



# Anxiety Sensitivity is a Leading Risk Factor of Severe or Widespread Pain Three Months After Motor Vehicle Collision

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## Background

- Approximately 4 million individuals are seen in US emergency department (ED) after motor vehicle collision (MVC) each year
- Severe and widespread pain are common sequelae of MVC in this population.
- Using data from a large prospective cohort study, we sought to identify the predictive factors that together most strongly predicted the development of severe and widespread pain, and to determine individual characteristics that most strongly influenced pain outcomes in the presence of other factors.

## Methods

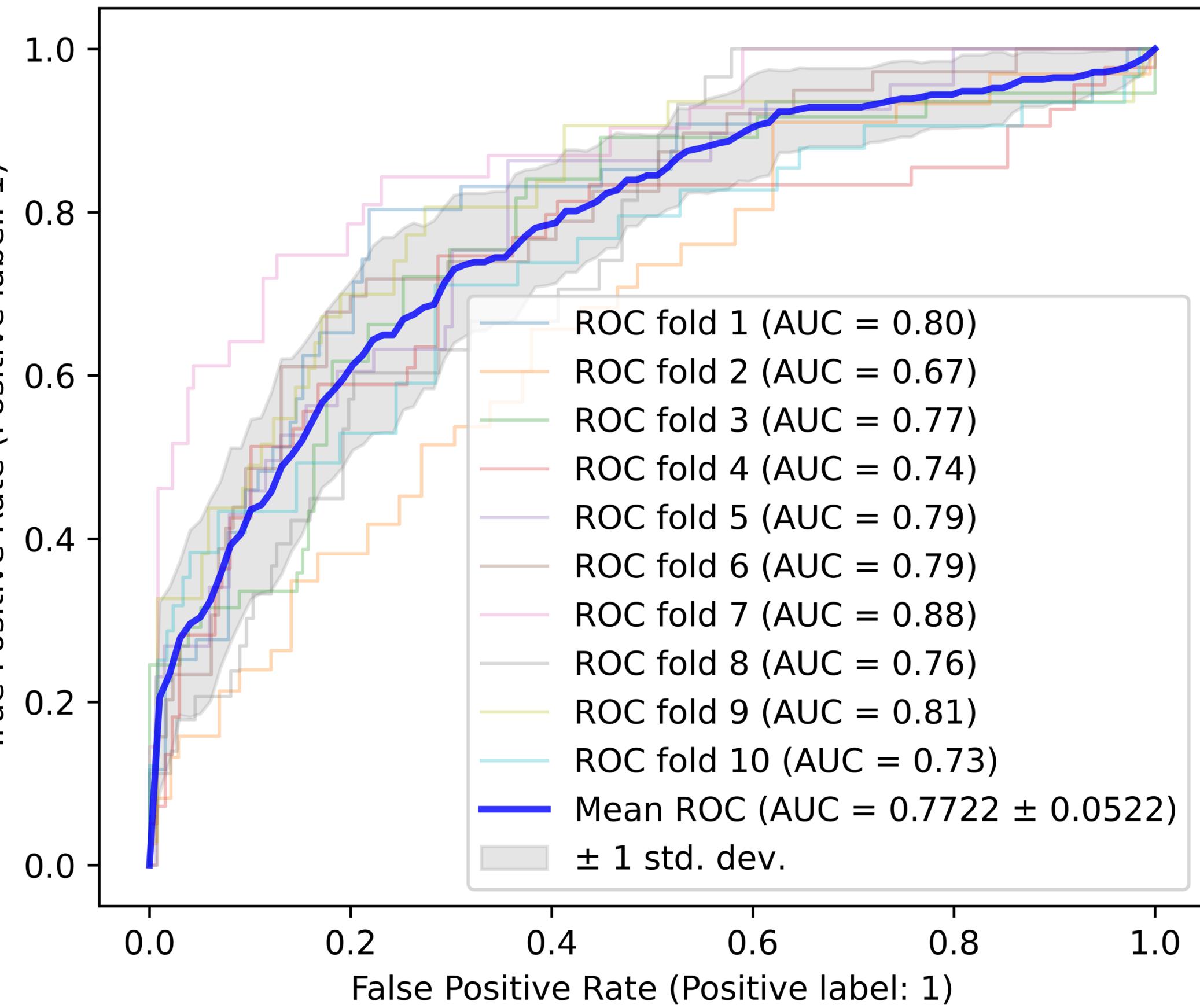
- ED patients 18-75 years old were recruited at 28 ED sites
- Individuals with previous severe or widespread pain were excluded from analyses of severe pain or widespread pain outcomes, respectively
- Candidate predictive characteristics assessed ( $p=265$ ) spanned 11 risk factor domains.
- Severe pain 3 months after MVC was defined by a Numeric Rating Scale score  $\geq 7$  (0-10 scale).
- Widespread pain 3 months after MVC was defined via 2016 diagnostic criteria (Wolfe et al 2016).
- LASSO regression was used to identify the group of most predictive factors.

**Table 1. Demographic Characteristics.**

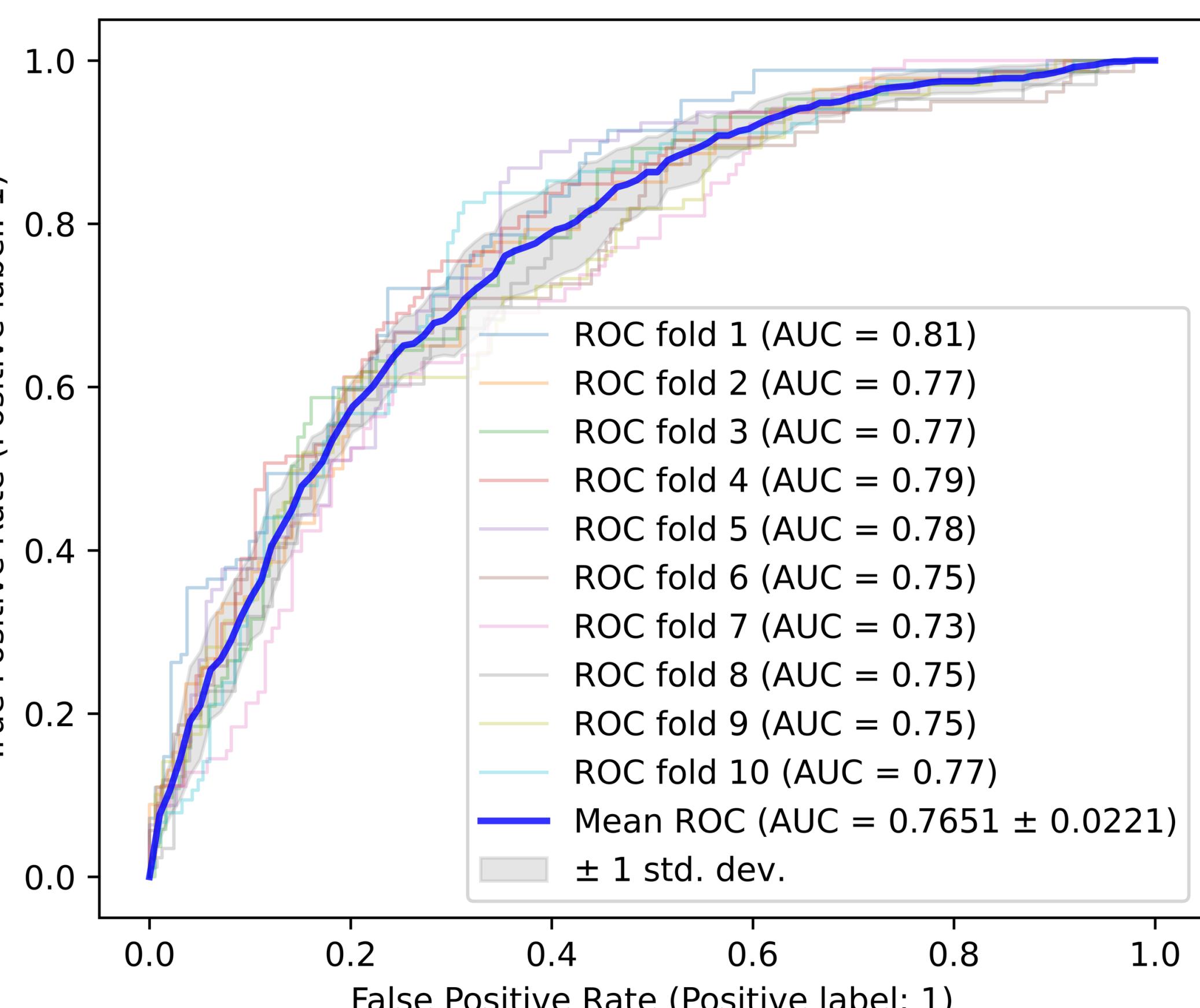
	Severe Pain Analysis Cohort <sup>a</sup> (N = 1,056)	Widespread Pain Analysis Cohort <sup>b</sup> (N = 1,376)
Age (y) (Mean, SD)	35.5 (13.0)	35.8 (13.0)
Gender (n, %)		
Female	704 (66.7)	942 (68.5)
BMI (Kg/m <sup>2</sup> ) (Mean, SD)	30.1 (8.1)	30.6 (8.4)
Race (n, %)		
Non-Hispanic White	373 (35.3)	452 (32.8)
Non-Hispanic Black	534 (50.6)	722 (52.5)
Hispanic	106 (10.0)	144 (10.5)
Non-Hispanic Other	40 (3.8)	56 (4.1)
Marital Status		
Married	226 (21.4)	300 (21.8)
Separated/Divorced/Widowed	184 (17.5)	235 (17.0)
Never been married	643 (60.9)	837 (60.8)
Income (n, %)		
<=\$19K	284 (26.9)	433 (31.5)
Employment Status (n, %)		
Employed	842 (79.7)	1041 (75.7)
Retired/Homemaker/Student	77 (7.3)	114 (8.3)
Unemployed	137 (13.0)	221 (16.1)
Education Status (n, %)		
Less than high school	84 (8.0)	134 (9.7)
High school graduate	263 (24.9)	362 (26.3)
Less than college	439 (41.6)	564 (41.0)
College graduate	269 (25.5)	314 (22.8)
Month 3 Severe Pain (n, %)	213 (20.2)	491 (35.7)
Month 3 Widespread Pain 2016 (n, %)		

<sup>a</sup>: Cohort removed those with pre-trauma moderate/severe pain (Pain NRS  $\geq 4$ ).

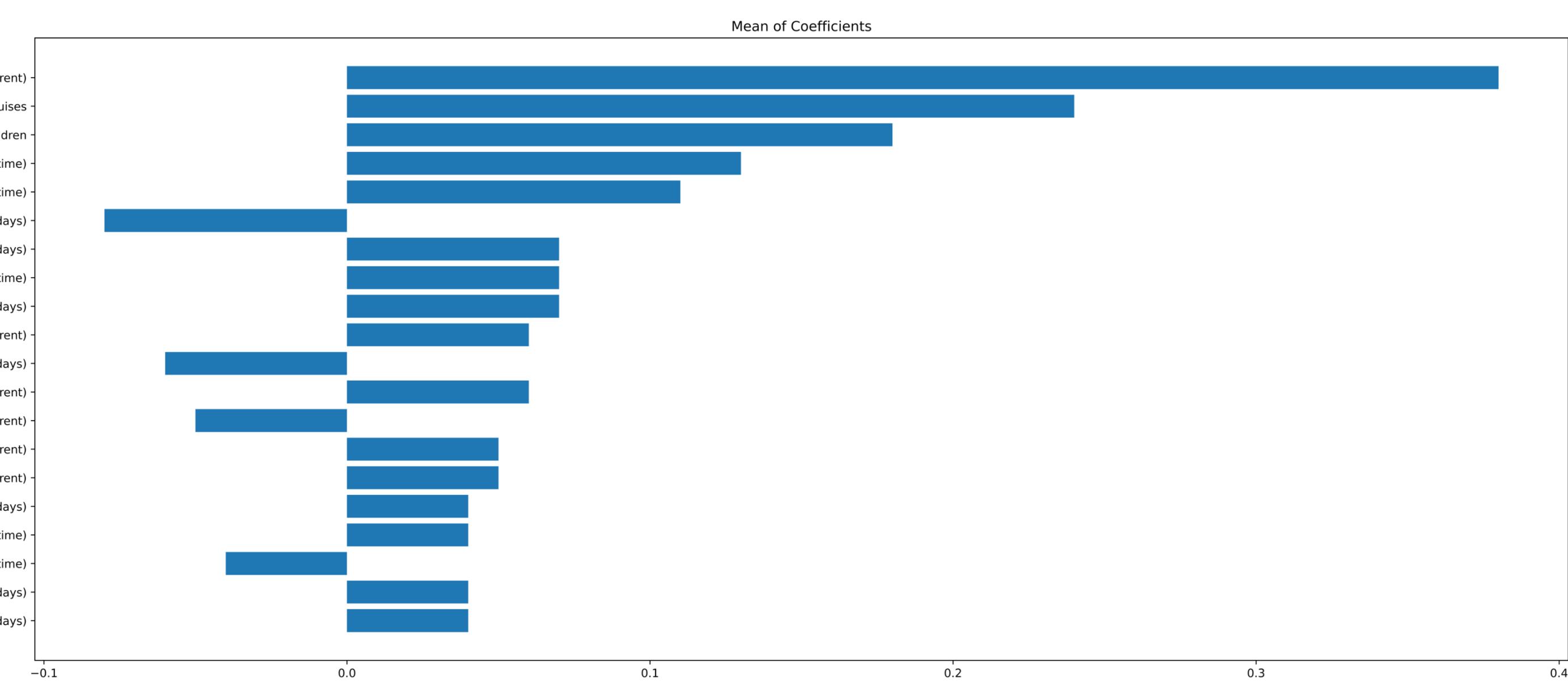
<sup>b</sup>: Cohort removed those with pre-trauma widespread pain 2016.



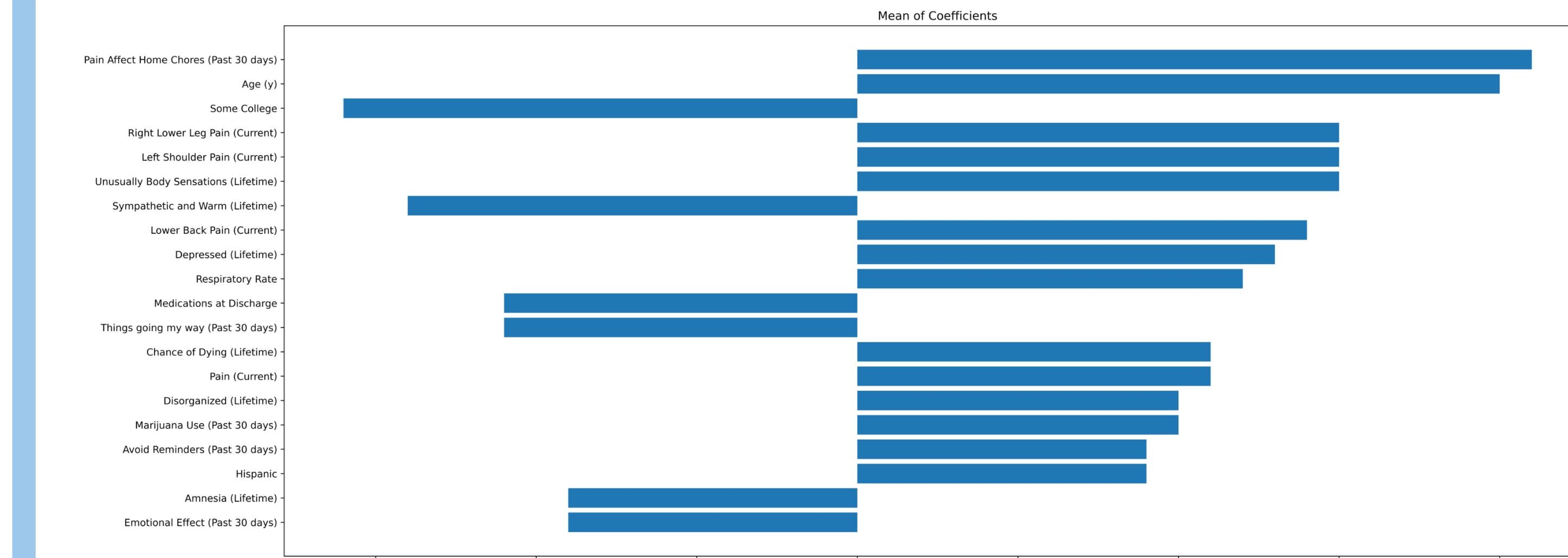
**Figure 1. Cross-validated AUCs for predicting severe pain**



**Figure 2. Cross-validated AUCs for predicting widespread pain**



**Figure 3. Relative variable importance among strongest predictors of presence of severe pain three months after motor vehicle collision.**



**Figure 4. Relative variable importance among strongest predictors of presence of widespread pain three months after motor vehicle collision.**

## Results

- Three months after MVC, 20% of participants met criteria for severe pain (n=1056, 67% female, 51% Non-Hispanic-Black, mean age 36), and 36% of participants (n=1376, 69% female, 53% Non-Hispanic-Black, mean age 36) met criteria for widespread pain.
- Prediction models provide decent prediction accuracy for severe and widespread pain as measured by cross-validated AUCs (Figures 1 and 2).
- Factors most strongly predictive of severe pain were (Figure 3):
  - pre-trauma and peri-traumatic pain and somatic symptoms
  - Pre-trauma and peri-traumatic psychological symptoms
  - Child abuse
  - Anxiety sensitivity
- Factors most strongly predictive of widespread pain were (Figure 4):
  - Sociodemographic factors (age, education)
  - pre-trauma and peri-traumatic pain and somatic symptoms
  - Anxiety sensitivity
  - Pre-trauma and peri-traumatic psychological symptoms

## Conclusion

- Large prospective cohorts can provide new insights into risk factors for severe and widespread pain. Such findings can help identify those at risk and inform the development of preventive interventions.

## References

- Wolfe F, Clauw DJ, Fitzcharles MA, Goldenberg DL, Häuser W, Katz RL, Mease PJ, Russell IJ, Walitt B. 2016 Revisions to the 2010/2011 fibromyalgia diagnostic criteria. Semin Arthritis Rheum. 2016 Dec;46(3):319-329. doi: 10.1016/j.semarthrit.2016.08.012. Epub 2016 Aug 30. PMID: 27916278.
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## Funding

a: Cohort removed those with pre-trauma moderate/severe pain (Pain NRS  $\geq 4$ ).  
b: Cohort removed those with pre-trauma widespread pain 2016.