Clinical trial results:
Comparison of the effects of the electronic cigarette and nicotine inhalator on tobacco withdrawal symptoms over 24 hours of abstinence

Summary

EudraCT number	2011-005565-20
Trial protocol	GB
Global end of trial date	21 February 2013

Results information

Result version number	v1 (current)
This version publication date	29 July 2017
First version publication date	29 July 2017

Trial information

Trial identification

Sponsor protocol code	QMUL111111

Additional study identifiers

ISRCTN number	-
ClinicalTrials.gov id (NCT number)	NCT01454362
WHO universal trial number (UTN)	U1111-1127-4445
Other trial identifiers	Reda Ref: 008261

Notes:

Sponsors

Sponsor organisation name	Queen Mary University of London
Sponsor organisation address	5 Walden Street, London, United Kingdom, E1 2EF
Public contact	The Joint Research Office , QUEEN MARY, UNIVERSITY OF LONDON, 0207 882 7260, researchamendments@bartsandthelondon.nhs.uk
Scientific contact	The Joint Research Office , QUEEN MARY, UNIVERSITY OF LONDON, 0207 882 7260, researchamendments@bartsandthelondon.nhs.uk

Notes:

Paediatric regulatory details

Is trial part of an agreed paediatric investigation plan (PIP)	No
Does article 45 of REGULATION (EC) No 1901/2006 apply to this trial?	No
Does article 46 of REGULATION (EC) No 1901/2006 apply to this trial?	No

Notes:

Results analysis stage

Analysis stage	Final
Date of interim/final analysis	02 May 2017
Is this the analysis of the primary completion data?	Yes
Primary completion date	21 February 2013
Global end of trial reached?	Yes
Global end of trial date	21 February 2013
Was the trial ended prematurely?	No

Notes:

General information about the trial

Main objective of the trial:

The primary objective of this study is to investigate whether the E-C is more effective at alleviating withdrawal symptoms than the nicotine inhalator during 24hr abstinence.

Protection of trial subjects:

Participants were screened and consented by a medical doctor and completed a health problems checklist after product use.

Background therapy: -

Evidence for comparator: -

Actual start date of recruitment	09 January 2013
Long term follow-up planned	No
Independent data monitoring committee (IDMC) involvement?	No

Notes:

Population of trial subjects

Subjects enrolled per country

Country: Number of subjects enrolled	United Kingdom: 51
Worldwide total number of subjects	51
EEA total number of subjects	51

Notes:

Subjects enrolled per age group

In utero	0
Preterm newborn - gestational age < 37 wk	0
Newborns (0-27 days)	0
Infants and toddlers (28 days-23 months)	0
Children (2-11 years)	0
Adolescents (12-17 years)	0
Adults (18-64 years)	48
From 65 to 84 years	3
85 years and over	0

Subject disposition

Recruitment

Recruitment details:

Participants were recruited at the Tobacco Dependence Research Unit in London between January 2013 and February 2013.

Pre-assignment

Screening details:

Inclusion Criteria
Smoking at least 12 cigarettes per day; first cigarette smoked within 60 mins of waking; willing to abstain from smoking for one day in 2 consecutive weeks.
Exclusion Criteria
Under 18s; current psychiatric illness; planning pregnancy, pregnant or breastfeeding; enrolled in other research, used EC or inhaler before.

Period 1

Period 1 title	Baseline (overall period)
Is this the baseline period?	Yes
Allocation method	Randomised - controlled
Blinding used	Not blinded

Blinding implementation details:

Not applicable

Arms

Are arms mutually exclusive?	No
Arm title	E-cigarette

Arm description: -

Arm type	Experimental
Investigational medicinal product name	E-cigarette
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Inhalation solution
Routes of administration	Oral use

Dosage and administration details:

As needed

Arm title	Inhalator

Arm description: -

Arm type	Active comparator
Investigational medicinal product name	Nicorette Inhalator
Investigational medicinal product code	
Other name	
Pharmaceutical forms	Inhalation vapour
Routes of administration	Oral use

Dosage and administration details:

As needed.

Number of subjects in period 1	E-cigarette	Inhalator
Started	51	51
Completed	51	51

Baseline characteristics

Reporting groups	
Reporting group title	Baseline

Reporting group description: -

Reporting group values	Baseline	Total	
Number of subjects	51	51	
Age categorical Units: Subjects			
In utero	0	0	
Preterm newborn infants (gestational age < 37 wks)	0	0	
Newborns (0-27 days)	0	0	
Infants and toddlers (28 days-23 months)	0	0	
Children (2-11 years)	0	0	
Adolescents (12-17 years)	0	0	
Adults (18-64 years)	48	48	
From 65-84 years	3	3	
85 years and over	0	0	
Age 18+	0	0	
Gender categorical Units: Subjects			
Female	9	9	
Male	42	42	

End points

End points reporting groups

Reporting group title	E-cigarette
Reporting group description: -	
Reporting group title	Inhalator
Reporting group description: -	

Primary: Mean withdrawal rating at 24 hours

End point title	Mean withdrawal rating at 24 hours
End point description: Mean withdrawal rating at 24 hours	
End point type	Primary
End point timeframe: 24 hours	

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51[1]	51[2]		
Units: withdrawal rating				
arithmetic mean (standard deviation)	0.73 (± 0.64)	0.86 (± 0.73)		

Notes:

[1] - Study was randomised crossover trial

[2] - Study was a randomised crossover trial

Statistical analyses

Statistical analysis title	Comparison of mean withdrawal ratings at 24h
Comparison groups	Inhalator v E-cigarette
Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.17
Method	t-test, 2-sided

Primary: Mean urge to smoke at 24 hours

End point title	Mean urge to smoke at 24 hours
End point description: Mean urge to smoke at 24 hours	
End point type	Primary
End point timeframe: 24 hours	

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: urge rating				
arithmetic mean (standard deviation)	1.84 (± 0.91)	2.28 (± 0.9)		

Statistical analyses

Statistical analysis title	Comparison of mean urge to smoke at 24 hours
Comparison groups	E-cigarette v Inhalator
Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.005
Method	t-test, 2-sided

Secondary: Mean change in salivary cotinine ng/ml	
End point title	Mean change in salivary cotinine ng/ml
End point description: Mean change in salivary cotinine	
End point type	Secondary
End point timeframe: 24 hours	

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	49	49		
Units: change in salivary cotinine				
arithmetic mean (standard deviation)	-66.32 (± 94.84)	-53.8 (± 119.4)		

Statistical analyses

Statistical analysis title	Comparison of mean change in salivary cotinine ng/
Comparison groups	E-cigarette v Inhalator

Number of subjects included in analysis	98
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.43
Method	t-test, 2-sided

Secondary: Mean satisfaction from product when compared to cigarettes (rating 0-4)

End point title	Mean satisfaction from product when compared to cigarettes (rating 0-4)

End point description:

Mean satisfaction from product when compared to cigarettes (rating 0-4)

End point type	Secondary

End point timeframe:

24 hours

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: satisfaction rating				
arithmetic mean (standard deviation)	1.18 (± 1.05)	0.59 (± 1.1)		

Statistical analyses

Statistical analysis title	Comparison of mean satisfaction from product
Comparison groups	E-cigarette v Inhalator
Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.003
Method	t-test, 2-sided

Secondary: Mean pleasant feeling from using the product (rating 0-4)

End point title	Mean pleasant feeling from using the product (rating 0-4)

End point description:

Mean pleasant feeling from using the product (rating 0-4)

End point type	Secondary

End point timeframe:

24 hours

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: pleasantness rating				
arithmetic mean (standard deviation)	2 (± 1.11)	0.67 (± 0.89)		

Statistical analyses

Statistical analysis title	Comparions of Mean pleasant feeling
Comparison groups	E-cigarette v Inhalator
Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.001
Method	t-test, 2-sided

Secondary: Mean enjoyment of the sensation in the throat and chest (rating 0-4)

End point title	Mean enjoyment of the sensation in the throat and chest (rating 0-4)
End point description:	
Mean enjoyment of the sensation in the throat and chest (rating 0-4)	
End point type	Secondary
End point timeframe:	
24 hours	

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: enjoyment rating				
arithmetic mean (standard deviation)	1.65 (± 1.05)	0.51 (± 0.7)		

Statistical analyses

Statistical analysis title	Comparison of Mean enjoyment of the sensation
Comparison groups	E-cigarette v Inhalator

Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.001
Method	t-test, 2-sided

Secondary: Mean helpfulness of the product enabling the participant to keep from smoking (rating 0-4)

End point title	Mean helpfulness of the product enabling the participant to keep from smoking (rating 0-4)

End point description:

Mean helpfulness of the product enabling the participant to keep from smoking (rating 0-4)

End point type	Secondary

End point timeframe:

24 hours

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: helpfulness rating				
arithmetic mean (standard deviation)	2.61 (± 1.08)	1.69 (± 1.03)		

Statistical analyses

Statistical analysis title	Comparison of mean helpfulness of the product
Comparison groups	E-cigarette v Inhalator
Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.001
Method	t-test, 2-sided

Secondary: Mean embarrassment of using the products in company (rating 0-4)

End point title	Mean embarrassment of using the products in company (rating 0-4)

End point description:

Mean embarrassment of using the products in company (rating 0-4)

End point type	Secondary

End point timeframe:

24 hours

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: embarrassment rating				
arithmetic mean (standard deviation)	0.75 (± 0.98)	0.65 (± 0.98)		

Statistical analyses

Statistical analysis title	Comparison of mean embarrassment
Comparison groups	E-cigarette v Inhalator
Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	= 0.53
Method	t-test, 2-sided

Secondary: Mean use of the products as a stop smoking aid, SSA (rating 0-4)	
End point title	Mean use of the products as a stop smoking aid, SSA (rating 0-4)
End point description: Mean use of the products as a stop smoking aid (rating 0-4)	
End point type	Secondary
End point timeframe: 24 hours	

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: rating of product as stop smoking aid				
arithmetic mean (standard deviation)	3.16 (± 1.05)	1.57 (± 1.2)		

Statistical analyses

Statistical analysis title	Comparison of mean use of the products as a SSA
Comparison groups	E-cigarette v Inhalator

Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.001
Method	t-test, 2-sided

Secondary: Mean recommend the products to a friend who wants to quit smoking (rating 0-4)

End point title	Mean recommend the products to a friend who wants to quit smoking (rating 0-4)

End point description:

Mean recommend the products to a friend who wants to quit smoking (rating 0-4)

End point type	Secondary

End point timeframe:

24 hours

End point values	E-cigarette	Inhalator		
Subject group type	Reporting group	Reporting group		
Number of subjects analysed	51	51		
Units: recommendation rating				
arithmetic mean (standard deviation)	3.2 (± 1.1)	1.9 (± 1.2)		

Statistical analyses

Statistical analysis title	Comparison of mean recommend the products
Comparison groups	E-cigarette v Inhalator
Number of subjects included in analysis	102
Analysis specification	Pre-specified
Analysis type	superiority
P-value	< 0.001
Method	t-test, 2-sided

Adverse events

Adverse events information	
Timeframe for reporting adverse events: 24 hours	
Assessment type	Systematic
Dictionary used	
Dictionary name	MedDRA
Dictionary version	20.0
Reporting groups	
Reporting group title	E-cigarette AEs
Reporting group description: -	
Reporting group title	Inhalator AEs
Reporting group description: -	

Serious adverse events	E-cigarette AEs	Inhalator AEs	
Total subjects affected by serious adverse events			
subjects affected / exposed	0 / 51 (0.00%)	0 / 51 (0.00%)	
number of deaths (all causes)	0	0	
number of deaths resulting from adverse events	0	0	

Frequency threshold for reporting non-serious adverse events: 0 %

Non-serious adverse events	E-cigarette AEs	Inhalator AEs	
Total subjects affected by non-serious adverse events			
subjects affected / exposed	30 / 51 (58.82%)	34 / 51 (66.67%)	
Cardiac disorders			
Dyspnoea			
subjects affected / exposed	8 / 51 (15.69%)	6 / 51 (11.76%)	
occurrences (all)	8	6	
Dyspnoea at rest			
subjects affected / exposed	5 / 51 (9.80%)	2 / 51 (3.92%)	
occurrences (all)	5	2	
Chest pain			
subjects affected / exposed	6 / 51 (11.76%)	4 / 51 (7.84%)	
occurrences (all)	6	4	
Chest discomfort			

subjects affected / exposed	7 / 51 (13.73%)	3 / 51 (5.88%)	
occurrences (all)	7	3	
Nervous system disorders			
Dizziness			
subjects affected / exposed	9 / 51 (17.65%)	9 / 51 (17.65%)	
occurrences (all)	9	9	
Headache			
subjects affected / exposed	10 / 51 (19.61%)	9 / 51 (17.65%)	
occurrences (all)	10	9	
Sleep disturbance			
subjects affected / exposed	7 / 51 (13.73%)	5 / 51 (9.80%)	
occurrences (all)	7	5	
Eye disorders			
Visual impairment			
subjects affected / exposed	4 / 51 (7.84%)	2 / 51 (3.92%)	
occurrences (all)	4	2	
Gastrointestinal disorders			
Nausea			
subjects affected / exposed	7 / 51 (13.73%)	11 / 51 (21.57%)	
occurrences (all)	7	11	
Respiratory, thoracic and mediastinal disorders			
Wheezing			
subjects affected / exposed	7 / 51 (13.73%)	8 / 51 (15.69%)	
occurrences (all)	7	8	
Cough			
subjects affected / exposed	14 / 51 (27.45%)	18 / 51 (35.29%)	
occurrences (all)	14	18	
Productive cough			
subjects affected / exposed	12 / 51 (23.53%)	9 / 51 (17.65%)	
occurrences (all)	12	9	
Psychiatric disorders			
Disturbance in attention			
subjects affected / exposed	9 / 51 (17.65%)	15 / 51 (29.41%)	
occurrences (all)	9	15	

More information

Substantial protocol amendments (globally)

Were there any global substantial amendments to the protocol? Yes

Date	Amendment
23 August 2012	Change to PI.

Notes:

Interruptions (globally)

Were there any global interruptions to the trial? No

Limitations and caveats

None reported