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Supplemental Material

Pediatric Psychiatric Emergency Department Utilization and Fine Particulate Matter: A Case-Crossover Study

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Table S3. Odds ratios and 95% confidence intervals from the case-crossover modeling for the risk of a psychiatric ED visit related to a $10 \mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ overall and by psychiatric ED visit categories. Results are presented using 30, 45, and 60 day fixed length periods to stratify and select control windows for each case window.

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Table S5. Odds ratios and 95% confidence intervals from the case-crossover modeling for the risk of a psychiatric ED visit related to a $10 \mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ stratified by community deprivation. Separate associations by high and low community deprivation were estimated for psychiatric ED visit categories that showed a significant effect modification ($p < 0.05$) for at least one exposure lag, in accord with a pre-specified selection criterion.

Supplementary Information

Table S1: ICD-10 codes from each case's primary diagnosis and their psychiatric category as derived using the Clinical Classification Software (CCS) and DSM-5 nosology. A board-certified child and adolescent psychiatrist (JRS) familiar with the institutional practices of ICD coding/documentation reviewed the excluded or altered codes based on both (1) current clinical practice and (2) current child and adolescent psychiatry diagnostic formulation. Some ICD-10 codes were not assigned to any category (e.g. alcohol-related disorders, cognitive disorders) because we did not believe that they represented an acute exacerbation that could have been possibly caused by an acute chemical insult.

CCS Category	ICD-10	ICD Description	Psychiatric Category
Adjustment disorders	F43.20	Adjustment disorder, unspecified	adjustment disorder
Adjustment disorders	F43.21	Adjustment disorder with depressed mood	adjustment disorder
Adjustment disorders	F43.22	Adjustment disorder with anxiety	adjustment disorder
Adjustment disorders	F43.23	Adjustment disorder with mixed anxiety and depressed mood	adjustment disorder
Adjustment disorders	F43.24	Adjustment disorder with disturbance of conduct	adjustment disorder
Adjustment disorders	F43.25	Adjustment disorder w mixed disturb of emotions and conduct	adjustment disorder
Adjustment disorders	F43.29	Adjustment disorder with other symptoms	adjustment disorder
Adjustment disorders	F43.8	Other reactions to severe stress	adjustment disorder
Adjustment disorders	F43.9	Reaction to severe stress, unspecified	adjustment disorder
Alcohol-related disorders	F10.10	Alcohol abuse, uncomplicated	
Alcohol-related disorders	F10.120	Alcohol abuse with intoxication, uncomplicated	
Alcohol-related disorders	F10.129	Alcohol abuse with intoxication, unspecified	
Alcohol-related disorders	F10.20	Alcohol dependence, uncomplicated	
Alcohol-related disorders	F10.229	Alcohol dependence with intoxication, unspecified	
Alcohol-related disorders	F10.950	Alcohol use, unsp w alcoh-induce psych disorder w delusions	
Alcohol-related disorders	F10.988	Alcohol use, unspecified with other alcohol-induced disorder	
Alcohol-related disorders	Q86.0	Fetal alcohol syndrome (dysmorphic)	
Anxiety disorders	F40.00	Agoraphobia, unspecified	anxiety
Anxiety disorders	F40.01	Agoraphobia with panic disorder	anxiety
Anxiety disorders	F40.10	Social phobia, unspecified	anxiety
Anxiety disorders	F40.11	Social phobia, generalized	anxiety
Anxiety disorders	F40.298	Other specified phobia	anxiety
Anxiety disorders	F41.0	Panic disorder without agoraphobia	anxiety
Anxiety disorders	F41.1	Generalized anxiety disorder	anxiety
Anxiety disorders	F41.3	Other mixed anxiety disorders	anxiety
Anxiety disorders	F41.8	Other specified anxiety disorders	anxiety
Anxiety disorders	F41.9	Anxiety disorder, unspecified	anxiety
Anxiety disorders	F42	Obsessive-compulsive disorder	

Anxiety disorders	F42.9	Obsessive-compulsive disorder, unspecified	
Anxiety disorders	F43.0	Acute stress reaction	ptsd
Anxiety disorders	F43.10	Post-traumatic stress disorder, unspecified	ptsd
Anxiety disorders	F43.11	Post-traumatic stress disorder, acute	ptsd
Anxiety disorders	F43.12	Post-traumatic stress disorder, chronic	ptsd
Anxiety disorders	F48.8	Other specified nonpsychotic mental disorders	
Anxiety disorders	F48.9	Nonpsychotic mental disorder, unspecified	
Anxiety disorders	R45.4	Irritability and anger	
Anxiety disorders	R45.5	Hostility	
Anxiety disorders	R45.6	Violent behavior	
Anxiety disorders	R45.7	State of emotional shock and stress, unspecified	
Anxiety disorders	R45.83	Excessive crying of child, adolescent or adult	
Attention deficit conduct and disruptive behavior disorders	F90.0	Attn-defct hyperactivity disorder, predominately inattentive type	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F90.1	Attn-defct hyperactivity disorder, predominately hyperactive type	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F90.2	Attention-deficit hyperactivity disorder, combined type	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F90.8	Attention-deficit hyperactivity disorder, other type	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F90.9	Attention-deficit hyperactivity disorder, unspecified type	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F91.1	Conduct disorder, childhood-onset type	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F91.2	Conduct disorder, adolescent-onset type	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F91.3	Oppositional defiant disorder	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F91.8	Other conduct disorders	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	F91.9	Conduct disorder, unspecified	externalizing disorder
Attention deficit conduct and disruptive behavior disorders	R46.89	Other symptoms and signs involving appearance and behavior	externalizing disorder
Delirium dementia and amnesic and other cognitive disorders	F05	Delirium due to known physiological condition	
Delirium dementia and	F07.0	Personality change due to known	

amnesic and other cognitive disorders		physiological condition	
Delirium dementia and amnesic and other cognitive disorders	F07.81	Postconcussional syndrome	
Delirium dementia and amnesic and other cognitive disorders	F09	Unsp mental disorder due to known physiological condition	
Developmental disorders	F79	Unspecified intellectual disabilities	
Developmental disorders	F80.0	Phonological disorder	
Developmental disorders	F80.1	Expressive language disorder	
Developmental disorders	F80.2	Mixed receptive-expressive language disorder	
Developmental disorders	F80.81	Childhood onset fluency disorder	
Developmental disorders	F80.89	Other developmental disorders of speech and language	
Developmental disorders	F80.9	Developmental disorder of speech and language, unspecified	
Developmental disorders	F82	Specific developmental disorder of motor function	
Developmental disorders	F88	Other disorders of psychological development	
Disorders usually diagnosed in infancy childhood or adolescence	F64.2	Gender identity disorder of childhood	
Disorders usually diagnosed in infancy childhood or adolescence	F84.0	Autistic disorder	developmental disorder
Disorders usually diagnosed in infancy childhood or adolescence	F84.5	Aspergers syndrome	developmental disorder
Disorders usually diagnosed in infancy childhood or adolescence	F84.8	Other pervasive developmental disorders	developmental disorder
Disorders usually diagnosed in infancy childhood or adolescence	F84.9	Pervasive developmental disorder, unspecified	
Disorders usually diagnosed in infancy childhood or adolescence	F93.0	Separation anxiety disorder of childhood	anxiety
Disorders usually diagnosed in infancy childhood or adolescence	F93.8	Other childhood emotional disorders	
Disorders usually diagnosed in infancy	F93.9	Childhood emotional disorder, unspecified	

childhood or adolescence			
Disorders usually diagnosed in infancy childhood or adolescence	F94.0	Selective mutism	
Disorders usually diagnosed in infancy childhood or adolescence	F94.1	Reactive attachment disorder of childhood	
Disorders usually diagnosed in infancy childhood or adolescence	F94.2	Disinhibited attachment disorder of childhood	
Disorders usually diagnosed in infancy childhood or adolescence	F95.1	Chronic motor or vocal tic disorder	
Disorders usually diagnosed in infancy childhood or adolescence	F95.2	Tourettes disorder	
Disorders usually diagnosed in infancy childhood or adolescence	F95.8	Other tic disorders	
Disorders usually diagnosed in infancy childhood or adolescence	F95.9	Tic disorder, unspecified	
Disorders usually diagnosed in infancy childhood or adolescence	F98.0	Enuresis not due to a substance or known physiol condition	
Disorders usually diagnosed in infancy childhood or adolescence	F98.1	Encopresis not due to a substance or known physiol condition	
Disorders usually diagnosed in infancy childhood or adolescence	F98.21	Rumination disorder of infancy	
Disorders usually diagnosed in infancy childhood or adolescence	F98.29	Other feeding disorders of infancy and early childhood	
Disorders usually diagnosed in infancy childhood or adolescence	F98.4	Stereotyped movement disorders	
Disorders usually diagnosed in infancy childhood or adolescence	F98.8	Oth behav/emotn disord w onset usly occur in chldhd and adol	
Disorders usually diagnosed in infancy	F98.9	Unsp behav/emotn disord w onst usly occur in chldhd and adol	

childhood or adolescence			
Impulse control disorders not elsewhere classified	F63.1	Pyromania	impulse control disorder
Impulse control disorders not elsewhere classified	F63.81	Intermittent explosive disorder	impluse control disorder
Impulse control disorders not elsewhere classified	F63.89	Other impulse disorders	impluse control disorder
Impulse control disorders not elsewhere classified	F63.9	Impulse disorder, unspecified	impluse control disorder
Impulse control disorders not elsewhere classified	R45.850	Homicidal ideations	impluse control disorder
Miscellaneous mental disorders	F44.4	Conversion disorder with motor symptom or deficit	
Miscellaneous mental disorders	F44.5	Conversion disorder with seizures or convulsions	
Miscellaneous mental disorders	F44.6	Conversion disorder with sensory symptom or deficit	
Miscellaneous mental disorders	F44.89	Other dissociative and conversion disorders	
Miscellaneous mental disorders	F44.9	Dissociative and conversion disorder, unspecified	
Miscellaneous mental disorders	F45.8	Other somatoform disorders	
Miscellaneous mental disorders	F45.9	Somatoform disorder, unspecified	
Miscellaneous mental disorders	F50.00	Anorexia nervosa, unspecified	
Miscellaneous mental disorders	F50.01	Anorexia nervosa, restricting type	
Miscellaneous mental disorders	F50.02	Anorexia nervosa, binge eating/purging type	
Miscellaneous mental disorders	F50.2	Bulimia nervosa	
Miscellaneous mental disorders	F50.8	Other eating disorders	
Miscellaneous mental disorders	F50.89	Other specified eating disorder	
Miscellaneous mental disorders	F50.9	Eating disorder, unspecified	
Miscellaneous mental disorders	F51.3	Sleepwalking [somnambulism]	
Miscellaneous mental disorders	F51.4	Sleep terrors [night terrors]	
Miscellaneous mental disorders	F51.5	Nightmare disorder	
Miscellaneous mental disorders	F51.8	Oth sleep disord not due to a sub or known physiol cond	
Miscellaneous mental disorders	F53	Puerperal psychosis	

Miscellaneous mental disorders	F54	Psych & behavrl factors assoc w disord or dis classd elswhr	
Miscellaneous mental disorders	F64.1	Dual role transvestism	
Miscellaneous mental disorders	F68.10	Factitious disorder, unspecified	
Miscellaneous mental disorders	F99	Mental disorder, not otherwise specified	
Miscellaneous mental disorders	R45.89	Other symptoms and signs involving emotional state	
Mood disorders	F06.30	Mood disorder due to known physiological condition, unsp	
Mood disorders	F06.31	Mood disorder due to known physiol cond w depressv features	
Mood disorders	F30.2	Manic episode, severe with psychotic symptoms	bipolar disorder
Mood disorders	F30.8	Other manic episodes	bipolar disorder
Mood disorders	F30.9	Manic episode, unspecified	bipolar disorder
Mood disorders	F31.0	Bipolar disorder, current episode hypomanic	bipolar disorder
Mood disorders	F31.10	Bipolar disord, crnt episode manic w/o psych features, unsp	bipolar disorder
Mood disorders	F31.12	Bipolar disord, crnt episode manic w/o psych features, mod	bipolar disorder
Mood disorders	F31.13	Bipolar disord, crnt epsd manic w/o psych features, severe	bipolar disorder
Mood disorders	F31.2	Bipolar disord, crnt episode manic severe w psych features	bipolar disorder
Mood disorders	F31.30	Bipolar disord, crnt epsd depress, mild or mod severt, unsp	bipolar disorder
Mood disorders	F31.31	Bipolar disorder, current episode depressed, mild	bipolar disorder
Mood disorders	F31.32	Bipolar disorder, current episode depressed, moderate	bipolar disorder
Mood disorders	F31.4	Bipolar disord, crnt epsd depress, sev, w/o psych features	bipolar disorder
Mood disorders	F31.5	Bipolar disord, crnt epsd depress, severe, w psych features	bipolar disorder
Mood disorders	F31.60	Bipolar disorder, current episode mixed, unspecified	bipolar disorder
Mood disorders	F31.61	Bipolar disorder, current episode mixed, mild	bipolar disorder
Mood disorders	F31.62	Bipolar disorder, current episode mixed, moderate	bipolar disorder
Mood disorders	F31.63	Bipolar disord, crnt epsd mixed, severe, w/o psych features	bipolar disorder
Mood disorders	F31.64	Bipolar disord, crnt episode mixed, severe, w psych features	bipolar disorder
Mood disorders	F31.70	Bipolar disord, currently in remis, most recent episode unsp	bipolar disorder
Mood disorders	F31.73	Bipolar disord, in partial remis, most recent episode manic	bipolar disorder
Mood disorders	F31.75	Bipolar disord, in partial remis, most recent epsd depress	Bipolar disorder

Mood disorders	F31.77	Bipolar disord, in partial remis, most recent episode mixed	bipolar disorder
Mood disorders	F31.81	Bipolar II disorder	bipolar disorder
Mood disorders	F31.89	Other bipolar disorder	bipolar disorder
Mood disorders	F31.9	Bipolar disorder, unspecified	bipolar disorder
Mood disorders	F32.0	Major depressive disorder, single episode, mild	depressive disorder
Mood disorders	F32.1	Major depressive disorder, single episode, moderate	depressive disorder
Mood disorders	F32.2	Major depressv disord, single epsd, sev w/o psych features	depressive disorder
Mood disorders	F32.3	Major depressv disord, single epsd, severe w psych features	depressive disorder
Mood disorders	F32.5	Major depressive disorder, single episode, in full remission	depressive disorder
Mood disorders	F32.8	Other depressive episodes	depressive disorder
Mood disorders	F32.89	Other specified depressive episodes	depressive disorder
Mood disorders	F32.9	Major depressive disorder, single episode, unspecified	depressive disorder
Mood disorders	F33.0	Major depressive disorder, recurrent, mild	depressive disorder
Mood disorders	F33.1	Major depressive disorder, recurrent, moderate	depressive disorder
Mood disorders	F33.2	Major depressv disorder, recurrent severe w/o psych features	depressive disorder
Mood disorders	F33.3	Major depressv disorder, recurrent, severe w psych symptoms	depressive disorder
Mood disorders	F33.40	Major depressive disorder, recurrent, in remission, unsp	depressive disorder
Mood disorders	F33.8	Other recurrent depressive disorders	depressive disorder
Mood disorders	F33.9	Major depressive disorder, recurrent, unspecified	depressive disorder
Mood disorders	F34.0	Cyclothymic disorder	depressive disorder
Mood disorders	F34.1	Dysthymic disorder	depressive disorder
Mood disorders	F34.8	Other persistent mood [affective] disorders	other mood disorder
Mood disorders	F34.81	Disruptive mood dysregulation disorder	other mood disorder
Mood disorders	F34.89	Other specified persistent mood disorders	other mood disorder
Mood disorders	F34.9	Persistent mood [affective] disorder, unspecified	other mood disorder
Mood disorders	F39	Unspecified mood [affective] disorder	other mood disorder
Mood disorders	R45.86	Emotional lability	
Personality disorders	F60.3	Borderline personality disorder	personality disorder
Personality disorders	F60.89	Other specific personality disorders	personality disorder
Personality disorders	F60.9	Personality disorder, unspecified	personality disorder
Schizophrenia and other psychotic disorders	F06.0	Psychotic disorder w hallucin due to known physiol condition	
Schizophrenia and other psychotic disorders	F20.0	Paranoid schizophrenia	schizophrenia
Schizophrenia and other psychotic	F20.1	Disorganized schizophrenia	schizophrenia

disorders			
Schizophrenia and other psychotic disorders	F20.2	Catatonic schizophrenia	schizophrenia
Schizophrenia and other psychotic disorders	F20.3	Undifferentiated schizophrenia	schizophrenia
Schizophrenia and other psychotic disorders	F20.5	Residual schizophrenia	schizophrenia
Schizophrenia and other psychotic disorders	F20.81	Schizophreniform disorder	schizophrenia
Schizophrenia and other psychotic disorders	F20.89	Other schizophrenia	schizophrenia
Schizophrenia and other psychotic disorders	F20.9	Schizophrenia, unspecified	schizophrenia
Schizophrenia and other psychotic disorders	F22	Delusional disorders	schizophrenia
Schizophrenia and other psychotic disorders	F23	Brief psychotic disorder	schizophrenia
Schizophrenia and other psychotic disorders	F24	Shared psychotic disorder	schizophrenia
Schizophrenia and other psychotic disorders	F25.0	Schizoaffective disorder, bipolar type	schizophrenia
Schizophrenia and other psychotic disorders	F25.1	Schizoaffective disorder, depressive type	schizophrenia
Schizophrenia and other psychotic disorders	F25.8	Other schizoaffective disorders	schizophrenia
Schizophrenia and other psychotic disorders	F25.9	Schizoaffective disorder, unspecified	schizophrenia
Schizophrenia and other psychotic disorders	F28	Oth psych disorder not due to a sub or known physiol cond	
Schizophrenia and other psychotic disorders	F29	Unsp psychosis not due to a substance or known physiol cond	schizophrenia
Screening and history of mental health and substance abuse codes	Z04.6	Encntr for general psychiatric exam, requested by authority	
Screening and history of mental health and substance abuse codes	Z86.59	Personal history of other mental and behavioral disorders	
Substance-related	F11.10	Opioid abuse, uncomplicated	

disorders			
Substance-related disorders	F11.20	Opioid dependence, uncomplicated	
Substance-related disorders	F11.23	Opioid dependence with withdrawal	
Substance-related disorders	F12.10	Cannabis abuse, uncomplicated	
Substance-related disorders	F12.120	Cannabis abuse with intoxication, uncomplicated	
Substance-related disorders	F12.20	Cannabis dependence, uncomplicated	
Substance-related disorders	F12.251	Cannabis dependence w psychotic disorder with hallucinations	
Substance-related disorders	F12.90	Cannabis use, unspecified, uncomplicated	
Substance-related disorders	F12.920	Cannabis use, unspecified with intoxication, uncomplicated	
Substance-related disorders	F12.921	Cannabis use, unspecified with intoxication delirium	
Substance-related disorders	F12.929	Cannabis use, unspecified with intoxication, unspecified	
Substance-related disorders	F12.951	Cannabis use, unsp w psychotic disorder with hallucinations	
Substance-related disorders	F12.988	Cannabis use, unsp with other cannabis-induced disorder	
Substance-related disorders	F13.20	Sedative, hypnotic or anxiolytic dependence, uncomplicated	
Substance-related disorders	F14.10	Cocaine abuse, uncomplicated	
Substance-related disorders	F16.10	Hallucinogen abuse, uncomplicated	
Substance-related disorders	F16.129	Hallucinogen abuse with intoxication, unspecified	
Substance-related disorders	F19.10	Other psychoactive substance abuse, uncomplicated	
Substance-related disorders	F19.20	Other psychoactive substance dependence, uncomplicated	
Substance-related disorders	F19.90	Other psychoactive substance use, unspecified, uncomplicated	
Substance-related disorders	F19.920	Oth psychoactive substance use, unsp w intoxication, uncomp	
Substance-related disorders	F19.921	Oth psychoactive substance use, unsp w intox w delirium	
Substance-related disorders	F19.939	Other psychoactive substance use, unsp with withdrawal, unsp	
Substance-related disorders	F19.94	Oth psychoactive substance use, unsp w mood disorder	
Substance-related disorders	F19.951	Oth psychoactv sub use, unsp w psych disorder w hallucin	
Substance-related disorders	F19.988	Oth psychoactive substance use, unsp w oth disorder	
Substance-related disorders	F19.99	Oth psychoactive substance use, unsp w unsp disorder	
Substance-related disorders	P04.49	Newborn affected by maternal use of other drugs of addiction	

Substance-related disorders	P96.1	Neonatal w/drawal symp from matern use of drugs of addiction	
Substance-related disorders	T40.0X1A	Poisoning by opium, accidental (unintentional), init encntr	
Substance-related disorders	T40.1X4A	Poisoning by heroin, undetermined, initial encounter	
Substance-related disorders	T40.5X4A	Poisoning by cocaine, undetermined, initial encounter	
Substance-related disorders	T40.7X1A	Poisoning by cannabis (derivatives), accidental, init	
Substance-related disorders	T40.7X4A	Poisoning by cannabis (derivatives), undetermined, init	
Substance-related disorders	T40.8X1A	Poisoning by lysergide, accidental (unintentional), init	
Substance-related disorders	T40.8X4A	Poisoning by lysergide, undetermined, initial encounter	
Substance-related disorders	T40.904A	Poisoning by unsp psychodysleptics, undetermined, init	
Suicide and intentional self-inflicted injury	R45.851	Suicidal ideations	suicide
Suicide and intentional self-inflicted injury	T14.91	Suicide attempt	suicide
Suicide and intentional self-inflicted injury	T36.1X2A	Poison by cephalospor/oth beta-lactm antibiot, slf-hrm, init	suicide
Suicide and intentional self-inflicted injury	T37.5X2A	Poisoning by antiviral drugs, intentional self-harm, init	suicide
Suicide and intentional self-inflicted injury	T38.1X2A	Poisoning by thyroid hormones and sub, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T38.3X2A	Poison by insulin and oral hypoglycemic drugs, slf-hrm, init	suicide
Suicide and intentional self-inflicted injury	T39.012A	Poisoning by aspirin, intentional self-harm, init encntr	suicide
Suicide and intentional self-inflicted injury	T39.1X2A	Poisoning by 4-Aminophenol derivatives, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T39.1X2D	Poisoning by 4-Aminophenol derivatives, self-harm, subs	suicide
Suicide and intentional self-inflicted injury	T39.312A	Poisoning by propionic acid derivatives, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T39.392A	Poison by oth nonsteroid anti-inflam drugs, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T39.8X2A	Poison by oth nonopio analges/antipyret, NEC, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T39.92XA	Poison by unsp nonopi analgs/antipyr/antirheu, slf-hrm, init	suicide
Suicide and intentional self-inflicted injury	T40.2X2A	Poisoning by oth opioids, intentional self-harm, init encntr	suicide
Suicide and intentional self-inflicted injury	T40.4X2A	Poisoning by oth synthetic narcotics, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T40.7X2A	Poisoning by cannabis (derivatives), self-harm, init	suicide
Suicide and intentional self-inflicted injury	T40.8X2A	Poisoning by lysergide, intentional self-harm, init encntr	suicide
Suicide and intentional self-inflicted injury	T42.4X2A	Poisoning by benzodiazepines, intentional self-harm, init	suicide
Suicide and intentional self-inflicted injury	T42.6X2A	Poison by oth antieplptc and sed-hypntc	suicide

self-inflicted injury		drugs, slf-hrm, init	
Suicide and intentional self-inflicted injury	T42.8X2A	Poison by antiparkns drug/centr musc-tone depr, slf-hrm, init	suicide
Suicide and intentional self-inflicted injury	T43.012A	Poisoning by tricyclic antidepressants, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T43.212A	Poison by slctv seroton/norepineph reup inhibtr, slf-hrm, init	suicide
Suicide and intentional self-inflicted injury	T43.222A	Poison by slctv serotonin reuptake inhibtr, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T43.292A	Poisoning by oth antidepressants, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T43.3X2A	Poison by phenothiaz antipsychot/neurolept, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T43.592A	Poisoning by oth antipsychot/neurolept, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T43.612A	Poisoning by caffeine, intentional self-harm, init encntr	suicide
Suicide and intentional self-inflicted injury	T43.622A	Poisoning by amphetamines, intentional self-harm, init	suicide
Suicide and intentional self-inflicted injury	T43.632A	Poisoning by methylphenidate, intentional self-harm, init	suicide
Suicide and intentional self-inflicted injury	T44.3X2A	Poison by oth parasympath and spasmolytics, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T44.7X2A	Poisoning by beta-adrenocpt antagonists, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T44.992A	Poison by oth drug aff the autonm nervous sys, slf-hrm, init	suicide
Suicide and intentional self-inflicted injury	T45.0X2A	Poisoning by antiallerg/antiemetic, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T45.2X2A	Poisoning by vitamins, intentional self-harm, init encntr	suicide
Suicide and intentional self-inflicted injury	T45.4X2A	Poisoning by iron and its compounds, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T46.1X2A	Poisoning by calcium-channel blockers, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T46.4X2A	Poison by angiotens-convert-enzyme inhibtr, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T46.5X2A	Poisoning by oth antihypertensive drugs, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T47.0X2A	Poisoning by histamine H2-receptor blockers, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T47.92XA	Poisoning by unsp agents aff the GI sys, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T48.1X2A	Poisoning by skeletal muscle relaxants, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T48.3X2A	Poisoning by antitussives, intentional self-harm, init	suicide
Suicide and intentional self-inflicted injury	T48.4X2A	Poisoning by expectorants, intentional self-harm, init	suicide
Suicide and intentional self-inflicted injury	T49.0X2A	Poison by local antifung/infect/inflamm drugs, slf-hrm, init	suicide
Suicide and intentional self-inflicted injury	T50.902A	Poisoning by unsp drug/meds/biol subst, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T50.992A	Poisoning by oth drug/meds/biol subst, self-harm, init	suicide

Suicide and intentional self-inflicted injury	T51.0X2A	Toxic effect of ethanol, intentional self-harm, init encntr	suicide
Suicide and intentional self-inflicted injury	T54.1X2A	Toxic effect of corrosive organic compounds, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T54.92XA	Toxic effect of unsp corrosive substance, self-harm, init	suicide
Suicide and intentional self-inflicted injury	T65.892A	Toxic effect of oth substances, intentional self-harm, init	suicide
Suicide and intentional self-inflicted injury	T71.162A	Asphyxiation due to hanging, intentional self-harm, init	suicide

Table S2: Inclusion criteria and number of cases meeting each criterion.

n included	n excluded	% excluded	Reason for Inclusion
15,489			Encounters between 2011-2015 and likely to be in Hamilton County pulled from EHR based on ICD-10 codes
14,884	605	3.9%	Non-institutional address (e.g. the hospital or child welfare services)
14,759	125	0.8%	Non-PO box address
14,618	141	1.0%	Geocode precision of "street" or "range"
14,464	154	1.1%	Geocode score > 0.5
13,812	652	4.5%	Located within Hamilton County
13,176	636	4.6%	Did not have an encounter within the previous 7 days for same diagnosis grouping

Table S3: Odds ratios and 95% confidence intervals from the case-crossover modeling for the risk of a psychiatric ED visit related to a 10 $\mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ overall and by psychiatric ED visit categories. Results are presented using 30, 45, and 60 day fixed length periods to stratify and select control windows for each case window.

Category	Lag (days)	OR (45 days)	OR (30 days)	OR (60 days)
All	0	1.04 (0.99, 1.09)	1.03 (0.98, 1.08)	1.05 (1.00, 1.10)
	1	1.07 (1.02, 1.12)	1.06 (1.01, 1.12)	1.08 (1.03, 1.13)
	2	1.05 (1.00, 1.10)	1.06 (1.01, 1.12)	1.05 (1.01, 1.10)
	3	1.03 (0.99, 1.08)	1.05 (1.00, 1.10)	1.03 (0.98, 1.07)
Adjustment Disorder	0	1.02 (0.84, 1.24)	1.02 (0.83, 1.25)	1.03 (0.85, 1.25)
	1	1.24 (1.02, 1.52)	1.23 (1.00, 1.51)	1.24 (1.02, 1.50)
	2	1.24 (1.02, 1.51)	1.27 (1.04, 1.55)	1.25 (1.04, 1.51)
	3	1.20 (0.99, 1.45)	1.26 (1.03, 1.52)	1.22 (1.02, 1.46)
Anxiety	0	0.97 (0.76, 1.24)	0.93 (0.73, 1.20)	1.01 (0.80, 1.28)
	1	1.03 (0.80, 1.33)	1.02 (0.79, 1.33)	1.07 (0.84, 1.37)
	2	1.03 (0.81, 1.32)	1.07 (0.83, 1.38)	1.07 (0.85, 1.36)
	3	0.97 (0.77, 1.22)	1.01 (0.80, 1.28)	1.02 (0.81, 1.27)
Bipolar Disorder	0	1.07 (0.91, 1.26)	1.06 (0.89, 1.25)	1.08 (0.92, 1.26)
	1	1.11 (0.93, 1.31)	1.07 (0.90, 1.28)	1.06 (0.90, 1.25)
	2	1.13 (0.95, 1.33)	1.06 (0.89, 1.26)	1.04 (0.88, 1.22)
	3	1.12 (0.95, 1.31)	1.07 (0.91, 1.26)	1.07 (0.91, 1.24)
Depressive Disorder	0	1.03 (0.94, 1.12)	1.03 (0.94, 1.13)	1.06 (0.98, 1.15)
	1	0.98 (0.90, 1.08)	1.00 (0.91, 1.10)	1.04 (0.96, 1.14)
	2	0.99 (0.91, 1.08)	1.02 (0.93, 1.11)	1.02 (0.94, 1.11)
	3	1.01 (0.93, 1.10)	1.03 (0.95, 1.12)	1.02 (0.94, 1.10)
Externalizing Disorder	0	1.07 (0.94, 1.21)	1.09 (0.96, 1.24)	1.07 (0.95, 1.21)
	1	1.13 (0.99, 1.29)	1.15 (1.01, 1.32)	1.15 (1.01, 1.30)
	2	1.05 (0.92, 1.19)	1.06 (0.93, 1.21)	1.04 (0.92, 1.18)
	3	0.95 (0.84, 1.08)	0.97 (0.86, 1.10)	0.94 (0.84, 1.06)
Impulse Control Disorder	0	1.00 (0.88, 1.14)	0.95 (0.83, 1.08)	1.02 (0.90, 1.15)
	1	1.01 (0.88, 1.15)	0.98 (0.85, 1.12)	1.01 (0.88, 1.15)
	2	0.95 (0.84, 1.09)	0.95 (0.83, 1.09)	0.94 (0.83, 1.07)
	3	0.97 (0.86, 1.10)	0.98 (0.86, 1.11)	0.96 (0.85, 1.08)
Other Mood Disorder	0	0.98 (0.87, 1.11)	0.98 (0.87, 1.11)	0.98 (0.87, 1.10)
	1	1.11 (0.98, 1.25)	1.10 (0.97, 1.26)	1.09 (0.97, 1.23)
	2	1.15 (1.02, 1.30)	1.21 (1.06, 1.37)	1.16 (1.04, 1.31)
	3	1.10 (0.98, 1.24)	1.15 (1.02, 1.29)	1.12 (1.00, 1.25)
PTSD	0	1.16 (0.92, 1.46)	1.11 (0.87, 1.42)	1.09 (0.87, 1.37)
	1	1.02 (0.79, 1.31)	0.98 (0.76, 1.27)	1.00 (0.79, 1.26)
	2	1.00 (0.79, 1.28)	1.03 (0.80, 1.32)	1.01 (0.81, 1.27)
	3	1.13 (0.89, 1.42)	1.11 (0.87, 1.41)	1.03 (0.83, 1.28)
Schizophrenia	0	1.25 (1.00, 1.57)	1.27 (1.00, 1.61)	1.23 (0.99, 1.53)
	1	1.16 (0.91, 1.47)	1.17 (0.91, 1.50)	1.16 (0.92, 1.46)
	2	1.06 (0.84, 1.33)	1.07 (0.84, 1.36)	1.08 (0.87, 1.35)
	3	0.98 (0.77, 1.23)	0.97 (0.77, 1.23)	1.01 (0.81, 1.25)
Suicidality	0	1.29 (0.92, 1.81)	1.19 (0.83, 1.71)	1.17 (0.83, 1.63)
	1	1.44 (1.03, 2.02)	1.32 (0.91, 1.92)	1.27 (0.91, 1.79)
	2	1.16 (0.84, 1.62)	1.10 (0.77, 1.56)	0.99 (0.72, 1.36)
	3	1.04 (0.76, 1.43)	1.04 (0.75, 1.43)	0.95 (0.70, 1.28)

Table S4: P-values from a Chi-squared test used to determine if community deprivation significantly modified the association between PM_{2.5} and psychiatric ED visits by category. Separate associations for high and low community deprivation were estimated for outcomes only when there was significant modification ($p < 0.05$) for at least one exposure lag. Lags represent lagged exposures in days.

Category	Lag 3	Lag 2	Lag 1	Lag 0
All	0.649	0.319	0.194	0.538
Depressive Disorder	0.774	0.738	0.413	0.565
Other Mood Disorder	0.619	0.867	0.393	0.617
Adjustment Disorder	0.988	0.086	0.028	0.024
Anxiety	0.154	0.170	0.037	0.010
Bipolar Disorder	0.299	0.430	0.172	0.340
Externalizing Disorder	0.339	0.668	0.374	0.118
PTSD	0.992	0.739	0.985	0.405
Impulse Control Disorder	0.238	0.115	0.053	0.231
Suicidality	0.332	0.929	0.206	0.017
Schizophrenia	0.353	0.682	0.883	0.185

Table S5: Odds ratios and 95% confidence intervals from the case-crossover modeling for the risk of a psychiatric ED visit related to a 10 $\mu\text{g}/\text{m}^3$ increase in $\text{PM}_{2.5}$ stratified by community deprivation. Separate associations by high and low community deprivation were estimated for psychiatric ED visit categories that showed a significant effect modification ($p < 0.05$) for at least one exposure lag, in accord with a pre-specified selection criterion.

Category	Lag (days)	Deprivation Index	Odds Ratio	Lower 95% Confidence Interval Bound	Upper 95% Confidence Interval Bound
Adjustment Disorder	0	low	1.25	0.96	1.62
		high	0.82	0.62	1.08
	1	low	1.50	1.16	1.93
		high	1.00	0.76	1.33
	2	low	1.45	1.11	1.88
		high	1.05	0.80	1.39
3	low	1.20	0.92	1.56	
	high	1.20	0.92	1.56	
Anxiety	0	low	0.77	0.57	1.05
		high	1.39	0.97	2.00
	1	low	0.85	0.62	1.17
		high	1.39	0.96	2.01
	2	low	0.92	0.69	1.24
		high	1.28	0.86	1.90
3	low	0.87	0.65	1.15	
	high	1.22	0.83	1.80	
Suicidality	0	low	0.93	0.60	1.45
		high	1.98	1.22	3.23
	1	low	1.20	0.77	1.87
		high	1.77	1.11	2.82
	2	low	1.15	0.75	1.75
		high	1.18	0.74	1.89
3	low	1.18	0.79	1.75	
	high	0.87	0.54	1.42	