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Trauma, Posttraumatic Stress Disorder, and Substance Use Disorders

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DSM-IV Posttraumatic Stress Disorder

- A. Exposure to a traumatic event
 - (1) actual or threatened death or injury
 - (2) response involved fear, helplessness, horror
- B. Reexperiencing (1 out of 5)
- C. Avoidance and numbing (3 out of 7)
- D. Increased arousal (2 out of 5)
- E. Duration \geq 1 month
- F. Distress or impairment

Lifetime Prevalence (rate/100)

	Exposure		PTSD	
	M	F	M	F
Breslau et al. (1991)	43.0	36.7	6.0	11.3
Norris (1992)	73.6	64.8	-	-
Resnick et al. (1993)	-	69.0	-	12.3
Kessler et al. (1995)	60.7	51.2	5.0	10.4
Breslau et al. (1997)	-	40.0	-	13.8
Stein et al. (1997)	81.3	74.2	-	-
Breslau et al. (1998)	92.2	87.1	5.2	9.2
Breslau et al. (2004)	87.2	78.4	6.3	7.9

The 1996 Detroit Area Survey of Trauma

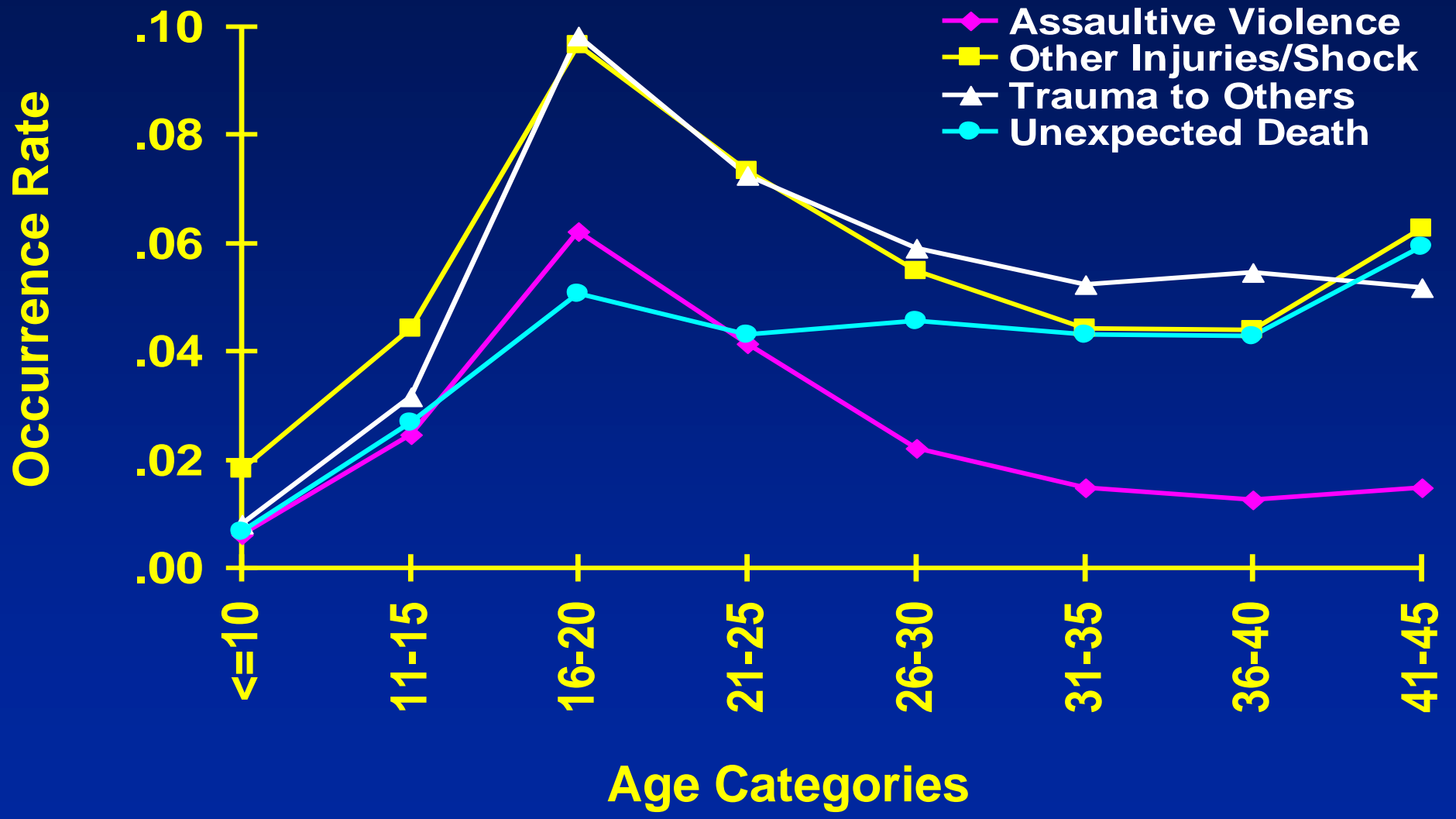
- A representative sample of Detroit PMSA
- 2,181 persons 18-45 years of age
- RDD used to select the sample
- A computer assisted telephone interview
- Screening completion = 76.2%
- Cooperation in eligible households = 86.8%
- DSM-IV list of events and PTSD criteria

List of 19 Events Grouped into 4 Categories

1. Assaultive Violence
2. Other Injury or Shocking Experience
3. Learning About Trauma to a Loved One
4. Sudden Unexpected Death of a Loved One

Lifetime Prevalence of Exposure to Traumatic Events by Sex (rate/100)

	Males	Females
Assaultive Violence	43.3	32.4
Other Injury	68.0	52.0
Learning About Others	63.1	61.8
Sudden Unexpected Death	61.1	59.0
Any Trauma	92.2	87.1



Sociodemographic Correlates of
Exposure Vary By Class of Trauma

Sociodemographic Correlates of Assaultive Violence

- Males > females
- Young > old
- Blacks > whites
- Low education > college
- Low income > high income

Sociodemographic Correlates for Other Traumas

- Weak or no relationship

The Conditional Risk of PTSD by Sex (rate/100)

	Males	Females
Assaultive Violence	6.0	35.7
Other Injury	6.6	5.4
Learning About Trauma	1.4	3.2
Sudden Unexpected Death	12.6	16.2
Any Trauma	6.2	13.0

Comorbidity of PTSD with Other Disorders

Lifetime Prevalence of Other Disorders Associated with PTSD in the NCS

	Males		Females	
	PTSD	No PTSD	PTSD	No PTSD
MDD	47.9	11.7	48.5	18.8
GAD	16.8	3.3	15.0	5.9
Panic Dx	7.3	1.9	12.6	4.3
Alcohol A/D	51.9	34.4	27.9	13.5
Drug A/D	34.5	15.1	26.9	7.6

From: Kessler et al. (1995)

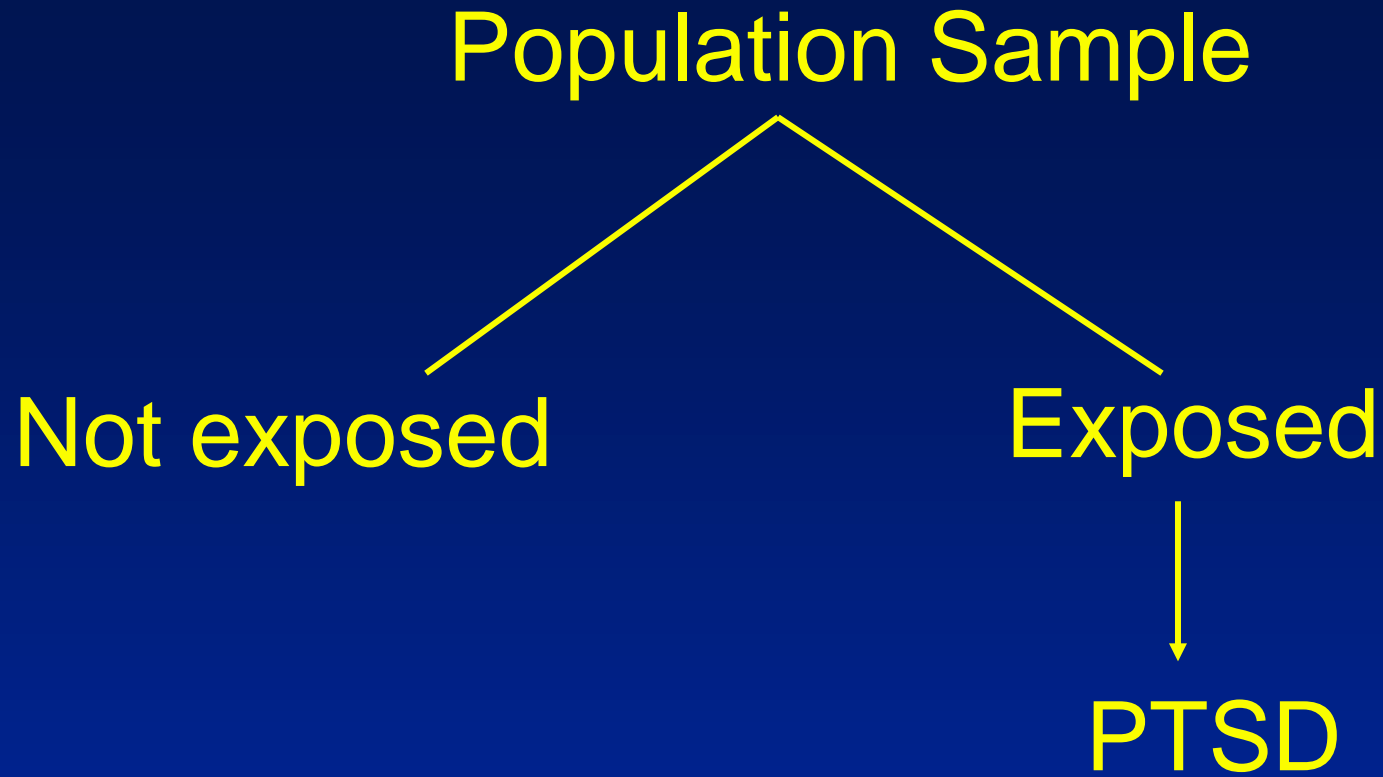
Alternative Explanations for Comorbidity

I. Preexisting SUD increases the risk for PTSD

- SUD increases the risk for exposure to trauma
- SUD increases the conditional risk (susceptibility) for PTSD given exposure

II. PTSD is associated with an increased risk for subsequent SUD

- PTSD causes SUD (complication)
- Underlying common vulnerability
- Traumas that cause PTSD also cause SUD through separate and distinct vulnerabilities



Conditional probability of PTSD given exposure (0 to 1)

Population Sample

Not exposed

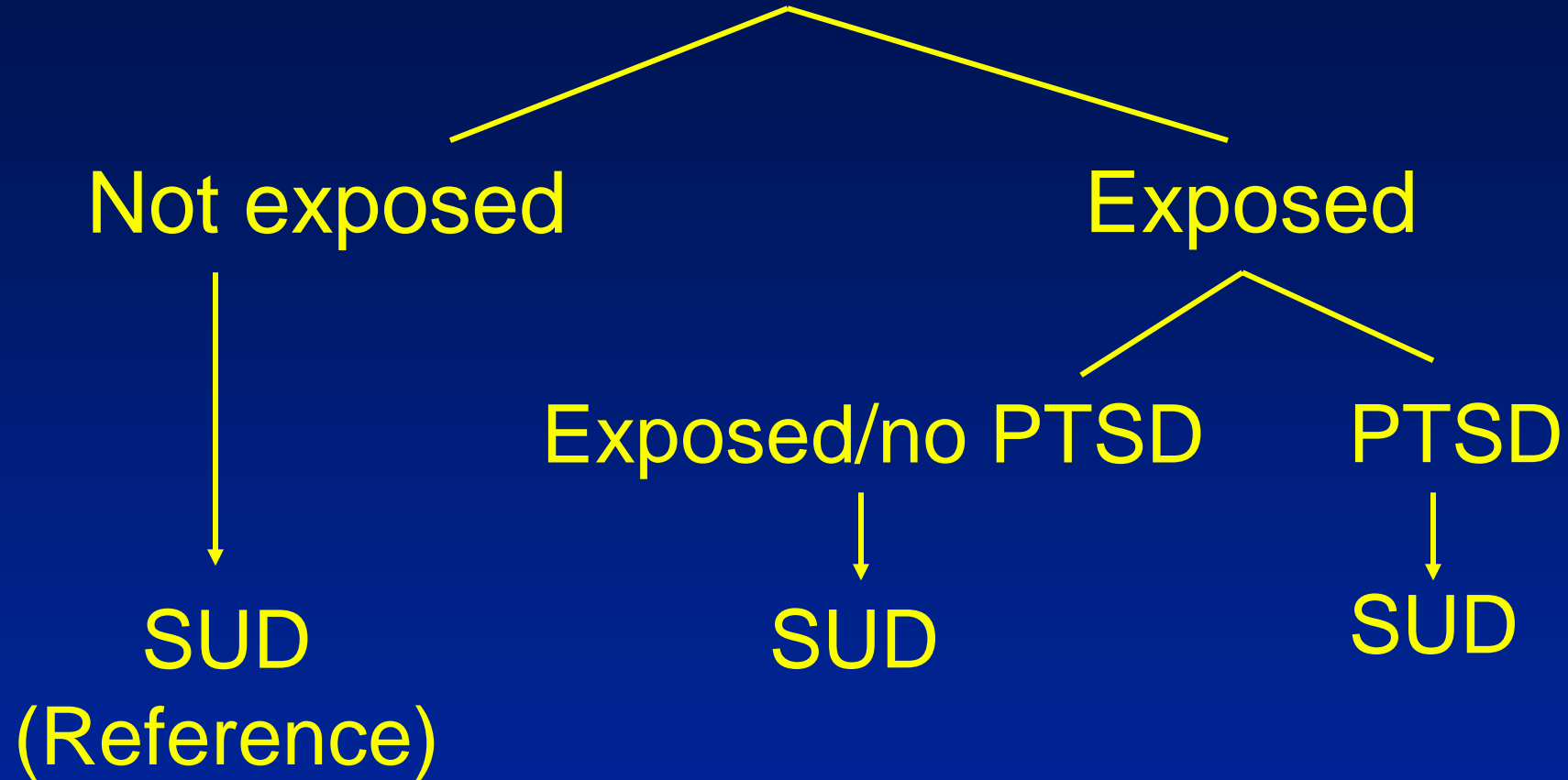
Exposed

Substance DX

Substance DX

RR for SUD in exposed vs. not exposed

Population Sample



RR for SUD in PTSD vs. not exposed

RR for SUD in exposed/no PTSD vs. not exposed

Epidemiologic Longitudinal Study of Young Adults

- A random sample of 1,007 21-30 year old members of a large HMO in southeast MI
- Baseline interviews conducted in 1989, follow-up in '92, '94, 2000
- Complete data on 90% of survivors
- DIS for DSM III-R

Analysis

Retrospective lifetime data from baseline

- Hazards ratios for subsequent onset of dx in persons with PTSD and exposure/no PTSD.
- Cox-proportional hazards models with time-dependent variables.

Prospective 10-year follow-up data

- Incidence of dxs during the 10-year interval.
- OR for subsequent dx in persons with baseline hx of PTSD and exposure/no PTSD (logistic regression).

HR of MDD Associated w/ Prior PTSD and Exposed/No PTSD (n=1,007)

Predictors	HR	(95% CI)
PTSD	2.81*	(1.57, 5.04)
Exposed/no PTSD	1.34	(0.82, 2.18)
Sex (f)	1.69*	(1.13, 2.54)
Race (wh)	1.00	(0.64, 1.57)
Ed (college)	0.69	(0.45, 1.06)

Cox proportional hazards model with time-dependent covariates

*p < .05

Breslau et al. (2000)

Incidence of Major Depression in 10-Year Follow-Up

	%	AOR (95% CI)
PTSD	38.5	2.96* (1.59, 5.53)
Exposed/no PTSD	19.5	1.35 (0.89, 2.03)
Not Exposed	17.1	-----

AOR=OR adjusted for sex, race, and education

*p < .05

PTSD vs. exposed only p=.02

HR of Nicotine Dependence Associated with Prior PTSD & Exposed/No PTSD (n=1,007)

Predictors	HR (95% CI)
PTSD	1.83* (1.04, 3.22)
Exposed/no PTSD	1.24 (0.84, 1.83)
Sex (f)	1.03 (0.76, 1.38)
Race (wh)	2.85* (1.75, 4.65)
Ed (college)	0.32* (0.21, 0.48)

Cox proportional hazards model with time-dependent covariates

*p < .05

Incidence of Nicotine Dependence in 10-Year Follow-Up

	%	AOR (95% CI)
PTSD	31.7	4.03* (2.10, 7.72)
Exposed/no PTSD	19.9	1.95* (1.22, 3.12)
Not Exposed	10.5	-----

AOR=OR adjusted for sex, race, & education

*p < .05

PTSD vs. exposed only p=.035

HR of Alcohol A/D Associated with Prior PTSD & Exposed/No PTSD (n=1,007)

Predictors	HR	(95% CI)
PTSD	1.72	(0.86, 3.45)
Exposed/no PTSD	1.33	(0.90, 1.96)
Sex (f)	0.35*	(0.26, 0.47)
Race (wh)	3.36*	(1.97, 5.71)
Ed (college)	0.65*	(0.47, 0.89)

Cox proportional hazards model with time-dependent covariates

*p < .05

Incidence of Alcohol A/D in 10-Year Follow-Up

	%	AOR (95% CI)
PTSD	15.8	1.45 (0.67, 3.17)
Exposed/no PTSD	15.6	1.14 (0.71, 1.85)
Not Exposed	12.8	-----

AOR=OR adjusted for sex, race, & education

HR of Drug A/D Associated with Prior PTSD & Exposed/No PTSD (n=1,007)

Predictors	HR	(95% CI)
PTSD	3.53*	(1.77, 7.02)
Exposed/no PTSD	1.44	(0.87, 2.39)
Sex (f)	0.38*	(0.26, 0.56)
Race (wh)	1.86*	(1.04, 3.33)
Ed (college)	0.50*	(0.31, 0.80)

Cox proportional hazards model with time-dependent covariates

*p < .05

PTSD vs. exposed only: p=.027

Incidence of Drug A/D in 10-Year Follow-Up

	%	AOR (95% CI)
PTSD	10.6	4.34* (1.63, 11.53)
Exposed/no PTSD	2.2	0.72 (0.25, 2.05)
Not Exposed	2.6	-----

AOR=OR adjusted for sex, race, & education

*p < .05

PTSD vs. exposed only p=.004

PTSD vs. Exposed/No PTSD: HR for Other Disorders

	PTSD	Exposed/no PTSD
Major Depression	2.8*	1.3
Nicotine Dep.	1.8*	1.2
Alcohol A/D	1.7	1.3
Drug A/D	3.5*	1.4

Cox proportional hazards models w/ time dependent covariates
Adjusted for sex, race, and education

*p < .05

PTSD vs. Exposed/No PTSD: ORs for Other Disorders

	PTSD	Exposed/no PTSD
Major Depression	3.0*	1.4
Nicotine Dep.	4.0*	2.0*
Alcohol A/D	1.4	1.1
Drug A/D	4.3*	0.7

Logistic regression of prospective data
Adjusted for sex, race, and education

*p < .05

Risk for Exposure to Trauma and PTSD by Preexisting Dx

Preexisting dxs	Exposure in Total Sample (n=1,007) HR (95% CI)	PTSD in Exposed (n=399) HR (95% CI)
Major Depression	2.0* (1.3, 3.0)	3.7* (2.0, 6.7)
Nicotine Dep.	1.4 (0.9, 1.9)	1.2 (0.6, 2.3)
Alcohol A/D	1.1 (0.8, 1.6)	2.1* (1.2, 3.9)
Drug A/D	1.1 (0.7, 1.7)	1.1 (0.5, 2.7)

Hazards ratios adjusted for sex, race, and education from 8 Cox proportional hazards models w/ time-dependent variables.

Risk for Exposure, PTSD:
Preexisting Dx as
Predictors

Risk for Subsequent Dx:
Exposure and PTSD as
Predictors

	Exposure	PTSD	Exposure	PTSD
MDD	X	X	---	X
ND	---	---	?	X
Alcohol	---	X	---	---
Drug	---	---	---	X

Summary

- The majority of community residents experience one or more traumas
- A small proportion of those exposed develop PTSD
- Exposure to assaultive violence is higher in males, non-white, the young, and persons in lower social classes

Summary (continued)

- Females are at higher risk for PTSD following assaultive violence
- The sex difference is not due to females' higher rate of rape

Summary (continued)

- The majority of exposed persons, those who do not develop PTSD, are not at a markedly increased risk for onset of SUD or MDD.
- The small proportion of victims (probably < 10% who develop PTSD also experience considerably higher rates of MDD, ND, and drug A/D, but probably not alcohol A/D.

Prevalence of Substance Use and Changes Before and After September 11th

	% using substance before 9/11	% using substance after 9/11	% reporting increased use of substance after 9/11
Cigarettes	22.6	23.4	9.7
Alcohol	59.1	64.4	24.6
Marijuana	4.4	5.7	3.2

From: Vlahov et al., Am J Epidemiol (2002)

Associations between Increase in Substance Use & Prevalence of Current PTSD & Current Depression

	N	% w/ current PTSD
Total	988	7.5
Increase in cigarettes*		
No	886	5.6
Yes	90	24.2
Increase in alcohol		
No	675	7.8
Yes	223	8.8
Increase in marijuana*		
No	939	6.6
Yes	32	36.0

*p-value for chi-square < 0.05

From: Vlahov et al., Am J Epidemiol (2002)