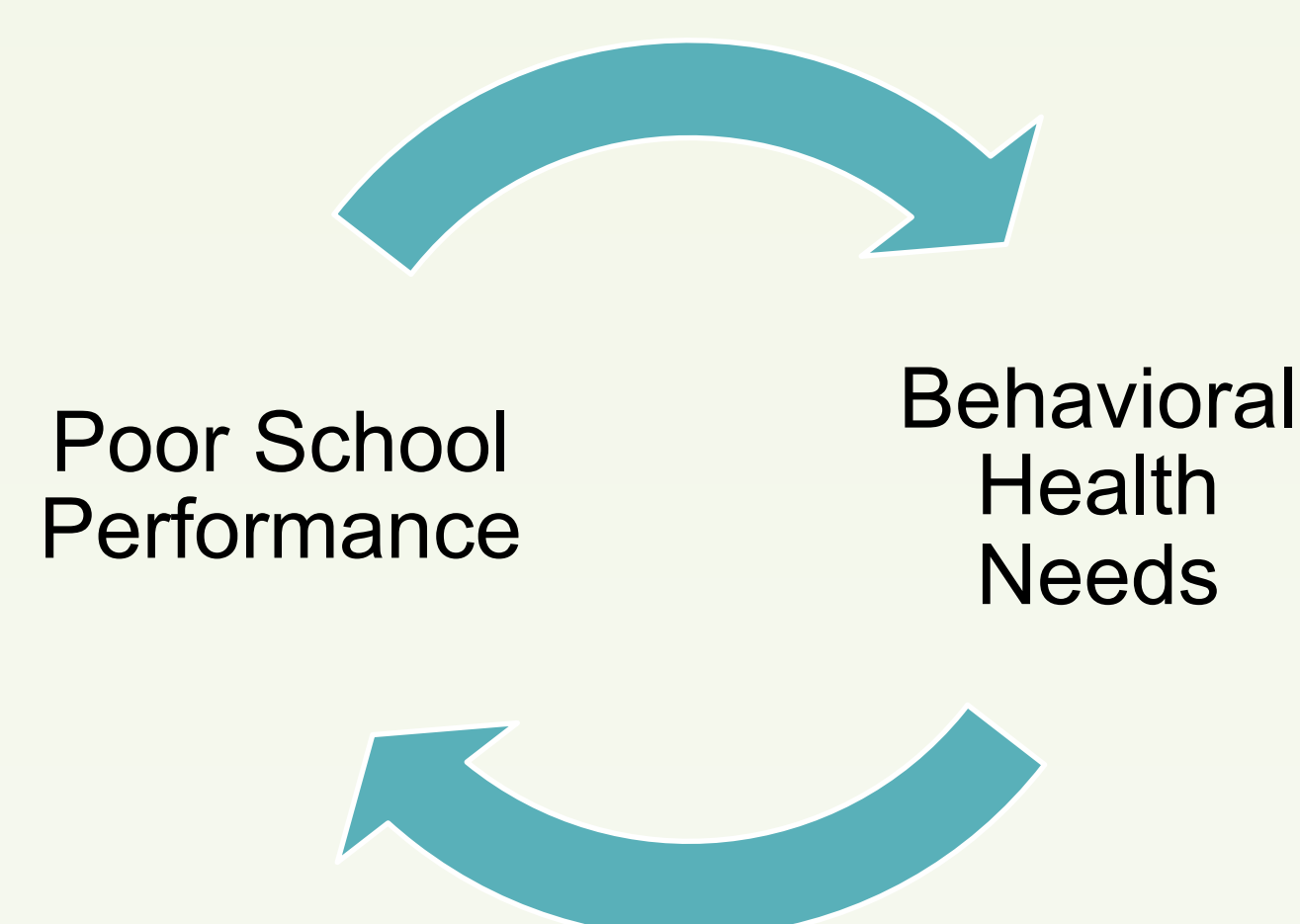


Can Academic Data Predict Behavioral Health Outcomes for High School Students?

Eryn Piper Block, MPP¹; Sheryl H. Kataoka, MD, MS²; Lingqi Tang, PhD²; Paul Chung, MD, MS³; Rebecca Dudovitz, MD, MS³
 1. UCLA Dept. of Health Policy and Management, 2. UCLA Department of Psychiatry, Center for Health Services and Society, 3. UCLA Dept. of Pediatrics

Background

- Many adolescents with behavioral health needs, such as depression and substance abuse, fail to seek early treatment, when their conditions might be more easily managed
- Academic performance, (grades, test scores, attendance, and educational attainment) is associated with adolescent behavioral health outcomes.^{1,2,3}



- Academic data is regularly collected and tracked and nearly all adolescents
- **However, no studies test whether academic data predict whether students are at risk for behavioral health needs**

Objectives

- Develop a risk-indicator tool to identify students with high risk for depression, substance use and comorbidity using nationally representative data
- Test the sensitivity, specificity and predictive value of the tool to identify each behavioral health outcome in a validation dataset

Methods

Using the National Longitudinal Study of Adolescent to Adult Health (Add Health), we built separate models for each outcome using logistic regression and survey weights.

Sample was split for model building and validation.

Candidate academic variables were identified based on the literature and routine availability from school districts.

Pseudo R-squared in weighted models were used to select significant interactions and squared terms for inclusion.

Area Under the Curve (AUC), Brier Score and Calibration Slope used to validate.

Measures

Dependent Variables (each with own model)

- Depression (CES-D)
- Alcohol misuse (> 1/month)
- Marijuana misuse (> 1/month)
- Other drug use (> 1/month)
- Any substance misuse
- Comorbidity (Depression and substance misuse)

Predictors: Demographics

- Age
- Race
- Ethnicity
- Sex
- Free-or-Reduced Price Lunch Status

Predictors: Academic

- Current GPA
- Change from previous-year GPA to current GPA
- Excused absences (count)
- Unexcused absences (count)
- Ever expelled
- Ever suspended

Results

Descriptive Statistics

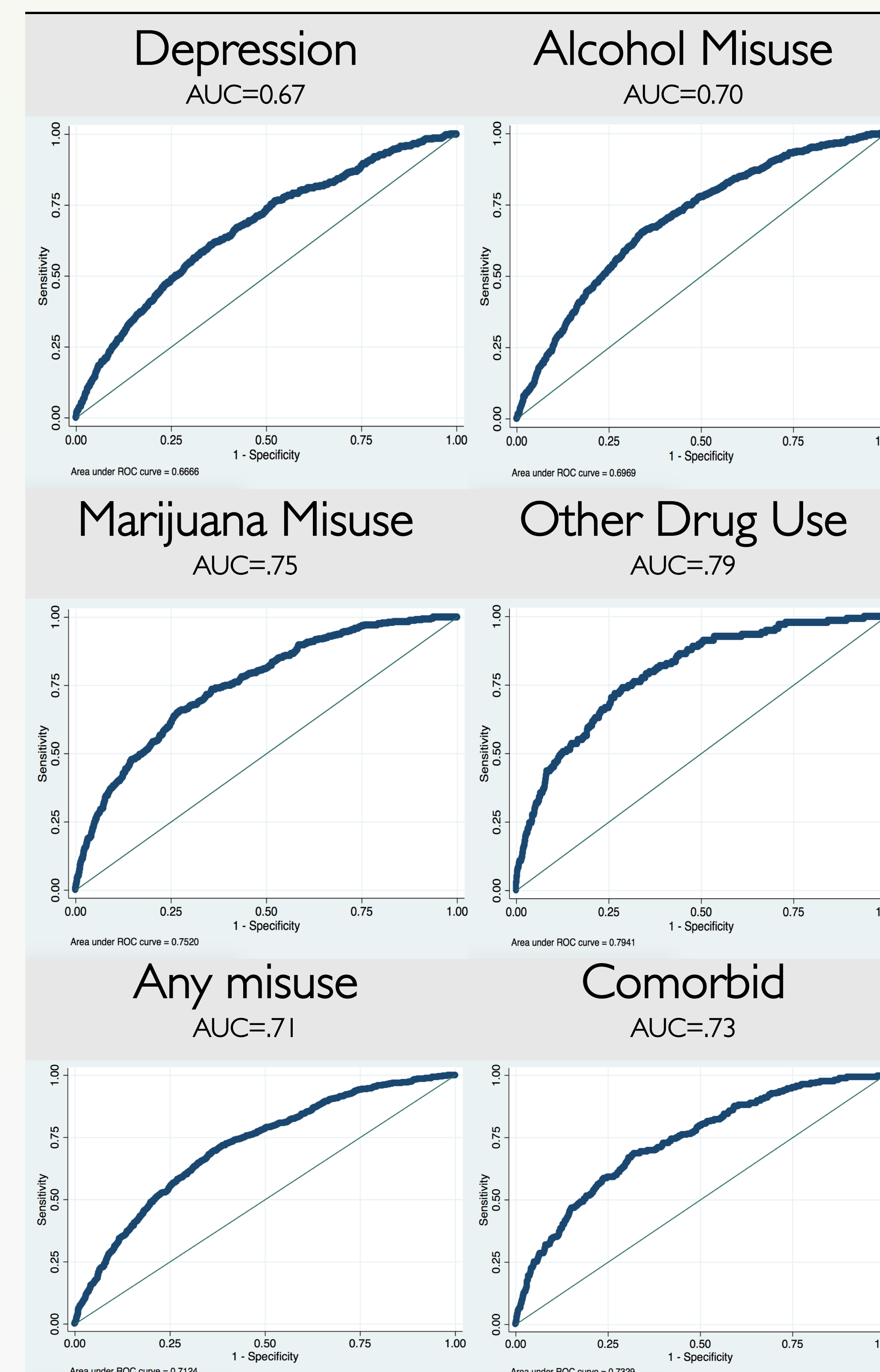
Variable Name	%
Female	49.8
Primary race	
White	71.9
African American	16.7
Native American	1.0
Asian	4.5
Other	5.9
Latino ethnicity	10.6
Free-or-Reduced-Price lunch status	
None	54.6
Reduced	7.9
Free	14.7
Missing	22.8
Grade in school	
9	1.7
10	27.7
11	27.0
12	43.2
Ever suspended	14.2
Ever expelled	1.9
Alcohol misuse	20.6
Marijuana misuse	13.4
Other drug Use	4.8
Any substance misuse	36.2
Depression	16.1
Comorbidity	7.6
	Mean
Current GPA	2.62
Proportion of courses with GPA decrease from prior Year	0.36
GPA change from prior year	.003
Mean excused absences	5.98
Mean unexcused absences	2.08

For each outcome, academic predictors added value over and above demographic information.

Conclusions

- Academic data can be used to predict behavioral health risk
- If validated, this presents new possibilities for population health management.
- Models that include interactions between demographics and academic variables achieved higher AUCs, suggesting the need for a “personalized” approach.
- ROC curves suggest that for some outcomes, the full models are only moderately predictive.
- Model performance improves as outcome severity increases

ROC Curves for Full Models



Next Steps

1. Validate and create risk index using validation sample
2. Validate externally using Los Angeles-specific student datasets

References

1. Bryant, A. L., Schulenberg, J. E., O'Malley, P. M., Bachman, J. G., & Johnston, L. D. (2003). How Academic Achievement, Attitudes, and Behaviors Relate to the Course of Substance Use During Adolescence: A 6-Year, Multiwave National Longitudinal Study. *Journal of Research on Adolescence*, 13(3), 361–397. <https://doi.org/10.1111/1532-7795.1303005>
2. Carter, P. L., & Welner, K. G. (2013). *Closing the opportunity gap: What America must do to give every child an even chance.* Oxford University Press.
3. Oberg, C., Colianni, S., & King-Schultz, L. (2016). Child Health Disparities in the 21st Century. *Current Problems in Pediatric and Adolescent Health Care*, 46(9), 291–312. <https://doi.org/10.1016/j.cppeds.2016.07.001>

Thank you to the Robert Wood Johnson Foundation Systems for Action Program for funding this work; and to The L.A. Trust for Children's Health and LAUSD School Mental health for their collaboration.