Women and men with Huntington's disease are **equally prone to suicidal ideation and attempt – but not suicide**

Huntington's disease (HD) is a terminal neurodegenerative disease associated with an array of crippling motor and cognitive impairments. Suicide has long been observed as a pressing clinical risk for those with HD (Paulsen et al., 2005; Wetzel et al., 2011). Yet, due to limited psychometric data, analysis has been limited, and the prevalence of suicidal thoughts and behaviors (STBs) remains somewhat enigmatic, especially with regards to demographic variation.
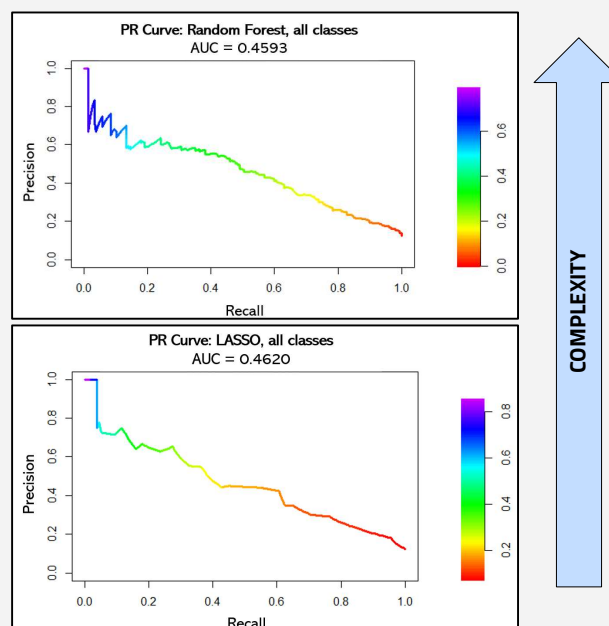
The only systematic review to investigate STB prevalence suggested inconsistencies with regards to sociodemographic risk factors (Kachian et al., 2019). For instance, **it is unknown how sex does or does not affect prevalence.** Using data from the Enroll-HD multinational dataset (N = 12 063, 54.02% female), **we found no sex difference in prevalence of suicidal thoughts or behaviors *outside of suicide*,** where men were more at-risk (χ^2 = 5.8077, $p < 0.05$).

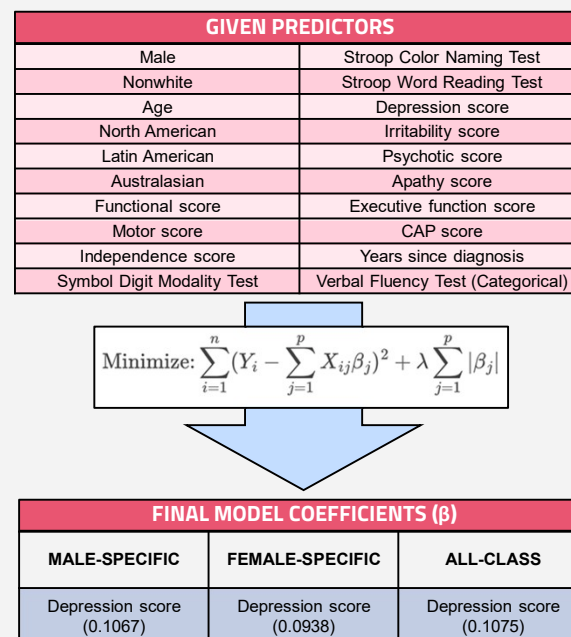| Symptom	Percentage – Female (N)	Percentage – Male (N)	χ^2	p^a
Any ideation in last two weeks	12.76% (2594)	12.18% (2431)	0.3405	0.5596
Attempt since last visit *given active ideation*	21.54% (130)	12.15% (107)	2.9898	0.0838
Suicide	0.15% (6516)	0.40% (5547)	*5.8077*	*0.0160*
a. X^2 values were calculated using a two-proportion Z-test.				

Interaction effects **do not influence suicidal ideation** in patients with Huntington's disease

Even as sex differences do not seem to affect prevalence of STBs in those with Huntington's disease, we suspected that risk factors would vary between affected groups (e.g., due to racial, ethnic, and sex differences). Here, suicidal ideation was evaluated rather than other STBs to allow for a reasonable sample size. Four models (random forest, male-specific LASSO, female-specific LASSO, all-class LASSO) were trained, with descending complexity. **Performance of model in terms of precision-recall AUC did not vary by model ability to capture potential interactions.**

PR Curve: Random Forest, all classes
AUC = 0.4593

PR Curve: LASSO, all classes
AUC = 0.4620

COMPLEXITY

One single construct predicts suicidal ideation in men and women with Huntington's disease: **depression**

With the development of male- and female-specific LASSO models, we may also evaluate which predictors are necessary for effective classification of ideators. **LASSO removed all included predictors aside from depression score in each model.**

GIVEN PREDICTORS	
Male	Stroop Color Naming Test
Nonwhite	Stroop Word Reading Test
Age	Depression score
North American	Irritability score
Latin American	Psychotic score
Australasian	Apathy score
Functional score	Executive function score
Motor score	CAP score
Independence score	Years since diagnosis
Symbol Digit Modality Test	Verbal Fluency Test (Categorical)

$$\text{Minimize: } \sum_{i=1}^{n}(Y_i - \sum_{j=1}^{p} X_{ij}\beta_j)^2 + \lambda \sum_{j=1}^{p}|\beta_j|$$

FINAL MODEL COEFFICIENTS (β)		
MALE-SPECIFIC	**FEMALE-SPECIFIC**	**ALL-CLASS**
Depression score (0.1067)	Depression score (0.0938)	Depression score (0.1075)

Predicting Suicidal Ideation in Patients with Huntington's Disease

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