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Project: Differential Gene Expression and Pulmonary Function in Vaping LatinX Adolescents

Analyst: Trent Hawkins

Investigator(s): Sunita Sharma, MD

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Center for Innovative Design & Analysis

colorado school of public health

Background

The data presented in this report are part of a study aimed to assess differential gene expression and methylation in vaping versus non-vaping LatinX youths in Pueblo and Denver, CO. Pulmonary function data were also obtained in order to better understand the impacts of vape use on pulmonary function. To assess differential gene expression and methylation, naso-epithelial swabs were obtained from each participating subject. Pulmonary function is assessed using PFTs (Pulmonary Function Tests) and Impulse Oscillometry (IOS).

Study Population

yrs

This data set consists of samples taken from 51 people ages 12-17 from the Pueblo, Denver, and Aurora, CO areas. Vape Status (did you vape in the last 6 months?) and ethnicity are self-reported.

Methods

All analyses performed using R version 4.1.2 (2021-11-01)

Clinical Data Processing

Vape Status

Subjects are dichotomized to those that used a vaping device in the last 6 months and those who have not based on the variables *ever_vape*, *vape_days*, and *last_vape*. This variable will be referred to as *Vape Status* throughout this report. *Vape Status* could not be confirmed for one individual. Any analyses including *Vape Status* will have a sample size of **n = 50** assuming no missing values for the other included variables.

Previous analyses showed **n = 12** participants had vaped in the last 6 months. This analysis will use **n = 13** participants who had vaped in the last 6 months. One participant (SID = 111) reported that they had used a vaping device 5 out of the last 30 days, but did not respond to *last_vape*. They were labeled as "NA" in previous analyses.

actual #'s would be in the results section,
methods is just for the steps you took

Sex

Biological sex will need to be identified using available genomic data.

Geographic Location

Subjects’ geographic location, *city*, was grouped into the new broader variable *recruiting_center* which encompasses the broader geographic area where they live.

Lung Function and IOS

Measures of lung function and IOS were visually inspected for normality using histograms. The lung function variable *fev1* and *fev1_fvc* reported 22 missing values. IOS measures *r5* and *x20* reported 1 and 6 missing values, respectively.

would be in the results section

Gene-Count Processing

Annotation: Ensembl
Differential Expression Analysis: DESeq2
Removal of Unwanted Variance: RUVSeq

Gene counts were quantified using Ensembl annotation for GrCh 38 ver. 37.

- Library Size: Gene filtering parameters
 - Removed genes with count = 0 and genes with range of counts > 100
- Normalization:
 - Variance Stabilizing Transformation (VST) found in code
- Technical effects:
 - Used RUVr which uses factor analysis on residuals
 - K = 4 nuisance factors? interesting I didn't think RUVr had nuisance factors, but I could be wrong

Results

After removing participants with missing values for *vape status*, we are left with **n = 50** subjects.

Table 1: Clinical Data so here is where the results of the number of subjects from earlier would go

Code

	Did Not Vape in Last 6 Months (N=37)	Vaped in Last 6 Months (N=13)	Total (N=50)
Gender			
Female	20 (54.1%)	5 (38.5%)	25 (50.0%)
Male	16 (43.2%)	8 (61.5%)	24 (48.0%)
Non-Binary	1 (2.7%)	0 (0.0%)	1 (2.0%)
Age (yrs)			
Mean (SD)	14.6 (1.4)	14.8 (1.4)	14.6 (1.4)
Range	12.0 - 17.0	13.0 - 17.0	12.0 - 17.0
Recruitment Center			
Aurora	16 (43.2%)	0 (0.0%)	16 (32.0%)
CommCity/Denver	11 (29.7%)	1 (7.7%)	12 (24.0%)
Pueblo	10 (27.0%)	12 (92.3%)	22 (44.0%)
Ethnicity			
LatinX	23 (62.2%)	11 (84.6%)	34 (68.0%)
Non-LatinX	14 (37.8%)	2 (15.4%)	16 (32.0%)
fev1 just a little formatting error FEV1			
N-Miss	10	12	22
Mean (SD)	2.6 (0.7)	3.9 (NA)	2.6 (0.7)
Range	1.2 - 3.9	3.9 - 3.9	1.2 - 3.9
FEV1/FVC (%)			
N-Miss	10	12	22

	Did Not Vape in Last 6 Months (N=37)	Vaped in Last 6 Months (N=13)	Total (N=50)
Mean (SD)	0.8 (0.1)	0.7 (NA)	0.8 (0.1)
Range	0.5 - 1.0	0.7 - 0.7	0.5 - 1.0
R5			
N-Miss	1	0	1
Mean (SD)	4.0 (0.9)	5.0 (1.3)	4.3 (1.1)
Range	2.0 - 6.1	3.7 - 7.6	2.0 - 7.6
X20			
N-Miss	4	2	6
Mean (SD)	0.1 (0.6)	0.7 (0.9)	0.2 (0.7)
Range	-1.1 - 2.4	-1.0 - 2.3	-1.1 - 2.4

Code

Figure 1: Population Demographics

Figure 1 visualizes the demographic information presented in Table 1. The majority of vaping subjects were recruited in Pueblo (92%) and identified as LatinX (85%). 62% of vapers identified as male.

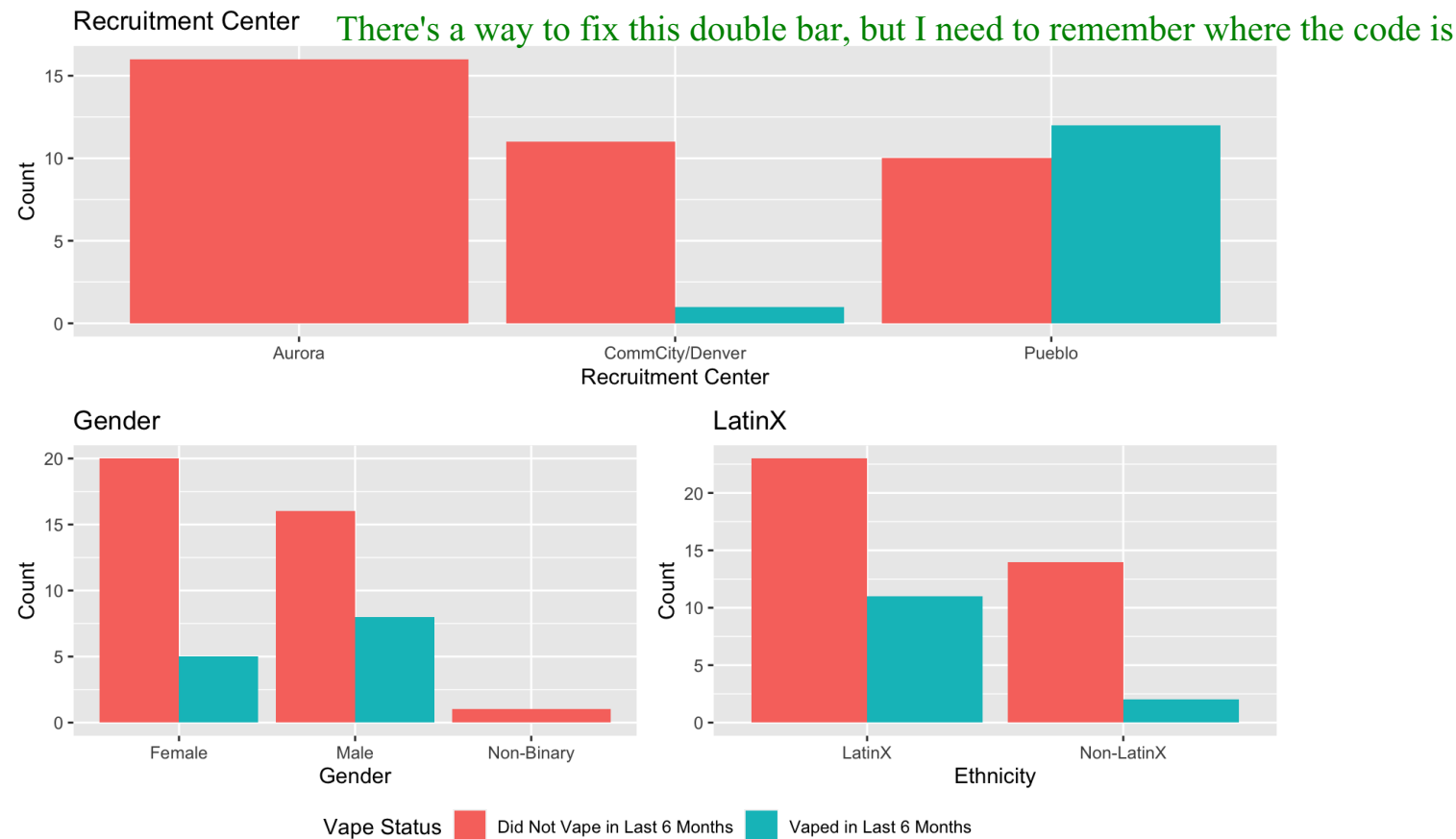


Figure 2: Pulmonary Function

Figure 2 is a visualization of the pulmonary function ($\frac{FEV1}{FVC}$) and IOS (*R5* and *X20*) variables. $\frac{FEV1}{FVC}$ was only completed by **n = 22** individuals from the study population. *R5* and *X20* represent **n = 49** and **n = 44** individuals, respectively.

Code

