

Effect of electronic cigarette use on transitions of smoking status among college students: A Markov Model

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Introduction

- Young adulthood (18-29 year)
 - Transitioning into college
 - Establishment of regular cigarette use
- Light smoking (i.e. ≤ 5 cigarettes per day (cpd))
 - Prevalent
 - Stable
 - Harmful
- E-cigarette (ECIG) use
 - Rapidly increased
 - More prevalent among young adults than other age groups



Introduction – cont'd

- ECIG use is associated with lower odds of reducing or quitting smoking cigarettes
- Effect of ECIG use on transitions in smoking status is unknown



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Purpose

- The purpose of the present study:
 - a) to examine the longitudinal transitions of cigarette smoking status (non vs light vs heavier) among college students
 - b) to examine current (past 30-day) ECIG use as an influential factor on these transitions

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Participants

- 5,482 18-29 year old college students participating in Project M-PACT (Marketing & Promotions Across Colleges in Texas)
- Mean age=20.49 (SD=2.36)
- 63.8% female
- 36.4% non-Hispanic white, 31.1% Hispanic, 16.9% Asian, 8.1% African American/black and 7.5% other



Procedure

- Online survey
- Recruited from 24 colleges in four Texas cities
 - 12 two-year and 12 four-year colleges
- Three of six semi-annual waves of data
 - W1: Nov, 2014 – Feb, 2015
 - W2: May, 2015 – Jun, 2015
 - W3: Oct, 2015 – Nov, 2015
 - ⋮



Measure

- Current (past 30 day) smoking status
 - NS = non smoker (0 cpd)
 - LS = light smoker (1-5 cpd)
 - HS = heavier smoker (>5 cpd)

- Current ECIG use
 - used electronic cigarettes at least one day during the past 30 days



Table 1. Descriptive Statistics

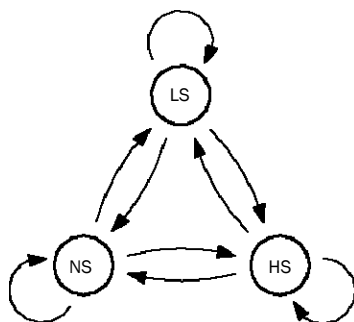
	Wave 1 (N=5478)	Wave 2 (n=4325)	Wave 3 (n=4318)
Smoking Status			
NS	78.8%	82.0%	82.2%
LS	18.2%	14.8%	14.9%
HS	3%	2.6%	2.5%

Note. Smoking status is past 30 day smoking status. NS = non smoker (0 cpd), LS = light smoker (1-5 cpd); HS = heavier smoker (>5 cpd)



Analysis

- Simple Markov Model/ Markov Chain
- Statistic software:
 - SAS 9.4, package *PROC LTA*



Analysis

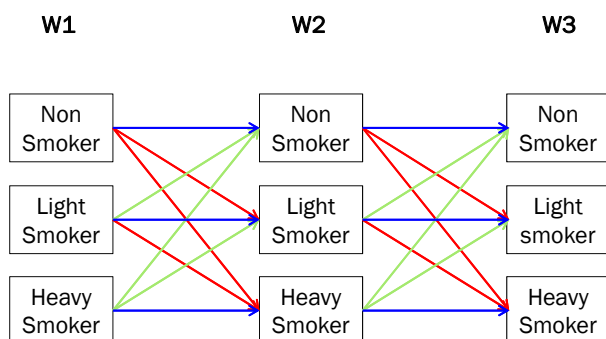


Table 2. Transitional probabilities across 3 waves

		NS	LS	HS
		Wave 2		
Wave 1	NS	94.0%	5.7%	0.3%
	LS	36.3%	59.5%	4.2%
	HS	10.0%	22.8%	67.2%
		Wave 3		
Wave 2	NS	93.6%	6.2%	0.2%
	LS	32.2%	62.8%	5.0%
	HS	6.7%	28.4%	64.9%
		Overall Transition Rate		
		Wave 3		
Wave 1	NS	93.6%	6.2%	0.2%
	LS	38.6%	55.8%	5.5%
	HS	14.5%	28.2%	57.3%



Results

- Most participants are not current smokers over a year
- Among current smokers, most are light smokers
- Non-current smokers and heavier smokers were more likely to retain their smoking status across time than to transition



Results

- About half of baseline light smokers maintained their light smoking status over one year, whereas the others transitioned to non-current smoking or heavier smoking
- Current ECIG use predicted transitions from non-smoking to light smoking ($p < .05$), and from light smoking to heavier smoking ($p < .05$)



Conclusions

- Markov modeling provided useful information on transitions of smoking status among college students.
- Light smoking behavior is not stable during college
- ECIG use is associated with transitioning from non smoking to smoking and to a higher level of smoking



Implications

- The findings indicated opportunities for prevention programs
- Preventing ECIG use may inhibit the escalating of cigarette consumption among college students.



Disclosures

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- The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH or the Food and Drug Administration.

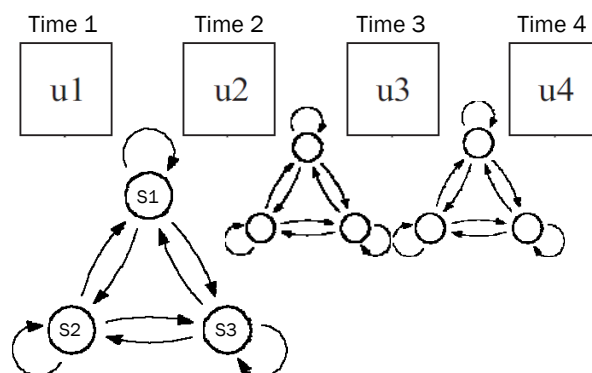




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Markov Model

- Describe transitional process through states in continuous time



Markov Models

- Hidden Markov Model (HMM)