the-data-miners

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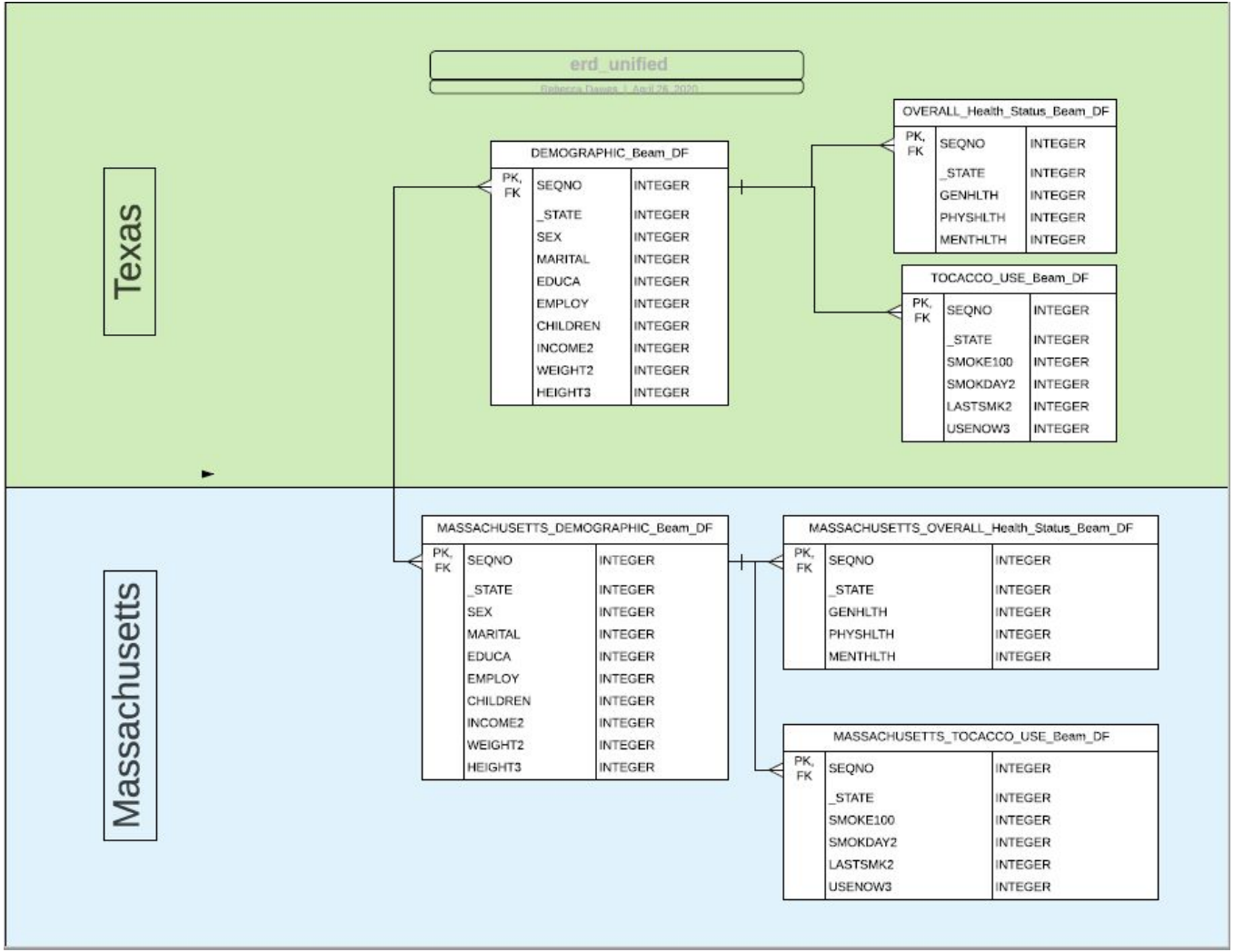
Introduction to The Behavioral Risk Factor Surveillance System (BRFSS)

- Yearly telephone survey by the Centers for Disease Control
- Measures behavioral and personal risk factors for disease
- 400,000 telephone interviews yearly with hundreds of questions
- Publicly accessible, anonymized public health data set

Research question: Does smoking status have a differing association with general mental and physical health differently in Texas and Massachusetts, states with different average educational attainment and average income?


erd_unified
Rebecca Dawes | April 26, 2020
Texas
DEMOGRAPHIC_Beam_DF
PK, FK
SEQNO INTEGER
_STATE INTEGER
SEX INTEGER
MARITAL INTEGER
EDUCA INTEGER
EMPLOY INTEGER
CHILDREN INTEGER
INCOME2 INTEGER
WEIGHT2 INTEGER
HEIGHT3 INTEGER
OVERALL_Health_Status_Beam_DF
PK, FK
SEQNO INTEGER
_STATE INTEGER
GENHLTH INTEGER
PHYSHLTH INTEGER
MENTHLTH INTEGER
TOCACCO_USE_Beam_DF
PK, FK
SEQNO INTEGER
_STATE INTEGER
SMOKE100 INTEGER
SMOKDAY2 INTEGER
LASTSMK2 INTEGER
USENOW3 INTEGER
Massachusetts
MASSACHUSETTS_DEMOGRAPHIC_Beam_DF
PK, FK
SEQNO INTEGER
_STATE INTEGER
SEX INTEGER
MARITAL INTEGER
EDUCA INTEGER
EMPLOY INTEGER
CHILDREN INTEGER
INCOME2 INTEGER
WEIGHT2 INTEGER
HEIGHT3 INTEGER
MASSACHUSETTS_OVERALL_Health_Status_Beam_DF
PK, FK
SEQNO INTEGER
_STATE INTEGER
GENHLTH INTEGER
PHYSHLTH INTEGER
MENTHLTH INTEGER
MASSACHUSETTS_TOCACCO_USE_Beam_DF
PK, FK
SEQNO INTEGER
_STATE INTEGER
SMOKE100 INTEGER
SMOKDAY2 INTEGER
LASTSMK2 INTEGER
USENOW3 INTEGER

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cdc_modeled

```
%%bigquery
CREATE TABLE cdc_modeled.DEMOGRAPHIC_2011 AS
SELECT * FROM(
SELECT distinct SEQNO, _STATE, SEX, MARITAL, EDUCA, EMPLOY, CHILDREN, INCOME2, WEIGHT2, HEIGHT3 from cdc_s
taging.2011
WHERE _STATE = 48
)
```

```
%%bigquery
CREATE TABLE cdc_modeled.DEMOGRAPHIC_2012 AS
SELECT * FROM(
SELECT distinct SEQNO, _STATE, SEX, MARITAL, EDUCA, EMPLOY, CHILDREN, INCOME2, WEIGHT2, HEIGHT3 from cdc_s
taging.2012
WHERE _STATE = 48
)
```

```
%%bigquery
CREATE TABLE cdc_modeled.OVERALL_Health_Status_2013 AS
SELECT * FROM(
SELECT SEQNO, _STATE, GENHLTH, PHYSHLTH, MENTHLTH from cdc_staging.2013
WHERE _STATE=48
)
```

```
%%bigquery
CREATE TABLE cdc_modeled.DEMOGRAPHIC_float AS
SELECT * FROM(
SELECT SEQNO, _STATE, SEX, MARITAL, EDUCA, EMPLOY, CHILDREN, INCOME2, WEIGHT2, HEIGHT3
FROM cdc_modeled.DEMOGRAPHIC_2011
UNION ALL
SELECT SEQNO, _STATE, SEX, MARITAL, EDUCA, EMPLOY, CHILDREN, INCOME2, WEIGHT2, HEIGHT3
FROM cdc_modeled.DEMOGRAPHIC_2012
UNION ALL
SELECT SEQNO, _STATE, SEX, MARITAL, EDUCA, EMPLOY1, CHILDREN, INCOME2, WEIGHT2, HEIGHT3
FROM cdc_modeled.DEMOGRAPHIC_2013)
```

```
%%bigquery
CREATE TABLE cdc_modeled.DEMOGRAPHIC AS
SELECT CAST(SEQNO AS INT64) SEQNO,
CAST(_STATE AS INT64) _STATE,
CAST(SEX AS INT64) SEX,
CAST (MARITAL AS INT64) MARITAL,
CAST (EDUCA  AS INT64) EDUCA,
CAST (EMPLOY  AS INT64) EMPLOY,
CAST (CHILDREN  AS INT64) CHILDREN,
CAST (INCOME2  AS INT64) INCOME2,
CAST (WEIGHT2  AS INT64) WEIGHT2,
CAST (HEIGHT3  AS INT64) HEIGHT3
FROM cdc_modeled.DEMOGRAPHIC_float
```

```
%run DEMOGRAPHIC_beam.py
```

```
WARNING:apache_beam.runne
WARNING:apache_beam.runne
PCollection visualization
necessary dependencies to
/home/jupyter/venv/lib/py
g: options is deprecated
```

```
%run DEMOGRAPHIC_beam.py
```

```
query_results PCollection[Re
/home/jupyter/venv/lib/pytho
g: options is deprecated sin
d
  experiments = p.options.vi
INFO:apache_beam.runners.dir
```

Beam Pipelines

Data cleansing tasks:

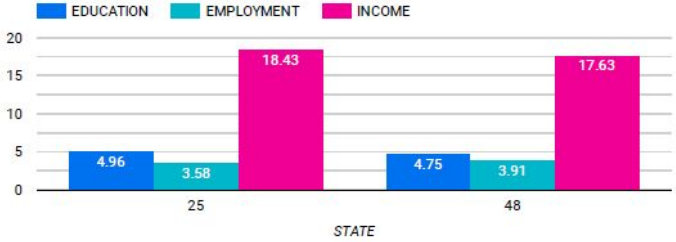
1. Replace “none” with 0
2. Remove outliers
3. Remove special codes
4. Unit standardization for height and weight

Combining Datasets and Cross-Dataset Queries

Demo

https://121e03b141109d7d-dot-us-central1.notebooks.googleusercontent.com/lab/workspaces/auto-Y?authuser=0

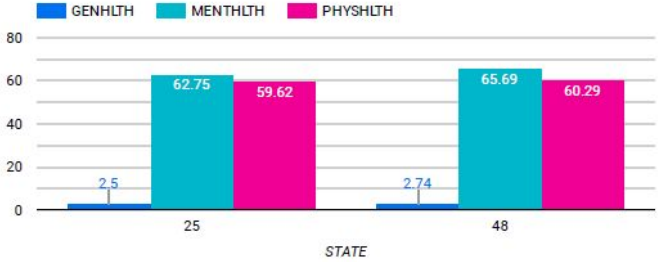
Average_demographics_in_TEXAS_and_MASSACHUSETTS



This column chart looks at the average Education, Employment and Income in the states of Texas (STATE = 48) and Massachusetts (STATE = 25).

Education and Income rates are slightly higher Massachusetts, however Employment rate is higher in Texas.

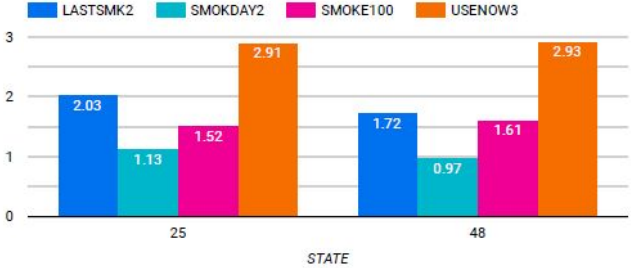
Average_Overall_Health_in_TEXAS_and_MASSACHUSETTS



This column chart looks at the average General Health, Mental Health and Physical Health in the states of Texas (STATE = 48) and Massachusetts (STATE = 25).

It is clear that Texas has a better overall health status than Massachusetts. Texas is higher that Massachusetts based on all the factors of General, Mental and Physical health.

Average_Tobacco_Use_in_TEXAS_and_MASSACHUSETTS



This column chart looks at the average Tobacco use in the states of Texas (STATE = 48) and Massachusetts (STATE = 25).

The graphs average values are unable to give a clear trend on whether Texas or Massachusetts has worse smoking rates. Texas ranks higher in terms of LASTSMK2 and SMOKEDAY2, however, Massachusetts has higher SMOKE100 and USENOW3 rates.

Workflow

Functionalities:

- Explicitly state functionality of cdc_staging and cdc_modeled to create staging and modeled datasets and to load in data
- Create and update tables after cleansing through referenced beam.py pipelines

https://121e03b141109d7d-dot-us-central1.notebooks.googleusercontent.com/lab?authuser=0

Future Improvements

- Expand number of responses and tables
- Conduct analysis for more years
- Expand to different states
- Look at more health related trends from the same datasets

Citations

1. Centers for Disease Control and Prevention. The Behavioral Risk Factor Surveillance System. Kaggle. Accessed: January 31, 2020. https://www.kaggle.com/cdc/behavioral-risk-factor-surveillance-system/version/1
2. 2018: ACS 1-Year Estimates Subject Tables - Educational Attainment. United States Census. Accessed May 7th. https://data.census.gov/cedsci/table?q=Educational%20Attainment&hidePreview=true&tid=ACSST1Y2018.S1501&t=Educational%20Attainment&vintage=2018&g=0400000US48,25