis abuse screening test (CAST). Questions exploring socioeconomic factors were chosen with the help of three general practitioners working on the theme of health social inequalities in France: Drs Claire Rondet, Sophia Chatelard and Alan Charissou.

The first version of the questionnaire was submitted to the expertise of a specialist in social communication to assess its comprehensibility. She proposed modifications that were validated by the steering committee of the study.

Then, the questionnaire was used in a pilot study to assess its feasibility and acceptability to patients. The pilot study was performed in two general practices in April 2015 for 1 week. It was described in the article. Further changes were made to the questionnaire, the information letter and display by the steering committee after this pilot study.

The same process is planned between February and April 2016 for the follow-up questionnaire.

Supplementary file 2: Data collected on factors related to smoking, use of alcohol or cannabis in e-TAC study (France).

Products studied	Issues	Notices
Smoking	Have you ever tried smoking tobacco (cigarettes, cigars, pipes, rolling tobacco, cigarillos, hookah, etc.) at least once in your life? Yes □ No □	
	How old were you when you tried to smoke tobacco for the first time? .... years	
	Have you smoked tobacco in the last 30 days? Yes □ No □	
	Are you a current smoker (daily or occasionally)? No, I have never smoked □ No, I'm a former smoker □ Yes □	
	On average, how often do you smoke tobacco? Everyday □ Less than once /day □ Less than once/week □ Less than once/month □	
	Please rate your addiction to cigarettes on a scale of 0–100 I am not addicted to cigarettes at all □ I am extremely addicted to cigarettes=100 □	**CDS-5**
	On average, how many cigarettes do you smoke per day? 0-5 cigarettes/day □ 6-10 cigarettes/day □ 11-20 cigarettes/day □ 21-29 cigarettes/day □ 30 cigarettes/day or more □	
	Usually, how soon after waking up do you smoke your first cigarette? 0-5 minutes □ 6-15 minutes □ 16-30 minutes □ 21-29 minutes □ 61 minutes or more □	
	For you, quitting smoking for good would be Impossible □ Very difficult □ Fairly difficult □ Fairly easy □ Very easy □	
	Please indicate whether you agree with each of the following statements: *"after a few hours without smoking, I feel an irresistible urge to smoke"* Totally disagree □ Somewhat disagree □ Fairly difficult □ Neither agree nor disagree □ Somewhat agree □ Fully agree □	

	Are you using the electronic cigarette while continuing smoking? Yes and I mostly use electronic cigarettes as tobacco □ Yes and I also often use electronic cigarettes as tobacco □ Yes I smoke more often than using the electronic cigarette □ No, I do not use electronic cigarettes □	
	Do you want to quit smoking? No □ Yes and I am trying to stop □ Yes but in the year □ Yes but later □ I do not know □	
Alcohol	How often do you have a drink containing alcohol (wine, beer, whiskey, vodka, tequila, etc.)? Never □ Once a month or less □ Two to four times a month □ Two or three times a week □ Four or more times a week □	
	How many drinks containing alcohol do you have on a typical day when you are drinking? 1 or 2 □ 3 or 4 □ 5 or 6 □ 7 to 9 □ 10 or more □	**AUDIT-C**
	How often do you have six or more drinks on one occasion? Never □ Once a month or less □ Monthly □ Weekly □ Daily or almost daily □	
	Have you been drunk in the last 12 months? Yes □ No □	
Cannabis	Have you ever used cannabis at least once in your life (hash, marijuana, etc.)? Yes □ No □	
	How old were you when you used cannabis for the first time? … years	
	Have you used cannabis in the last 12 months? Yes □ No □	
	How many times have you used it in the last 12 months? … times	
	Have you smoked cannabis when you were alone in the last 12 months? Yes □ No □	
	Have you had memory problems when you smoked cannabis in the last 12 months? Yes □ No □	**CAST**
	Have friends or family members told you that you should reduce or stop your cannabis use in the last 12 months? Yes □ No □	

	Have you tried to reduce or stop your cannabis use without succeeding in the last 12 months? Yes □ No □	
	Have you had problems because of your cannabis use (argument, fight, accident, poor results at school, etc.) in the last 12 months? Yes □ No □	

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported
Objectives	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design	4	Present key elements of study design early in the paper
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias	9	Describe any efforts to address potential sources of bias
Study size	10	Explain how the study size was arrived at
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding
		(*b*) Describe any methods used to examine subgroups and interactions
		(*c*) Explain how missing data were addressed
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy
		(*e*) Describe any sensitivity analyses

Continued on next page

Results		
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed
		(b) Give reasons for non-participation at each stage
		(c) Consider use of a flow diagram
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders
		(b) Indicate number of participants with missing data for each variable of interest
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time
		Case-control study—Report numbers in each exposure category, or summary measures of exposure
		Cross-sectional study—Report numbers of outcome events or summary measures
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included
		(*b*) Report category boundaries when continuous variables were categorized
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results	18	Summarise key results with reference to study objectives
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.