

## Post-Traumatic Stress Disorder Dimensions And Asthma Morbidity In World Trade Center Rescue And Recovery Workers

**I. Mindlis<sup>1</sup>, E. Morales<sup>1</sup>, E. R. Goodman<sup>1</sup>, K. Xu<sup>1</sup>, C. Vilacastelar<sup>2</sup>, K. Keller<sup>1</sup>, G. Crawford<sup>1</sup>, S. James<sup>1</sup>, C. L. Katz<sup>1</sup>, L. E. Crowley<sup>1</sup>, R. E. de la Hoz<sup>1</sup>, S. Markowitz<sup>2</sup>, J. P. Wisnivesky<sup>1</sup>**

<sup>1</sup>Icahn School of Medicine at Mount Sinai, New York, NY, <sup>2</sup>Queens College, City University of New York, Flushing, NY

### Rationale

Post-traumatic stress disorder (PTSD) has been linked to asthma onset and severity in World Trade Center (WTC) rescue and recovery workers. However, there is limited evidence about the impact of sub-threshold PTSD and specific PTSD symptom dimensions on asthma control.

### Methods

We used data from a prospective cohort of WTC rescue and recovery workers with a physician diagnosis of asthma enrolled in the WTC Health Program. Participants underwent a Structured Clinical Interview for Diagnostic and Statistical Manual to assess presence of PTSD following Diagnostic and Statistical Manual IV criteria. Sub-threshold PTSD was defined as meeting criteria for two symptom dimensions (re-experiencing, avoidance, and hyper-arousal). Asthma control, acute asthma-related resource utilization, and asthma-related quality of life data was collected using validated scales. We performed unadjusted and multiple regression analyses to assess the relationship between sub-threshold PTSD and PTSD symptom domains with asthma morbidity measures.

### Results

Of the 181 WTC rescue and recovery workers with asthma recruited into the study for which a SCID was available at the time of analysis, 28% and 25% had PTSD and sub-threshold PTSD, respectively. While PTSD was associated with increased asthma morbidity, sub-threshold PTSD was not significantly associated with any measure of asthma morbidity ( $p>0.05$  for all comparisons), among patients not meeting criteria for PTSD, having re-experiencing symptoms was independently associated with poorer asthma quality of life (mean difference: -0.69, 95% confidence interval [CI]: -1.12, -0.26), while avoidance was associated with increased acute resource use (mean difference: 4.73, 95% CI: 1.00, 22.43), after adjusting for potential confounders. No other significant relationships between specific PTSD symptom dimensions and both resource utilization and asthma morbidity measures were identified ( $p>0.05$  for all comparisons).

### Conclusions

We found a strong association between PTSD, but not sub-threshold PTSD, and worse asthma control, increased resource utilization and poorer quality of life. However, specific PTSD symptom domains were associated with some measures of asthma morbidity among patients without full PTSD. Evaluating symptoms of PTSD may be important in WTC rescue and recovery workers with asthma even if they do not meet full PTSD criteria. Addressing isolated PTSD symptoms may contribute to improving asthma outcomes in these patients.

Table 1. Participants Meeting Criteria for Specific Post Traumatic Stress Disorder Symptom Clusters and Relation to Respiratory Outcomes – Adjusted Analysis

All Participants, n=181			
	Re-experiencing	Avoidance	Hyper arousal
Asthma control, mean difference, (95% CI)	0.52 (-0.15, 0.69)	0.23 (-0.14, 0.60)	0.23 (-0.30, 0.60)
Quality of life, mean difference, (95% CI)	-0.79 (-1.18, -0.40)	-0.39 (-0.86, 0.02)	-0.61 (-1.00, -0.22)
One or more outpatient visits during last year due to asthma, OR, (95% CI)	2.33 (0.98, 5.31)	1.48 (0.68, 3.20)	1.83 (0.87, 3.00)
One or more inpatient visits during last year due to asthma, OR, (95% CI)	5.53 (1.45, 23.10)	7.09 (2.35, 19.70)	4.30 (1.80, 12.08)
Participants not diagnosed with PTSD, n=139			
	Re-experiencing	Avoidance	Hyper arousal
Asthma control, mean difference, (95% CI)	0.40 (-0.03, 0.81)	-0.23 (-0.38, 0.28)	-0.07 (-0.30, 0.30)
Quality of life, mean difference, (95% CI)	-0.69 (-1.12, -0.26)	0.20 (-0.37, 0.77)	-0.21 (-0.70, 0.28)
One or more outpatient visits during last year due to asthma, OR, (95% CI)	2.31 (0.82, 5.41)	1.07 (0.35, 3.28)	1.70 (0.70, 4.12)
One or more inpatient visits during last year due to asthma, OR, (95% CI)	4.68 (0.03, 23.73)	8.73 (1.00, 22.43)	1.64 (0.44, 6.08)

Adjusted for age, sex, education, race/ethnicity, and zip code.

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