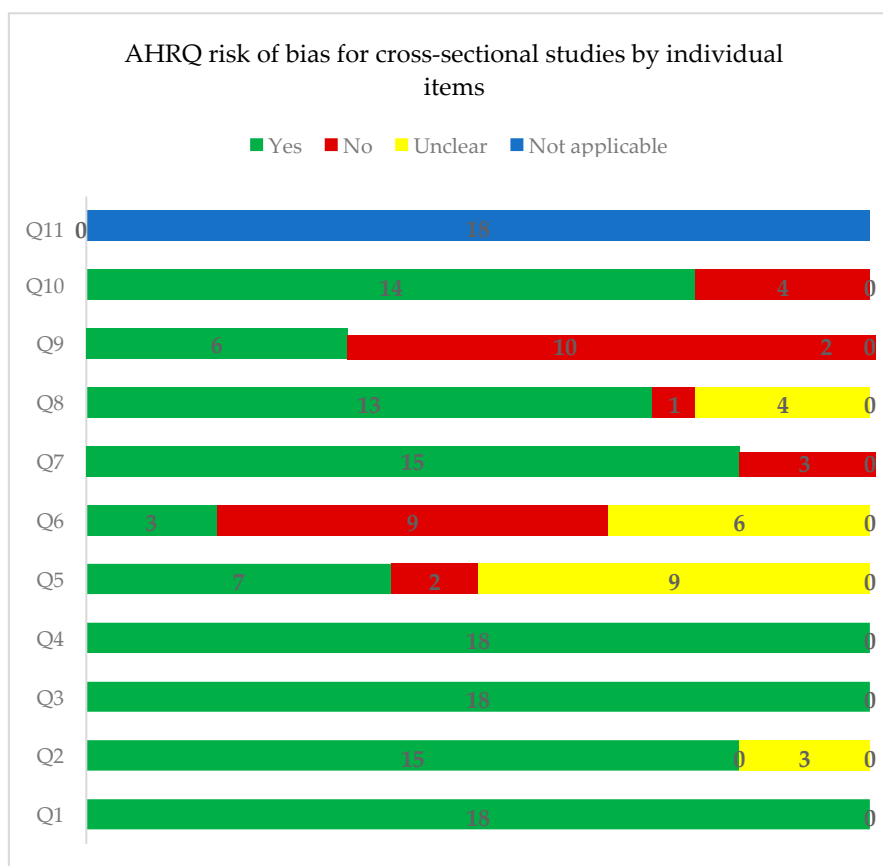


Supplementary Materials

Supplementary Table S1. Details of PubMed search strategy.

Focus	Operator	Search Terms
#1 Youth	Keywords	((((((((((((((((((("young adult"[MeSH Terms]) OR adolescent[MeSH Terms]) OR adolescence[MeSH Terms]) OR "Secondary School"[MeSH Terms]) OR "young adult*"[Title/Abstract]) OR youth*[Title/Abstract]) OR adolesc*[Title/Abstract]) OR teen*[Title/Abstract] OR "Secondary School"[Title/Abstract]) OR "Secondary School*"[Title/Abstract]) OR "Secondary School Children"[Title/Abstract]) OR "middle school children"[Title/Abstract]) OR "high school children"[Title/Abstract]) OR "college student*"[Title/Abstract]) OR "university student*"[Title/Abstract]))))))))))))
#2 Perception	Keywords	((((((((((((((((((("perception"[MeSH Terms]) OR "thinking"[MeSH Terms]) OR "critical thinking"[MeSH Terms]) OR perceiv*[Title/Abstract]) OR perception*[Title/Abstract]) OR perspective[Title/Abstract]) OR opinion*[Title/Abstract]) OR view[Title/Abstract]) OR view-point*[Title/Abstract]) OR thinking*[Title/Abstract]) OR "thinking skill*"[Title/Abstract]) OR thought*[Title/Abstract]) OR "critical thinking*"[Title/Abstract]) OR impression*[Title/Abstract]) OR attitude[Title/Abstract]))))))))))))
#3 E-cigarettes	Keywords	((((((((((((((((((("electronic nicotine delivery systems"[MeSH Terms]) OR e-cigarettes[MeSH Terms]) OR "cigarettes, electronic"[MeSH Terms]) OR vaping[MeSH Terms]) OR "electronic cigarette*"[Title/Abstract]) OR "electronic nicotine delivery systems"[Title/Abstract]) OR ENDS[Title/Abstract]) OR e-cigarette*[Title/Abstract]) OR "e cigarette*"[Title/Abstract]) OR e-cig*[Title/Abstract]) OR "e cig*"[Title/Abstract]) OR vap*[Title/Abstract]) OR "E-Cigarette Use*"[Title/Abstract]) OR "E Cigarette Use*"[Title/Abstract]) OR "E-Cig Use*"[Title/Abstract]) OR "E Cig Use*"[Title/Abstract]))))))))))))
#4	Boolean Operator	#1 AND #2 AND #3
#5	Limits	#4 Filters activated: Humans, English, Child: birth-18 years, Adult: 19+ years, Adult: 19-44 years, Child: 6-12 years, Young Adult: 19-24 years, Adolescent: 13-18 years

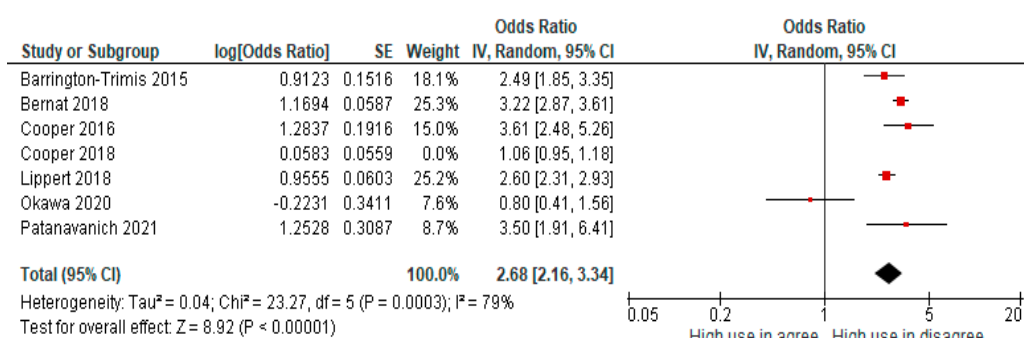
Supplementary Table S2 Risk of bias of cross-sectional studies based on AHRQ tool

Note: Selection bias (Q1–Q4), performance bias (Q5, Q6), attrition bias (Q7), detection bias (Q8, Q9) and reporting bias (Q10, Q11)

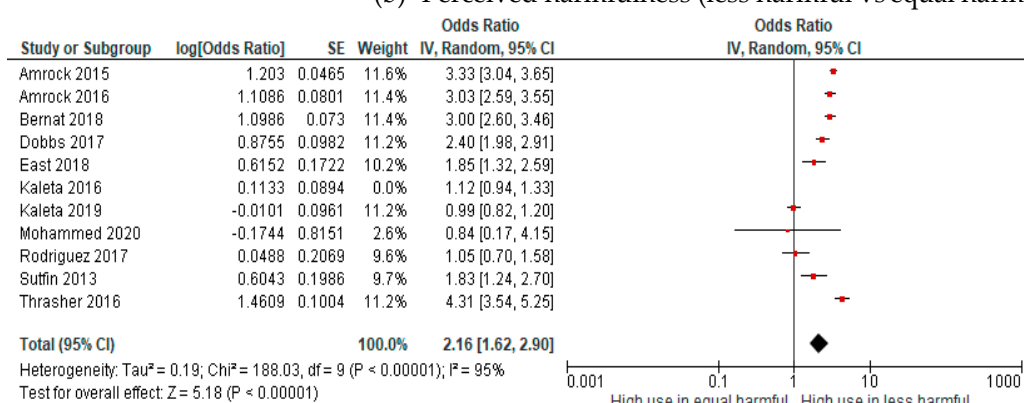
Supplementary Table S3 Risk of bias of cohort studies based on NOS tool

Study ID	Representative-ness of the cohort	Selection of the non-exposed cohort	Ascertainment of exposure	Outcome of interest was not present at start	Compa-rability*	Assess-ment of outco-me	Follow-up long enough for outcomes	Adequacy of follow up	Score	Quality
Andrews et al., 2016	*	*	-	-	-	-	*	*	4	Moderate
Cooper et al., 2018	*	*	-	*	*	-	*	*	7	High

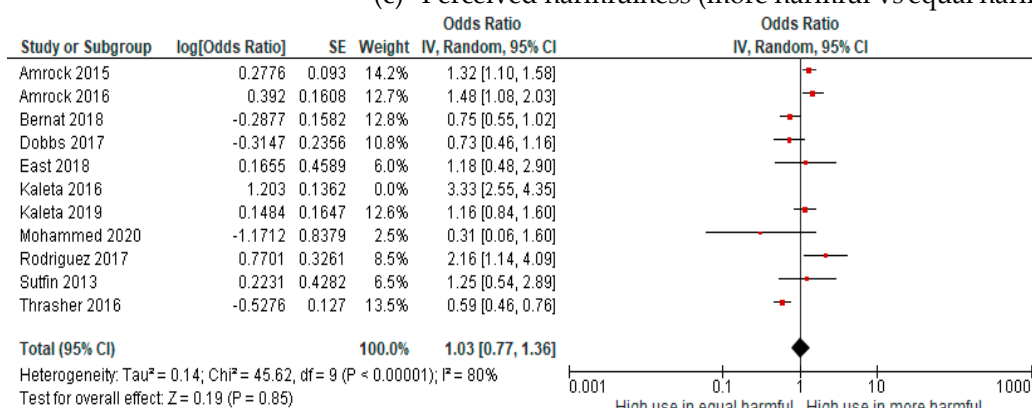
(a) Perceived harmfulness (disagree vs agree)



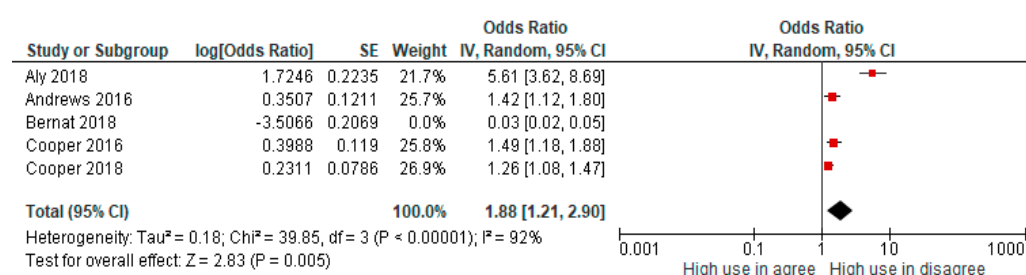
(b) Perceived harmfulness (less harmful vs equal harmful)



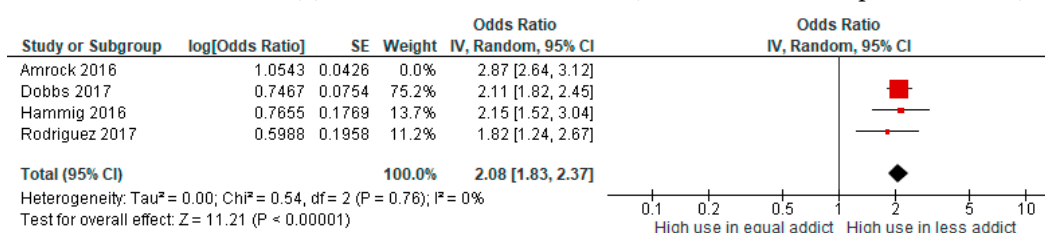
(c) Perceived harmfulness (more harmful vs equal harmful)



(d) Perceived addictiveness (disagree vs agree)



(e) Perceived addictiveness (less addictive vs equal addictive)



(f) Perceived addictiveness (more addictive vs equal addictive)

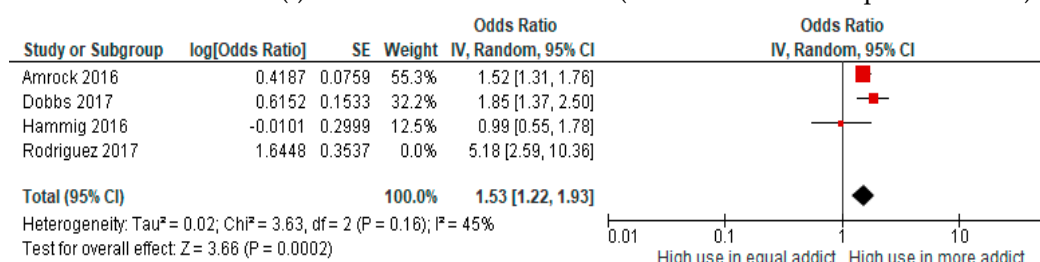


Figure S1 Forest plot of the meta-analysis for perceived risks, (a-c) perceived harmfulness, (d-f) perceived addictiveness and ever e-cigarettes use in young people after sensitivity analysis. Each study is identified by their first author. The individual effect estimates is identified as odds ratios with lower and upper limits (95% confidence interval)

Supplementary Table S4 Quality assessment of the present review (GRADE Evidence Profile)

Certainty assessment							№ of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Disagree to perceived harmfulness	Agree to perceived harmfulness	Relative (95% CI)	Absolute (95% CI)		
Question: Should disagree vs. agree to perceived harmfulness be used for preventing e-cigarette use in young people?												
7	observational studies	not serious	serious ^a	not serious	not serious	Strong association			OR 2.20 (1.41 to 3.43)	2 fewer per 1,000 (from 3 fewer to 1 fewer)	⊕⊕○○ LOW	
Certainty assessment							№ of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Perceived less harmful	Perceived equally harmful	Relative (95% CI)	Absolute (95% CI)		
Question: Should less harmful vs. equally harmful to tobacco cigarettes be used for preventing e-cigarette use in young people?												
11	observational studies	not serious	serious ^a	not serious	not serious	strong association			OR 2.01 (1.47 to 2.75)	2 fewer per 1,000 (from 3 fewer to 1 fewer)	⊕⊕○○ LOW	
Certainty assessment							№ of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Perceived more harmful	Perceived equally harmful	Relative (95% CI)	Absolute (95% CI)		
Question: Should more harmful vs. equally harmful to tobacco cigarettes be used for preventing e-cigarette use in young people?												
11	observational studies	not serious	serious ^a	not serious	not serious	none			OR 1.16 (0.80 to 1.68)	1 fewer per 1,000 (from 2 fewer to 1 fewer)	⊕○○○ VERY LOW	

Certainty assessment							№ of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Disagree to perceived addictiveness	Agree to perceived addictiveness	Relative (95% CI)	Absolute (95% CI)		
Question: Should disagree vs. agree to perceived addictiveness be used for preventing e-cigarette use in young people?												
5	observational studies	not serious	serious ^a	not serious	not serious	none			OR 0.86 (0.29 to 2.56)	1 fewer per 1,000 (from 3 fewer to 0 fewer)	⊕○○○ VERY LOW	
Certainty assessment							№ of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Perceived less addictive	Perceived equally addictive	Relative (95% CI)	Absolute (95% CI)		
Question: Should less addictive vs. equally addictive to tobacco cigarettes be used for preventing e-cigarette use in young people?												
4	observational studies	not serious	serious ^a	not serious	not serious	strong association	0/0	0/0	OR 2.28 (1.81 to 2.88)	2 fewer per 1,000 (from 3 fewer to 2 fewer)	⊕⊕○○ LOW	
Certainty assessment							№ of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Perceived more addictive	Perceived equally addictive	Relative (95% CI)	Absolute (95% CI)		
Question: Should more addictive vs. equally addictive to tobacco cigarettes be used for preventing e-cigarette use in young people?												
4	observational studies	not serious	serious ^a	not serious	not serious	none	0/0	0/0	OR 1.82 (1.22 to 2.73)	2 fewer per 1,000 (from 3 fewer to 1 fewer)	⊕○○○ VERY LOW	

Question: Perceived harmfulness compared to traditional cigarettes (**perceived risk**) for preventing ever e-cigarette use across **age group**

Certainty assessment							№ of patients		Effect		Certainty	Importance
No of studies	Study design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other considerations	Perceived harmfulness	[comparison]	Relative (95% CI)	Absolute (95% CI)		
Perceived less harmful and ever e-cigarette use (Adolescents)												
9	observational studies	not serious	serious ^a	not serious	not serious	strong association			OR 2.18 (1.55 to 3.07)	2 fewer per 1,000 (from 3 fewer to 2 fewer)	⊕⊕○○ LOW	
Perceived less harmful and ever e-cigarette use (Young Adults)												
2	observational studies	not serious	not serious	not serious	not serious	none			OR 1.39 (0.81 to 2.40)	1 fewer per 1,000 (from 2 fewer to 1 fewer)	⊕⊕○○ LOW	
Perceived more harmful and ever e-cigarette use (Adolescents)												
9	observational studies	not serious	serious ^a	not serious	not serious	none			OR 1.08 (0.72 to 1.63)	1 fewer per 1,000 (from 2 fewer to 1 fewer)	⊕○○○ VERY LOW	
Perceived more harmful and ever e-cigarette use (Young Adults)												
2	observational studies	not serious	not serious	not serious	not serious	none			OR 1.76 (1.05 to 2.96)	2 fewer per 1,000 (from 3 fewer to 1 fewer)	⊕⊕○○ LOW	
GRADE Working Group grades of evidence High quality: Further research is very unlikely to change our confidence in the estimate of effect Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate Very low quality: We are very uncertain about the estimate												

CI: Confidence interval; OR: Odds ratio

a. The quality of evidence was downgraded due to considerable heterogeneity; majority of studies are cross-sectional studies