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A study in healthy smokers to determine the delivery of nicotine and satisfaction/craving relief gained from an e-cigarette containing different solutions (e-liquids)

Submission date
21/10/2014

Recruitment status
No longer recruiting

Registration date
04/11/2014

Overall study status
Completed

Last Edited
07/06/2018

Condition category
Injury, Occupational Diseases, Poisoning

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Electronic cigarettes (e-cigarettes) are battery-powered vaporizers that have been developed to mimic the feel and experience of tobacco smoking. They work by vaporizing a liquid solution known as an e-liquid, which typically contains a mixture of propylene glycol, glycerin, nicotine and flavourings. There is some evidence to suggest that e-cigarettes may be safer than conventional tobacco smoking. Here, we want to compare the satisfaction and relief from craving nicotine people get from smoking one of three different e-cigarettes containing different solutions and a regular cigarette.

Who can participate?
Adults aged 21-55, in good health and smoking at least 10 cigarettes a day for at least a year. Woman are not allowed to take part if pregnant or breastfeeding.

What does the study involve?
Once deemed eligible, participants attend the testing clinic four times during the study. During their first visit, they smoke a regular cigarette. Blood samples are then taken for nicotine analysis and the participants are asked to complete a questionnaire examining the effects of cigarette use on their cravings and urges to smoke. Their heart rate is monitored as they smoke and cigarette filters are collected for nicotine exposure analysis. After this visit, participants are given a e-cigarette to use for the next two days. They are randomly allocated one of three test e-cigarette solutions. After using the e-cigarette for two days they return to the clinic for the same nicotine analysis and cravings/urges analysis as before. Cartridges are weighed to estimate nicotine delivery from the e-cigarette. This process is repeated two more times so that each participant is given all three e-cigarette solutions to try. When at home, participants are asked to complete a paper diary to record their use of all products and also to answer questions on their cravings/urges and how satisfied they felt after using each product . Each participant receives a follow-up telephone call once the study is complete.

What are the possible benefits and risks of participating?
Participants will not gain any direct health benefits from taking part in this study. The screening examinations may help them learn about their general health. They may also help them discover an unknown medical condition. This study may help doctors, scientists or manufacturers learn things about tobacco products and e-cigarettes that will help people to quit smoking. Participants can speak to the study doctor at any time to ask for advice on stopping using tobacco products. Nicotine and tobacco use can have side effects but participants included in the study will already be using tobacco products. They will likely not be exposed to levels higher than the ones they are usually exposed to. Tobacco products and e-cigarettes may cause side effects, such as cough, irritation in the mouth and throat, feeling faint, nausea, dizziness and headache. Less common side effects include nasal congestion, stomach discomfort, hiccups, vomiting, chest palpitations and cardiac arrhythmia. Taking blood and having a cannula inserted can be painful and may cause bleeding, bruising, discomfort, dizziness, infections and/or pain at the needle site. Some people may also feel faint or light-headed when blood is taken.

Where is the study run from?
Celerion (UK)

When is the study starting and how long is it expected to run for?
December 3rd, 2014 to December 20th, 2014.

Who is funding the study?
British American Tobacco (Investments) Limited (UK)

Who is the main contact?
Dr Brendan Colgan
brendan.colgan@celerion.com

Contact information

Type(s)
Scientific

Contact name
Dr Brendan Colgan

Contact details
Celerion
22-24 Lisburn Road
Belfast
United Kingdom
BT9 6AD

Additional identifiers

Protocol serial number
BAT-OO1-PK/CA15374

Study information

Scientific Title
A part-randomised, part-blinded pharmacokinetic study of an e-cigarette containing different solutions and a combustible cigarette in healthy subjects

Study objectives
Nicotine delivery and urge relief/satisfaction will be modified by the inclusion of different components/ingredients in the e-cigarette liquid

Ethics approval required
Old ethics approval format

Ethics approval(s)
Health and Social Care Research Ethics Committee B, 21/11/2014 ref: 14/NI/1118

Primary study design
Interventional

Study design
Single-centre part-randomised and part-blinded interventional study

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Smoking

Interventions
Subjects will be asked to either smoke a regular cigarette or use an e-cigarette containing one of three different solutions

Intervention Type
Other

Phase
Not Applicable

Primary outcome(s)
1. Plasma nicotine concentration Cmax and Tmax. Measured at timepoints -5, 1, 2, 3, 4, 5, 6, 7, 8, 10, 14.5, 30, 45, 60, 75 and 90 minutes following the start of product use
2. Subjective measurements of cravings/urges. Measured at timepoints -2, 1.25, 3.25, 5.5, 7.5, 10.5, 14.5, 30, 45, 60, 75 and 90 minutes following the start of product use. This will be done using a standard single-item question of cravings/urges.
3. Product satisfaction. This will be done using a customised panel examining numerous aspects of satisfaction with product use.

Key secondary outcome(s)
1. Product (cigarette and e-cigarette) consumption per day during ambulatory periods
2. Heart rate during the first 12 minutes of product use
3. Cotinine and hydroxycotinine at the same timepoints as nicotine measurements

Completion date

07/08/2015

Eligibility

Key inclusion criteria
1. Subjects will be males or non-pregnant, non-lactating females between 21 and 55 years of age inclusive
2. Women of child-bearing potential should be using one of the following acceptable methods of contraception: combined (estrogen and progestogen containing) oral, intravaginal or transdermal hormonal contraception associated with inhibition of ovulation; progestogen-only hormonal contraception, either oral, injected or implanted, associated with inhibition of ovulation; progestogen-only oral hormonal contraception where inhibition of ovulation is not the primary mode of action; intrauterine device (IUD); intrauterine hormone-releasing system (IUS); bilateral tubal occlusion; male or female condom with or without spermicide; cap, diaphragm or sponge with spermicide.
3. Women of nonchildbearing potential may be included if they are either surgically sterile (hysterectomy and/or oophorectomy) or postmenopausal for more than 1 year (with follicle-stimulating hormone [FSH] level greater than or equal to 8 mIU/mL) and must have a negative serum pregnancy test result during screening. Women who are surgically sterile must provide documentation of the procedure by an operative report.
4. Subjects must be in good health as determined by medical history, vital signs, blood biochemistry, haematology, urinalysis and physical examination.
5. Subjects with negative HIV and Hepatitis B and C results.
6. Subjects must have a body mass index (BMI) between 18 and 30 kg/m2 inclusive. Male subjects must have a weight between 50 and 110kg and female subjects between 40 and 90kg.
7. No clinically significant abnormalities in blood pressure values (the differences between supine and standing BP are less than 20 mmHg) with no symptomatic evidence of postural hypotension.
8. Subjects will have negative results for the urinary drug of abuse and ethanol screening test.
9. Subjects will have given their written informed consent to participate in the study and to abide by the study restrictions.
10. Prior to study start, subjects must be daily smokers of at least 10 factory-produced cigarettes and have smoked continuously for a minimum of one year. Subjects current brand of cigarette will have a machine-smoked ISO tar yield of 8-10 mg. Smoking status will be confirmed with a Smokerlyzer breath CO >10ppm and a urinary cotinine level of >200ng/ml at screening. Subjects should be familiar with the use of e cigarettes but not currently dual-using cigarettes and e-cigarettes

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Sex

All

Key exclusion criteria
1. Subjects who have a history of, or clinically active significant, neurological, gastrointestinal, renal, hepatic, cardiovascular, psychiatric, respiratory, metabolic, endocrine, haematological disease or other major disorders.
2. Subjects with significant allergies who in the opinion of the Principal Investigator should not be included.
3. Subjects who have been diagnosed with urticaria or asthma.
4. Subjects with a recent history of or current drug or alcohol abuse who in the opinion of the Investigator should not be included. Excessive intake of alcohol within the last 6 months, defined as a regular maximum weekly intake of greater than 7 drinks for women or 14 drinks for men. One drink is defined as one pint of regular beer (5% alcohol), 200 ml of wine (12% alcohol), or 25 ml of distilled spirits (40% alcohol).
5. Subjects with an inability to communicate well with the Investigator/study staff (i.e., language problem, poor mental development or impaired cerebral function).
6. Subjects who are participating in another clinical research study or who have participated in a clinical research study in the last 3 months.
7. Subjects who have had treatment with prescription medications within 21 days or over-the-counter medication within 72 hours of the planned first product use occasion. For female subjects, oral contraceptives, hormonal contraceptive devices and replacement hormonal therapies are not included in the list of drugs leading to exclusion.
8. Subjects who have used any drugs or substances (except tobacco) known to be strong inducers or inhibitors of any CYP enzymes (formerly known as cytochrome P450 enzymes) within a 28 days period prior to first prodct administration. For a list of such drugs and substances, please refer to http://medicine.iupui.edu/clinpharm/ddis/main-table/.
9. Subjects who have had any treatment with smoking cessation medications (e.g. Bupropion, Champix, any nicotine replacement therapy or nicotine delivery systems) within 30 days of the planned first product use occasion.
10. Subjects with any other clinically significant medical history, in the Investigator's opinion, including conditions which might affect drug absorption, metabolism or excretion.
11. Female subjects, who are pregnant or become pregnant during the course of the study.
12. Subjects who have lost or donated more than 450ml blood, plasma or platelets within the 3 months preceding the first product administration.
13. Subjects who are currently trying to stop smoking or considering stopping in the next two months.
14. Subjects who are unwilling or unable to comply with the study requirements.
15. Subjects who in the opinion of the Investigator should not participate in the study for any other reason.

Date of first enrolment
03/12/2014

Date of final enrolment
20/12/2014

Locations

Countries of recruitment
United Kingdom

Northern Ireland

Study participating centre
Celerion
Belfast
United Kingdom
BT9 6AD

Sponsor information

Organisation
British American Tobacco (Investments) Limited (UK)

ROR
https://ror.org/01znsh139

Funder(s)

Funder type
Industry

Funder Name
British American Tobacco (Investments) Limited (UK)

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	01/01/2017		Yes	No
HRA research summary			28/06/2023	No	No