Temporal patterns of substance use and disparities in point-of-care toxicology screening among young adults with stroke in the Greater Cincinnati Northern Kentucky Stroke Study

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BACKGROUND

Recent evidence reveals an increasing incidence of strokes in young adults (YA) aged 18-55.[1,2]

Substance use – namely use of cocaine, methamphetamines, among others – is a common risk factor for stroke.[3]

There is a growing literature detailing disparities in toxicologic screening among YA stroke patients based on race, age, gender, and other sociodemographic and clinical associations.[4,5]

Research Questions: Are there disparities in toxicology screening of YA patients with stroke? Does testing appropriately reflect substance use patterns among racial and gender-based subgroups?

OBJECTIVES

- To describe patterns of substance use over time among YA patients with stroke in a large population-based stroke surveillance study
- To describe the breakdown of substances identified and/or reported during the study periods
- To investigate disparities in drug screening of YA patients with stroke

METHODS

- The Greater Cincinnati Northern Kentucky Stroke Study is a population-based study of strokes occurring in a 5-county region of southern Ohio and northern Kentucky.
- Strokes are ascertained for a full year every 5 years and adjudicated by trained study physicians.
- Data on demographic characteristics, whether a urine drug screen or ethanol level was ordered, the results of drug screens, and other covariates were abstracted from patient charts.
- Descriptive statistics were used to describe patient characteristics and patterns of drug use over time by race and gender.
- Multivariable logistic regression was used to determine predictors of drug screens.

RESULTS

Reported use of marijuana, cocaine, and other substances increased over the observed study periods. Overall, 4% of study participants reported use of a specific drug in 1993/4 compared with 28.8% in 2015.

Race, age, smoking status, and treatment location were associated with significant disparities in screening in 2015. Black patients had 59% higher odds of being screened for drug use compared with white patients, adjusting for gender, age, DM, HTN, CAD, prior stroke, NIHSS status, smoking status, treatment at an academic center, and stroke type (95% CI 1.03-2.46, $P = 0.04$).

TABLE 1: DEMOGRAPHICS

	1993/4 N=297	1999 N=376	2005 N=501	2010 N=521	2015 N=458
Age (SD)	45.3 (8.0)	45.3 (7.5)	45.6 (7.4)	46.6 (7.0)	45.5 (8.0)
Gender (F)	149 (50.2)	181 (48.1)	248 (49.5)	273 (52.4)	226 (49.3)
Race (%)					
Black	103 (34.7)	134 (35.6)	176 (35.1)	180 (34.6)	179 (39.1)
White	189 (63.6)	239 (63.6)	321 (64.1)	339 (65.1)	272 (59.4)
Other	5 (1.7)	3 (0.8)	4 (0.8)	2 (0.4)	7 (1.5)
Stroke Subtype (%)					
Ischemic	219 (73.7)	260 (69.2)	374 (74.6)	404 (77.5)	355 (77.5)
ISH	46 (15.5)	61 (16.2)	80 (16.0)	79 (15.2)	72 (15.7)
SAH	32 (10.8)	53 (14.1)	41 (8.2)	38 (7.3)	31 (6.8)
Unknown	0	2 (0.5)	6 (1.2)	0	0
Age group (y)					
18-34	40 (13.5)	39 (10.4)	47 (9.4)	39 (7.5)	51 (11.1)
35-44	64 (21.6)	94 (25.0)	120 (24.0)	106 (20.4)	107 (23.4)
45-54	193 (65.0)	243 (64.6)	334 (66.7)	376 (72.2)	300 (65.5)

FIG 1: PATTERNS OF TESTING IN 2015

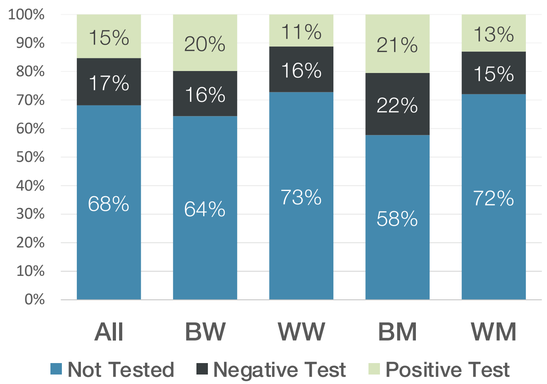
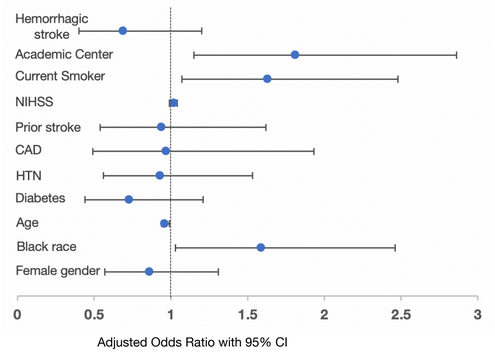


TABLE 2: PATTERNS OF DRUG USE OVER TIME

	1993/4 N=297	1999 N=376	2005 N=501	2010 N=521	2015 N=458	p-value for trend†	p-value for trend† 2005-15
Overall*	13 (4.4)	39 (10.4)	96 (19.2)	125 (24.0)	132 (28.8)	<0.0001	0.0005
Black Women	4/58 (6.9)	8/74 (10.8)	27/87 (31.0)	26/108 (24.1)	35/101 (34.6)	<0.0001	0.54
White Women	3/91 (3.3)	2/107 (1.9)	11/161 (6.8)	32/165 (19.4)	22/125 (17.6)	<0.0001	0.006
Black Men	5/45 (11.1)	15/60 (25.0)	30/89 (33.7)	27/72 (37.5)	32/78 (41.0)	0.0003	0.33
White Men	1/103 (1.0)	14/135 (10.4)	28/164 (17.1)	40/176 (22.7)	43/154 (27.9)	<0.0001	0.02

*†Cochran-Armitage test for trend; *Of all stroke cases each year for patients 18-54 years of age, the frequency (%) that either reported OR tested positive for non-prescribed illicit drugs (not including tobacco or alcohol)*

FIG 2: PREDICTORS OF SCREENING IN 2015



DISCUSSION

- **What do positive tests mean if testing is distributed inequitably?**
- Potential changes in clinical practice might include universal testing or, conversely, recommendations against testing if yield is low
- Limitations include bias in testing and measurement error due to potential errors in data collection

CONCLUSIONS

- Substance use increased among YA with stroke
- Screening disparities exist with regards to race, age, smoking status, and treatment location
- Future research should investigate the diagnostic yield of screening, clinical repercussions of screening, and strategies to avoid provider and systems-level biases in testing

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