



Where are the kids?

A look at chronic absenteeism
in TN schools

UrLeaka Newsome -- Nashville Software School
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What is Chronic Absenteeism?

According to the TN Department of Education, chronic absenteeism is defined “as a student missing 10 percent or more of the days the student is enrolled-for any reason, including excused absences and out-of-school suspensions.”

(<https://www.tn.gov/education/student-support/chronic-absenteeism.html>)

Consequences of Excessive Absences from School Include:

Loss of instructional time →

decrease in student achievement →

decrease in student growth →

negatively impact college and career goals

What could contribute to chronic absenteeism?

- Chronic or long – term illness
- Concern for mental health / behavioral issues
- Socioeconomic status (low income students miss school more frequently)
- Personal experience

Inquiry

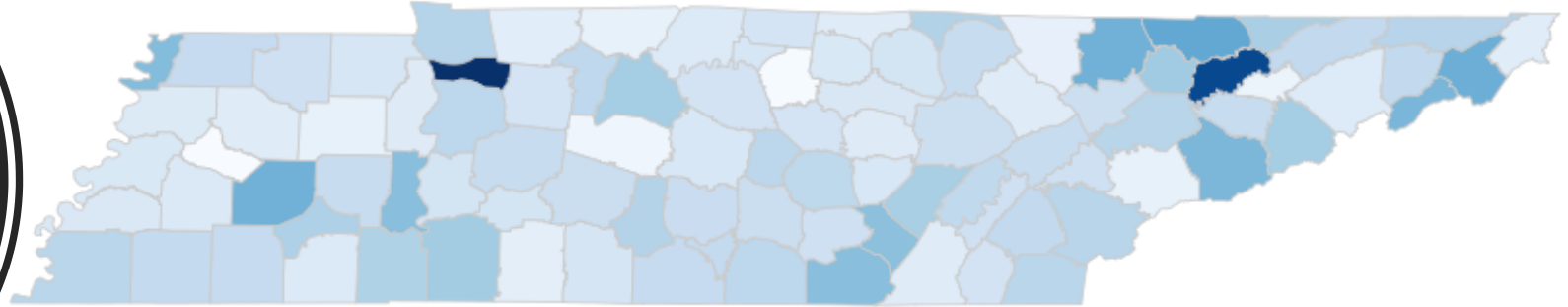
- Question: Is there a connection to public health of a community and quality of education / absentee rates?
- Question: Can one make predictions about a community's level of chronic absenteeism based on other factors that help define the community?
- Question: Are there prevalent factors that can impact overall chronic absenteeism in a community?
 - Public Health
 - Social Factors
 - Potential Environmental Issues

What did I do?

- Sources :
 - TN Department of Education,
 - Tennessee Education Association,
 - University of Wisconsin Population Health Institute and the Robert Wood Johnson Foundation (CDC)
- Preparation
- Exploratory Data Analysis
- Predictive Model
- Note: Analysis does not include Achievement School District (ASD).

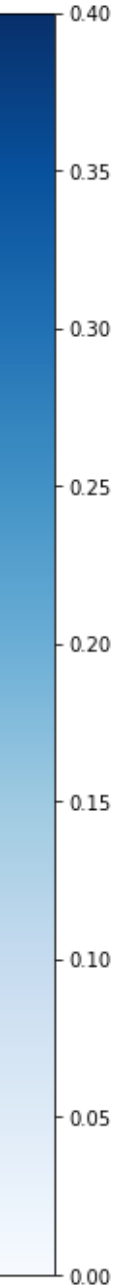
Discovery

Percentage of Chronically Absent Students in Tennessee



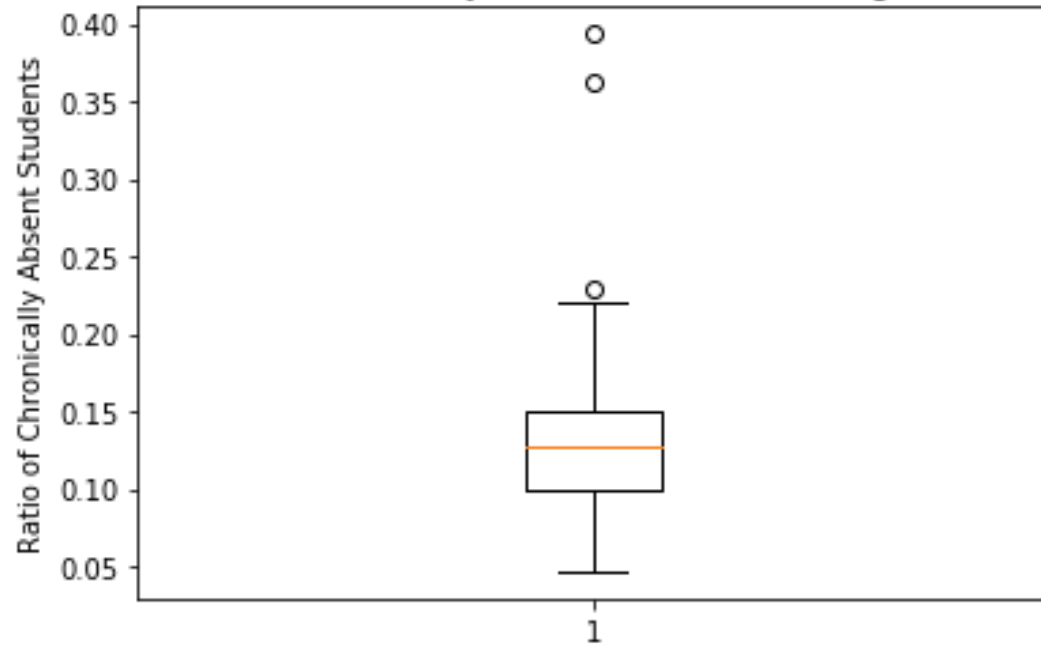
Average Chronic Absenteeism Rate for counties in TN
13.3%

Data Source: U.S. Census Bureau, 2010 & TN Dept. of Education 2017

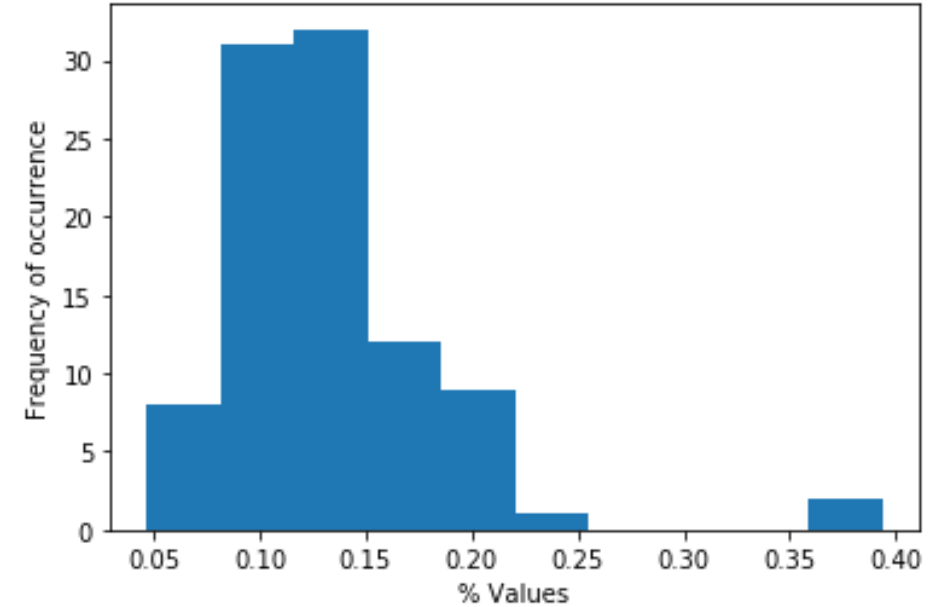


Exploration: Distribution

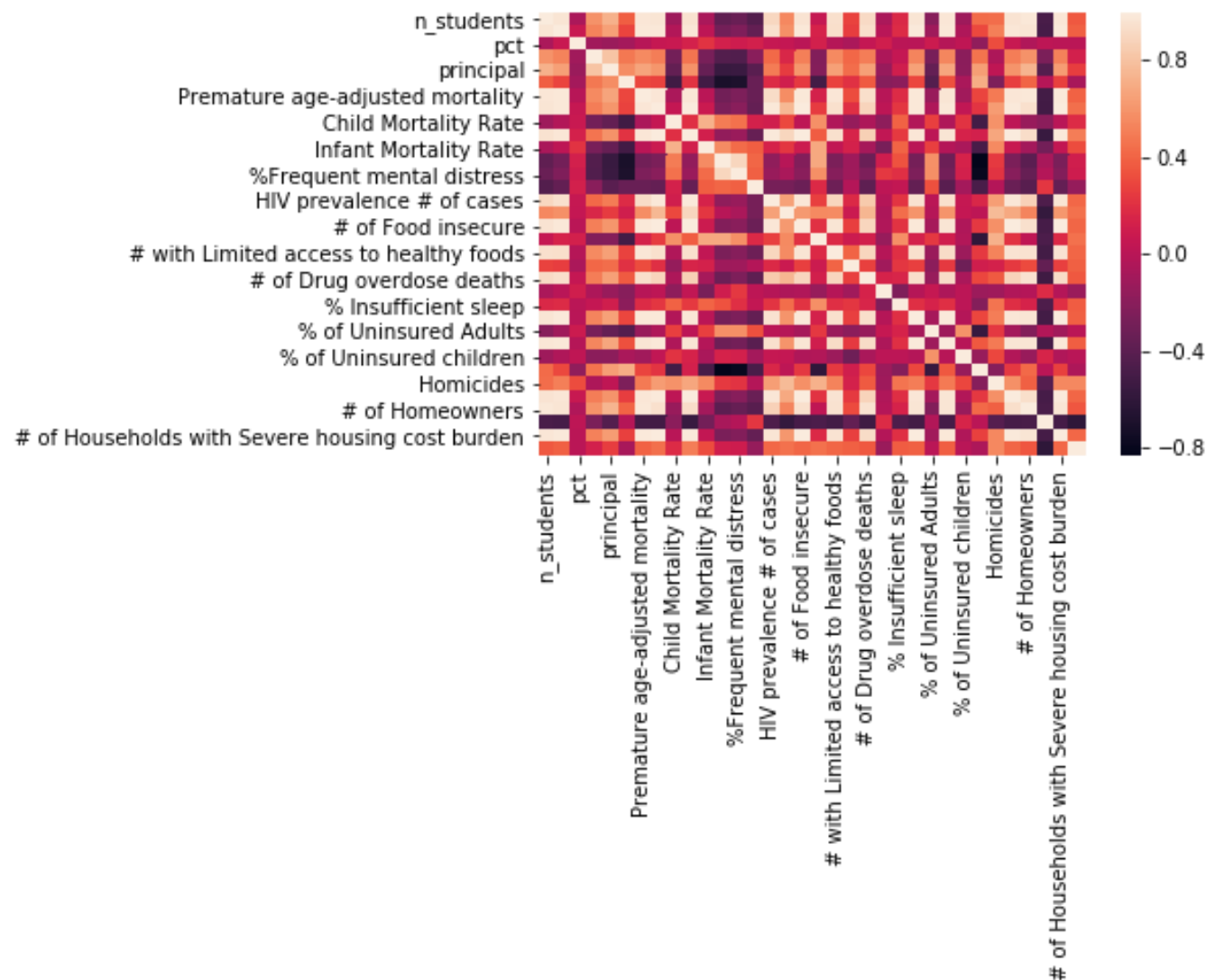
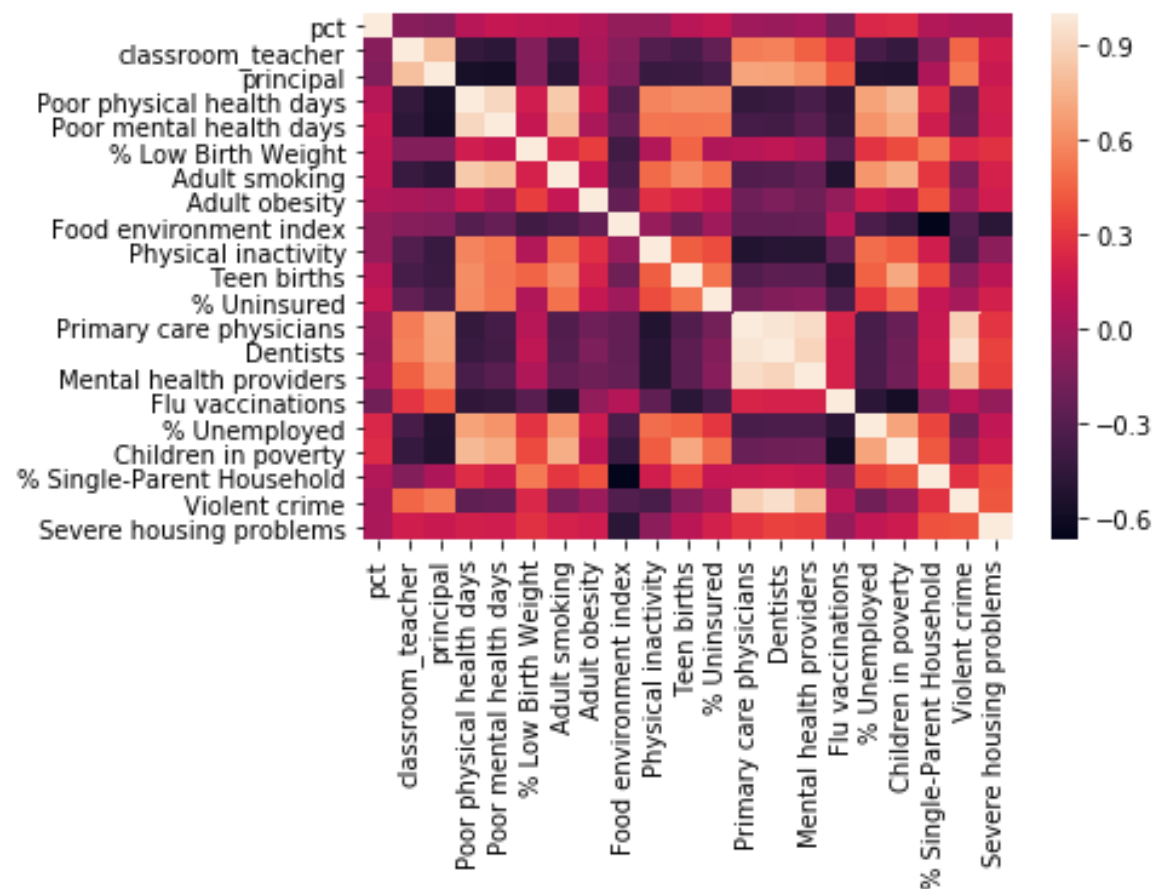
Distribution of Chronically Absent Students Amongst TN Counties



Histogram Characterizing Frequency of Chronic Absenteesim Amongst TN Counties



Correlation Maps

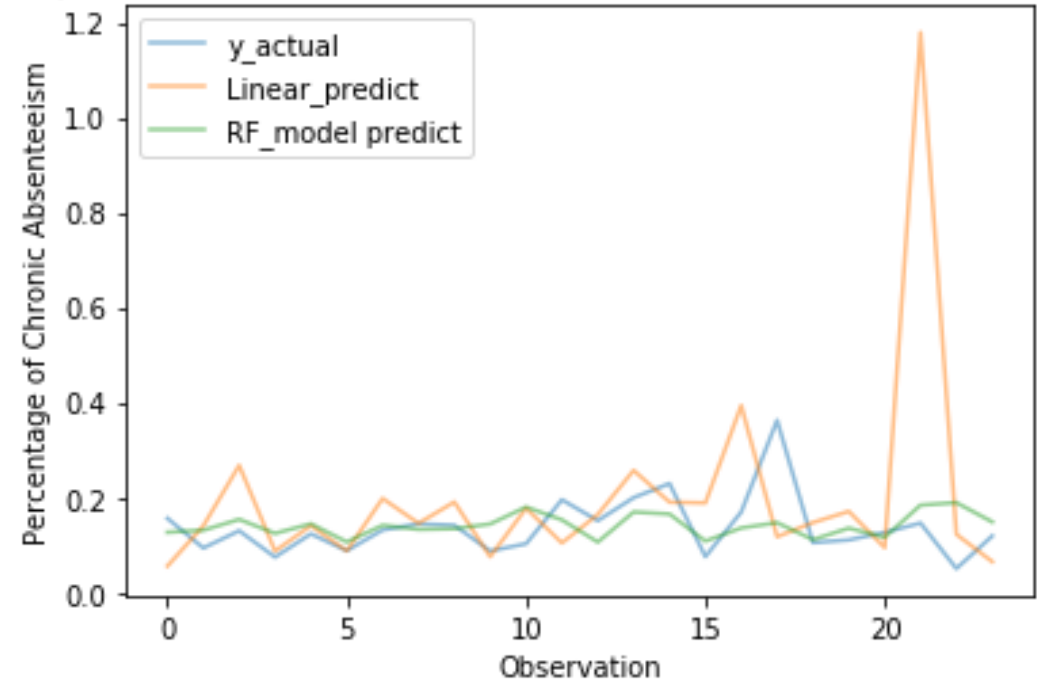


Predictive Model

	effect	error
Poor mental health days	1.533780e-01	0.130880
% Unemployed	1.795528e-02	0.022178
Infant Mortality Rate	1.582024e-02	0.011118
Adult obesity	8.538415e-03	0.005825
Adult smoking	6.354654e-03	0.008389
% of Uninsured children	6.003258e-03	0.028345
Children in poverty	5.978580e-03	0.004665
% of Uninsured Adults	3.867257e-03	0.022186
Flu vaccinations	2.776199e-03	0.002465
% of Severe Housing Cost Burden	2.366836e-03	0.010130
% Low Birth Weight	2.012967e-03	0.012526
Life expectancy	1.587947e-03	0.011374

Top 12 of 39 features considered

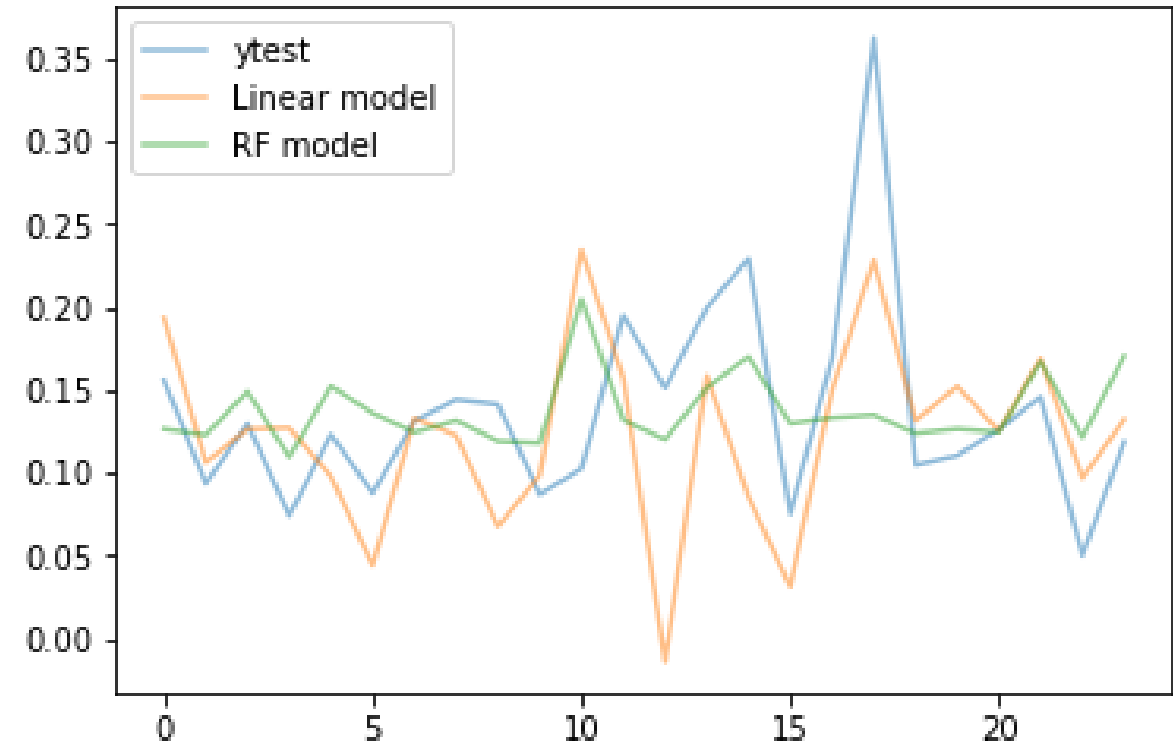
Comparison of Predictive Models for Chronic Absenteeism in TN Counties



Predictive Model

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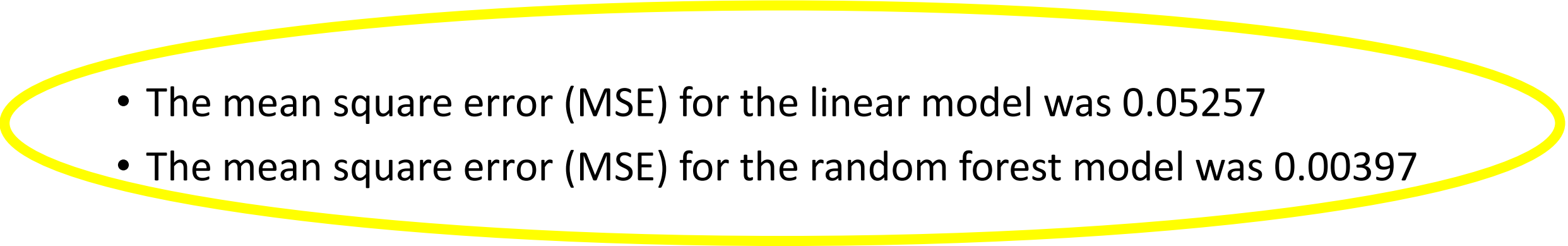


Moving Forward

- Further investigation
 - Still need to find data that supports more environmental factors
 - Consider the role of demographics (i.e. Age groups, Race/Ethnicity, etc.)
 - Expand investigation to multiple years
 - Create model that could be used from state to state depending on data available

Thank you!!

Additional Slides

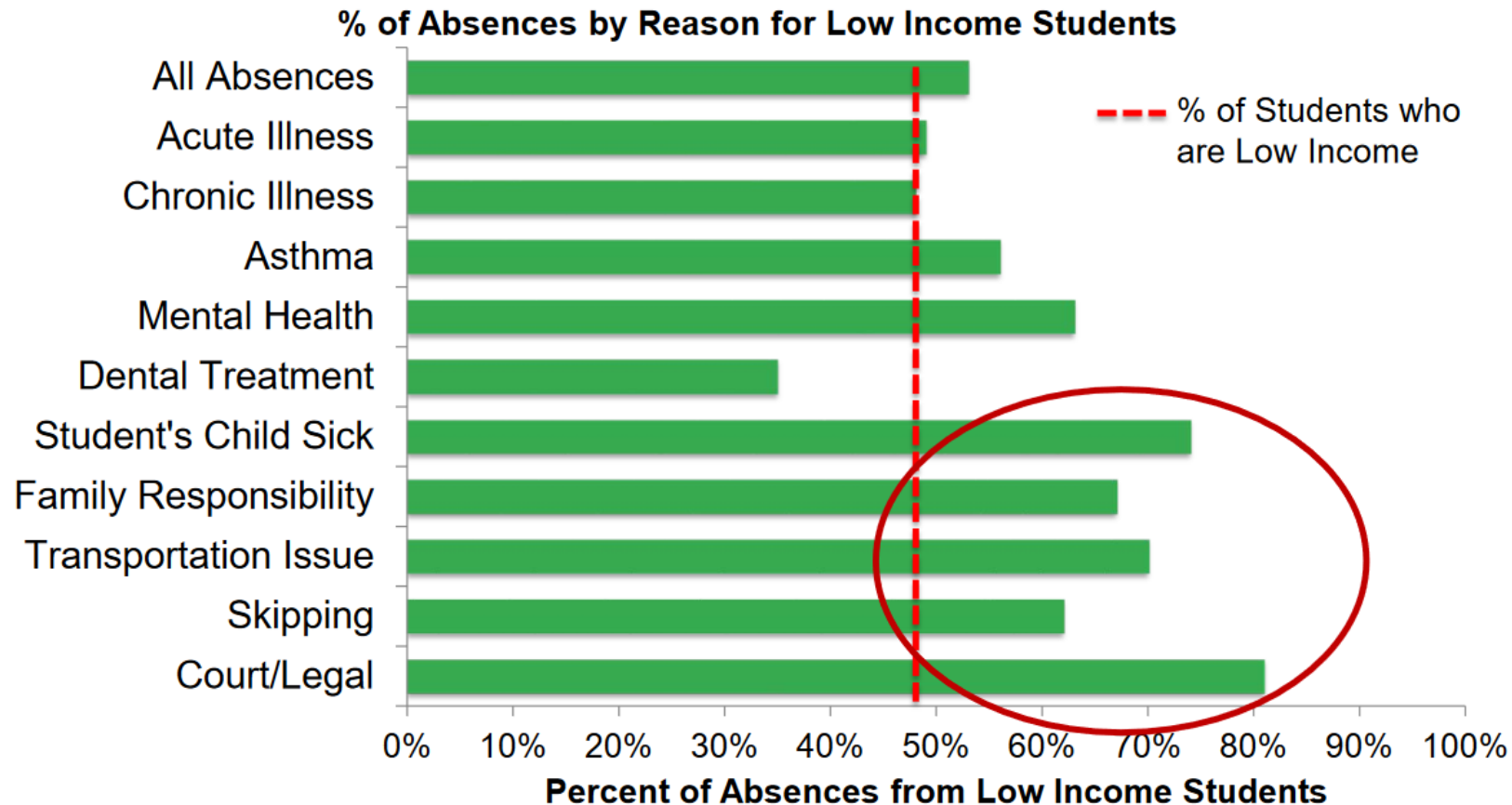
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- The mean square error (MSE) for the linear model was 0.05257
 - The mean square error (MSE) for the random forest model was 0.00397
 - The root mean square error (RMSE) for the linear model was 0.22928
 - The root mean square error (RMSE) for the random forest model was 0.06306
 - The mean absolute error (MAE) for the linear model was 0.10810
 - The mean absolute error (MAE) for the random forest model was 0.04392

- The mean square error (MSE) for the linear model was 0.00445
- The mean square error (MSE) for the random forest model was 0.00392
- The root mean square error (RMSE) for the linear model was 0.06671
- The root mean square error (RMSE) for the random forest model was 0.06262
- The mean absolute error (MAE) for the linear model was 0.04805
- The mean absolute error (MAE) for the random forest model was 0.04441

effect	error	
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% Low Birth Weight	2.012967e-03	0.012526
Life expectancy	1.587947e-03	0.011374
Drug Overdose Mortality Rate	1.429169e-03	0.001275
% of Homeowners	7.483313e-04	0.003311
# of Firearm fatalities	7.078335e-04	0.001076
Primary care physicians	7.059433e-04	0.000658
Violent crime	1.400402e-04	0.000123
% Uninsured	1.351271e-04	0.029050
HIV Prevalence Rate	1.735406e-05	0.000178
classroom_teacher	3.165303e-06	0.000006
principal	1.097783e-06	0.000002

Median household income	2.813301e-07	0.000003
# of Households with Severe housing cost burden	-3.432733e-06	0.000038
Premature age-adjusted mortality	-4.089742e-05	0.000088
Mental health providers	-1.195661e-04	0.000267
Severe housing problems	-3.034072e-04	0.008896
Teen births	-7.969505e-04	0.001959
Child Mortality Rate	-8.587819e-04	0.001218
% Single-Parent Household	-1.179948e-03	0.002816
Dentists	-1.890640e-03	0.001358
% Insufficient sleep	-2.945012e-03	0.008342
% Diabetes prevalence	-4.987517e-03	0.009763
Homicides	-5.845238e-03	0.008310
Physical inactivity	-8.819751e-03	0.004175
% of limited access to healthy foods	-9.873472e-03	0.018790
% of Food Insecure	-1.979509e-02	0.030013
% Frequent physical distress	-2.587153e-02	0.025625
%Frequent mental distress	-2.770411e-02	0.024326
Food environment index	-1.091789e-01	0.193318

Low Income Students Have More than Their Share of Non-Medical Absences



Source: E3 Alliance analysis of Absence data
from 9 schools in PISD & HCISD, 1/14/13-3/8/13

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