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RESEARCH ARTICLE

Prevalence of posttraumatic stress disorder and major depression in Ohio, Pennsylvania, and West Virginia 9 months after the East Palestine train derailment

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Abstract

On February 3, 2023, a Norfolk Southern train derailed in East Palestine, Ohio, releasing toxic compounds into the surrounding air, water, and soil. Technological chemical disasters represent potentially traumatic events capable of influencing mental disorders, such as posttraumatic stress disorder (PTSD) and major depression (MD). This study reports the first comprehensive investigation of the prevalence and correlates of mental disorders among potentially exposed residents of Ohio, Pennsylvania, and West Virginia 9 months postderailment. In this cross-sectional study, a nonprobability sample of 1,000 adults living within 65 miles of the derailment site completed a self-administered clinical survey interview assessing PTSD and MD, physical health symptoms, negative derailment-related beliefs and experiences, and preexisting psychiatric risk factors. Analyses were demographically weighted to yield estimates representative of the 65 mile–radius population. Most respondents were concerned about potential toxic exposure (73.9%) and associated health problems (92.1%), and half did not fully trust the information public health officials provided about the event (52.1%); half (49.7%) also reported at least one new or worsening physical health symptom since the derailment. Presumptive PTSD (15.4%) and MD (13.3%) were prevalent 9 months postderailment. Closer proximity to the derailment site was associated with greater endorsement of health concerns and symptoms, ds = 0.21–0.22, but not with greater mental disorder, OR = 1.02. Chemical disasters could have psychological consequences even without documented exposures, potentially due to uncertainty regarding exposure and associated health effects. The East Palestine community may benefit from increased attention to mental health services as a component of disaster response.

Amid an acceleration of infrastructure and climate-driven disaster events worldwide, there is a growing research imperative to better understand the factors that can improve community preparation and resilience to natural disasters (e.g., earthquakes, hurricanes, wildfires) and human-caused disasters (e.g., mass violence events, infrastructure failures, acute toxic-compound releases). As one component of this effort, identifying short- and long-term psychological sequelae of disasters and predictors of these sequelae (e.g., symptom morbidity and comorbidities, disorder prevalence rates, sociodemographic correlates) is particularly important to inform the targeted dissemination of treatments and primary prevention initiatives. Several systematic reviews on the topic have identified a high burden of stress- and trauma-related psychiatric disorders, such as posttraumatic stress disorder (PTSD) and major depressive disorder (i.e., *major depression*) after disasters (Galea et al., 2005; Neria et al., 2008; North & Pfefferbaum, 2013; Smith et al., 2009), with greater disorder risk for individuals who report a higher magnitude of exposure (e.g., survivors directly exposed to disasters; Neria et al., 2008). This is highly relevant for human-caused disasters, which may include long-term displacement; uncertainty about the extent and duration of potential toxic exposures; and the erosion of trust, particularly in relation to public officials with some responsibility for the disaster event (Norris et al., 2002). The current study sought to aid these efforts to understand, prevent, and remediate mental health problems following exposure to human-caused technological disasters.

On February 3, 2023, a Norfolk Southern train derailed in East Palestine, Ohio, resulting in the release of tens of thousands of tons of hazardous volatile organic compounds (VOCs), including vinyl chloride, ethylene glycol, ethylhexyl acrylate, isobutylene, and butyl acrylate (Chen et al., 2024). Town residents were instructed to evacuate from within 1 mile of the crash due to air quality concerns. On February 6, 2023, fire officials initiated a controlled release and chemical burn to avoid an explosion, leading to an expanded evacuation zone following the emission of additional toxicants; the evacuation order was lifted on February 8, ending the active fire incident. In total, an estimated 1,100,000 pounds of vinyl chloride—classified as a human carcinogen by the U.S. Environmental Protection Agency (EPA)—were released into the air, water, and soil (Hauser, 2023).

In the acute aftermath of the train derailment, many evacuated residents experienced continued displacement, concerns about returning home, and distrust of government intervention (Venkatesh, 2024). Concerns aligned with reports of contaminated water and commercial buildings, strong odors, and air quality–related physical health concerns (Coelho et al., 2024). Initial stationary air safety monitoring by the EPA and follow-up investigations of mobile air-safety monitoring found significant atmospheric concentrations of chemicals in the immediate (within 3 miles of East Palestine) and surrounding (within 5 miles of Pittsburgh) geographic areas (Oladeji et al., 2023; U.S. EPA, 2024). National Atmospheric Deposition Program data suggested a much wider atmospheric impact, with precipitation chemistry measurements showing an aerial impact spanning 16 states, ranging from the midwestern to the northeastern United States, encompassing 1,400,000 square kilometers, or 14% of U.S. land area (Gay et al., 2024). Consistent with past studies of known exposure to VOCs, many residents reported physical health concerns in the acute aftermath of the derailment, such as respiratory, neurological, dermal, and gastrointestinal symptoms (Caudill, 2023; Ohio Emergency Management Agency, 2023; U.S. Department of Health and Human Services [HHS], 2024).

The rapid onset of this disaster, widespread and prolonged potential for toxic substance exposure, uncertainty about the extent of exposure and potential health effects, and concern about the accuracy of information from officials constitute a potentially traumatic event (PTE) that could be associated with the onset or worsening of psychiatric symptoms, including those related to two common postdisaster psychiatric disorders: PTSD and major depression. The *Diagnostic and Statistical Manual of Mental Disorders* (5th ed., text rev.; *DSM-5-TR*; American Psychiatric Association [APA], 2022) defines a PTE as exposure to actual or threatened death, serious injury, or sexual violence (Supplementary Table S1). Toxic VOCs like vinyl chloride have known neurotoxic effects: Symptoms include nausea and headache for acute exposure and sleep disturbance, depressed mood, and sensory–motor neuropathy for chronic exposure (Podoll et al., 1990). Indeed, research from Three Mile Island; Flint, Michigan; and other contamination events (e.g., U.S. Superfund sites) suggests that human-caused technological disasters and exposure events are routinely and uniquely associated with negative psychological sequelae, typically PTSD and major depression (Baum & Fleming, 1993; Galea et al., 2005; Kilpatrick, 2016; Neria et al., 2008; Reuben et al., 2022). Rates of PTSD are variable across studies of human-caused technological disasters, but estimates suggest that short-term (e.g., past-year) prevalence is 30%–40% among directly exposed individuals and 10%–20% among rescue workers and individuals with potential indirect exposure (e.g., to stories, images, and consequences associated with the disaster; Galea et al., 2005; Neria et al., 2008). Further, studies have consistently found that both event-related experiences (e.g., perceptions of uncertainty associated with toxic substance exposure, a lack of perceived control, and worry about health effects associated with exposure) and

preexisting risk factors (e.g., low social support, prior PTE exposure) are associated with the initiation or exacerbation of rates of these mental health problems (Baum & Fleming, 1993; Kilpatrick, 2016; Neria et al., 2008; Reuben et al., 2022).

Although the full extent and degree of exposure to toxic VOCs remains under investigation, preliminary biological data collected 5 months after the train derailment found no significant toxicant elevations in a small sample of residents living within 1 mile of the incident (Haynes et al., 2024). Yet, early area survey data suggest the derailment may still be a significant precipitant of mental health problems in the surrounding area. In a community survey administered to 702 Pennsylvania and Ohio area residents in the weeks after the derailment, 86% of respondents believed they were exposed to toxic substances in the air, soil, or water, and 70% experienced "at least one worsening mental health symptom" (Caudill, 2023). However, to our knowledge, no study to date has reported diagnostic-level evidence on mental health disorders associated with the derailment, and the long-term prevalence rates and correlates of disorder in the region remain uninvestigated.

This study reports results from a large-scale mental health survey about psychological experiences and reactions to the East Palestine train derailment in potentially affected individuals living in Ohio, Pennsylvania, and West Virginia. Data were derived from a nonprobability sample of adults living within a 65-mile radius of the derailment, assessed 9 months after using a novel, rapid area-based sampling method that leveraged existing smartphone-based commercial survey panels. We investigated (a) beliefs and experiences related to the derailment (e.g., perceptions of exposure, concerns about physical health problems, financial expenses); (b) the presumptive prevalence of *DSM-5* diagnostic-level PTSD and major depression; and (c) possible correlates of presumptive psychiatric disorders, such as sociodemographic characteristics, derailment-related factors (e.g., beliefs, experiences, and proximity to the derailment), and non-derailment–related risk factors (e.g., past PTE exposure, low social support).

METHOD

Participants

A total of 4,222 individuals from two research panels (MFour and EMI; see Procedure section) had addresses with ZIP codes within the 65-mile derailment radius and were sent a generic notification that a survey was available for them to consider. Of these individuals, 1,698 (40.2%) accessed the survey, which provided detailed information, and agreed to participate. Four hundred forty-nine (26.4% of those who consented to participate) screened ineligible due to age or not residing in the 65-mile radius, indicating that the panels included some people under 18 years of age and some addresses that were not current. Of the 1,249 eligible adults, 1,000 completed the survey (80.1% of eligible participants), and 249 partially completed it (19.9%). Using 26.4% as an estimated screen-out rate for the entire group of 4,222 invited individuals, the estimated number of total eligible panel participants would be 3,099, and the survey completion rate would be 32.3%.

TABLE 1 Distribution of train derailment survey respondents and residential proximity from the East Palestine train derailment site

Derailment proximity (miles)	Respondents	
	n	%
< 25	417	41.7
26–35	124	12.4
36–45	118	11.8
46–55	239	23.9
56–65	102	10.2

Figure 1 and Table 1 show the distribution of respondents in Ohio, Pennsylvania, and West Virginia. A total of 417 participants (41.7%) lived within 25 miles of the site, 659 (65.9%) lived within 45 miles, and all 1,000 lived within 65 miles, consistent with recruitment procedures. Respondents were evenly distributed across the region, reflecting cities, suburbs, and rural areas as well as affluent and less-affluent ZIP codes. Consistent with these observations, respondents reported the full range of annual income levels and educational attainment (Table 2). Respondents were 51.1% female, and the racial/ethnic distribution reflected the regional sociodemographic make-up of the region (Table 2).

Procedure

Overview of study design

The objective of this cross-sectional study was to locate and conduct a rapid assessment with a demographically diverse sample of adults aged 18 years or older who lived within a 65-mile radius of the epicenter of the train derailment since the derailment occurred (February 3, 2023). Sampling, participant recruitment, survey content, and data collection are summarized here and detailed in the Supplementary Materials. ICF, a well-respected national survey research firm, coordinated all sampling, recruitment, data collection, and data weighting to adjust for potential nonresponse bias. All study participants provided informed consent; this study was approved by the

TABLE 2 Sociodemographic characteristics of the final sample

Characteristic	Unweighted		Weighted	
	n	%	*n*	%
Age (years)	1,000	100		
18–24	133	13.3	109	10.9
25–34	240	24.0	159	15.9
35–49	330	33.0	223	22.3
50–64	198	19.8	338	33.8
≥ 65	99	9.9	171	17.1
Gender	995	99.5		
Female	710	71.0	511	51.1
Male	281	28.1	482	48.2
Another identity	4	0.4	4	0.4
Race	997	99.7		
White	793	79.3	820	82
Black or African American	121	12.1	107	10.7
Asian	15	1.5	12	1.2
American Indian or Alaska Native	6	0.6	5	0.5
Native Hawaiian or Pacific Islander	5	0.5	5	0.5
Other/more than one race	57	5.7	50	5.0
Ethnicity	997	99.7		
Hispanic/Latino	43	4.3	25	2.5
Non-Hispanic/Latino	954	95.4	971	97.1
Educational attainment	997	99.7		
Less than high school diploma	46	4.6	80	8.0
High school diploma/GED	304	30.4	336	33.6
Some college/associate's degree	345	34.5	286	28.6
4-year college graduate	209	20.9	186	18.6
Postgraduate training	93	9.3	111	11.1
Marital status	988	98.8		
Married	368	36.8	481	48.1
Divorced or separated	149	14.9	152	15.2
Widowed	45	4.5	54	5.4
Never married	426	42.6	305	30.5
Annual income (USD)	964	96.4		
< $25,000	230	23.0	208	20.8
$25,000–$49,999	274	27.4	274	27.4
$50,000–$74,999	179	17.9	178	17.8
$75,000–$99,999	129	12.9	134	13.4
≥ $100,000	152	15.2	179	17.9
Household size (number of persons)	974	97.4		
1	177	17.7	174	17.4
2	297	29.7	362	36.2
3	197	19.7	188	18.8
≥ 4	303	30.3	251	25.1

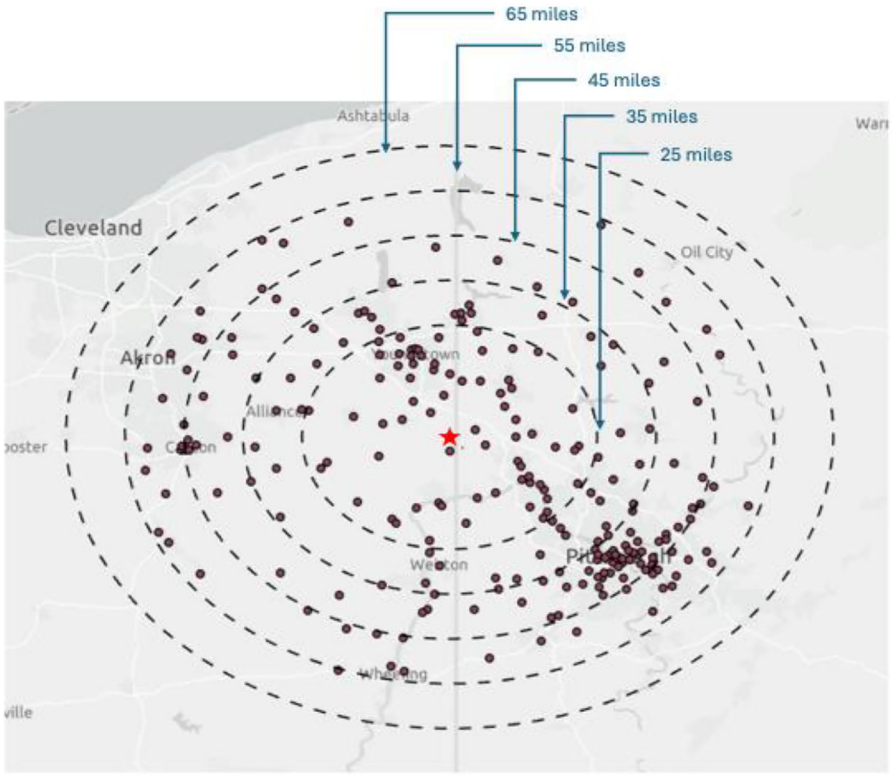

FIGURE 1 *Visual illustration depicting the distribution of train derailment survey respondents and residential proximity from the East Palestine train derailment site*

Note: Dots represent survey respondent locations, with distance from the derailment site (red star) highlighted. Southeast of the red star is Pittsburgh, PA and northwest is Youngstown, OH.

Institutional Review Board of the Medical University of South Carolina. This report follows the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE; von Elm et al., 2007) guidelines for cross-sectional studies.

Sampling, participant recruitment, and data collection

To conduct a rapid, low-cost assessment that could reach a wide impact area in a short period, we utilized non-probability area-based sampling via existing commercial market research panels. Although area-based probability sampling remains the gold standard for epidemiological assessment, the current approach was designed as a test of a novel method that might allow for lower-cost and more nimble assessments after acute disaster events by leveraging existing panels. Specifically, our sampling method identified adults residing within ZIP codes falling within a 65-mile radius of the train derailment from two large national panels of individuals who had agreed to receive invitations to participate in market research and other research studies. The first panel was constructed by MFour and includes approximately 2,000,000 individuals in the United States who own a smartphone with Android or iOS and are registered to receive invitations to participate in surveys administered via MFour's Surveys On The Go app. The second large national panel was constructed by EMI Research Solutions and also includes large numbers of adults who agreed to receive invitations to participate in surveys. Although the MFour and EMI panels were not constructed using probability-based sampling, they are drawn nationally and are sufficiently large and demographically diverse to permit weighting survey data for demographic differences between the achieved sample and U.S. Census–based population estimates for these ZIP codes. Specifically, MFour and EMI collect panelists' age, gender, race/ethnicity, marital status, education, and ZIP code. To better represent the overall population, survey weights were calculated using an iterative raking technique that calibrates to population controls by adjusting survey data. Weights were generated and assigned to different groups based on these demographic characteristics. The population data, sourced from the 2022 American Community Survey (U.S. Census Bureau, 2023), was extracted for ZIP codes that fully fell within a 65-mile radius of the East Palestine train derailment site.

Data were collected 9 months after the derailment, from September 20, 2023, to October 26, 2023, via a self-administered clinical interview online survey. Panelists were recruited using ZIP code 44413—the site of the derailment—as the reference point. The initial radius recruited panelists living within 25 miles or less of the reference point. The eligibility radius was incrementally increased over the data collection period until a target sample size of 1,000 respondents was reached, ultimately culminating in a final eligibility radius of up to 65 miles from the reference point. Only ZIP codes that were fully within the 65-mile radius were included, and panelists were required to enter their ZIP code in the survey to confirm they lived within the designated 65-mile radius. Several procedures were designed to encourage participation, candidness, and response quality. Survey responses were screened for duplicates using internet protocol (IP) addresses, and data quality was monitored by checking survey completion speed and responses for possible straight-lining. Further, no personally identifying information was collected as part of the survey. The survey was administered in English and took approximately 15 min to complete, and respondents were compensated $4 (USD) for their time. Data from partial completers were not retained, as the MFour and EMI panels do not pay for partial information.

Recruitment was a three-stage process. First, panelists were sent a generic notification that a survey was available, with no information about the topic of the survey. Second, individuals who clicked on the link to the survey received informed consent information about the survey. Third, panelists who agreed to participate were screened for eligibility to ensure they were 18 years of age or older and had lived in the area since the derailment.

Measures

Negative derailment-related experiences and beliefs

Questions assessing negative beliefs and experiences were modeled after previous research assessing similar concerns linked to mental health among people exposed to natural and technology-related disasters (Baum & Fleming, 1993; Reuben et al., 2022). Concerns about exposure to contaminated air, water, or soil from the derailment and associated short- and long-term health problems were assessed on a 4-point Likert scale with response options ranging from *not at all concerned* to *extremely concerned*. Respondents reported on the perceived likelihood of exposure to toxic substances via contamination (*not at all likely* to *extremely likely*). Respondents reported whether they personally experienced or knew a close friend or family member who got sick due to hazardous chemical exposure ("yes" or "no") and were asked about 10 physical symptoms that started or worsened following the derailment (e.g., rash on skin, sore throat, cough). Finally, respondents reported on strategies used to limit exposure, costs associated with these strategies, and their level of confidence in information from public officials concerning exposure to hazardous chemicals in the 2 weeks following the derailment.

Presumptive PTSD and depression

Diagnostic-level PTSD was measured using the National Stressful Events Survey (NSES) PTSD module developed in conjunction with the *DSM-5* PTSD workgroup (Kilpatrick et al., 2013). This module assesses exposure to 11 types of *DSM-5* PTEs (e.g., combat exposure, sexual assault; see the Supplementary Materials and Supplementary Table S1); the severity of all 20 *DSM-5* PTSD symptoms; and whether symptoms have caused significant distress or impairment in the areas of work, school, health, or social functioning. Symptoms are assessed to identify if the diagnostic criteria have been met at any time during one's life, in the past year, or in the past month. Individuals were assigned a presumptive PTSD diagnosis if they met the criteria using the *DSM-5* algorithm (i.e., one intrusion symptom, one avoidance symptom, two negative alterations in cognition and mood symptoms, and two alterations in arousal and reactivity symptoms). Internal consistency for past-month PTSD symptoms was excellent, Cronbach's $\alpha = .94$.

Diagnostic-level major depression was measured using the *DSM-5* criteria for a major depressive episode (MDE) from a modified version of the National Women's Study Depression Module previously used in National Institutes of Health- and National Institute of Justice-funded epidemiological surveys of depression prevalence following trauma (Galea et al., 2002; Kilpatrick et al., 2003). This module assesses all nine MDE symptoms. Temporal information about symptoms was used to determine if the criteria were met since the onset of the derailment, in the past year, or in the past month. Individuals were assigned a presumptive major depression diagnosis if they met the criteria using the *DSM-5* algorithm for a MDE (i.e., depressed mood and/or anhedonia with a total endorsement of five of nine depression symptoms). Internal consistency for past-month major depression was excellent, Cronbach's $\alpha = .90$.

Preexisting risk factors

Preexisting risk factors assessed included prior PTE exposure (described previously) and low social support. Social

support was measured using the five-item version of the Medical Outcomes Study module (MOS; Sherbourne & Stewart, 1991). Participants rated each item on a 4-point Likert scale ranging from 1 (*none of the time*) to 4 (*all of the time*) based on the frequency of perceived social support over the past 6 months. Social support scores were summed to create a total score ranging from 5 to 20, with higher scores indicating higher degrees of perceived social support. Following previous work using the MOS post-trauma (Kilpatrick et al., 2007; Moreland et al., 2024), individuals were classified as having low social support if their total score was 15 or less. The five-item MOS has demonstrated good psychometric properties (Sherbourne & Stewart, 1991). In this sample, internal consistency for the MOS social support scale was excellent, Cronbach's $\alpha = .90$. These measures are further detailed in the Supplementary Materials and Supplementary Tables S1 and S2.

Data analysis

Data were weighted for age, gender, race/ethnicity, marital status, educational attainment, and ZIP code using population data sourced from the 2022 American Community Survey (U.S. Census Bureau, 2023). Analyses followed three steps. First, we calculated the prevalence of negative derailment-related experiences and beliefs. Second, we calculated the prevalence of presumptive PTSD and major depression. Third, we examined correlates of mental disorders using logistic regression. Mental health outcomes were separately regressed onto three correlate categories: (a) sociodemographic characteristics (i.e., gender, race, ethnicity, educational attainment, and household income); (b) derailment-related factors, including proximity to the derailment site and negative psychological experiences and beliefs (i.e., concerns about exposure and health problems associated with contaminated air, water, and soil, and confidence in information from public officials); and (c) psychosocial risk factors unrelated to the derailment (i.e., past PTE exposure and low social support). Bivariate logistic regression analyses were first estimated to identify significant associations between variables within each correlate category, entered separately, and presumptive psychiatric disorders. Multivariate logistic regressions were then estimated in a final stepwise model using significant correlates from the bivariate models to generate conservative risk estimates adjusted for factors in both the same and other categories. Specifically, all significant sociodemographic characteristics were entered simultaneously in Step 1, followed by all significant derailment-related risk factors in Step 2 and, finally, all significant preexisting risk factors in Step 3. These estimates thus reflect risk correlates that remained significantly associated with presumptive psychiatric disorder after adjusting for other correlates in the model. All analyses were conducted in SPSS (Version 29.0.2), with two-tailed significance tests and an alpha level of .05.

RESULTS

Negative derailment-related experiences and beliefs

At 9 months post-derailment, most respondents were at least somewhat concerned about personal exposure to contaminants (73.9%), an immediate family member's exposure (71.0%), or short- or long-term health problems associated with exposure (92.1%; Figure 2). Most respondents reported activities to limit exposure to released contaminants, including avoiding drinking water (51.8%) or eating food grown on land (51.5%) believed to be contaminated, as well as preventing children from playing in areas believed to be contaminated (42.0%). Most respondents reported having either not much (39.6%) or no confidence (24.4%) in the accuracy of information provided by government or public health officials in the 2 weeks post-derailment. One in four respondents reported incurring personal expenses to lower their risk of toxicant exposure (21.3%). Compared to respondents living more than 25 miles from the derailment site, respondents living within 25 miles reported higher levels of concern about toxic substance exposure and its consequences, $p < .001$, $d = 0.21$, and reported more engagement in preventative activities, $p < .001$, $d = 0.22$. In contrast, respondents living further away reported incurring more expenses to lower their risk of exposure, $p < .001$, $d = 0.21$. Proximity groups did not differ in their perceptions of trust in public official information, $p = .814$.

Half of all respondents reported at least one physical health problem that either started or worsened after the derailment (49.7%; Figure 3). The most commonly reported problems were related to respiratory, eye, and skin conditions (e.g., nose irritation or sinus drip: 24.3%, cough: 23.6%). Gastrointestinal issues were also commonly reported (e.g., diarrhea: 12.2%). Compared to respondents living more than 25 miles from the derailment site, those living within 25 miles reported more physical health symptoms, $p = .028$, $d = 0.14$.

Presumptive psychiatric disorders

Mental health disorders were highly prevalent among respondents across the survey: 15.4%, 95% confidence

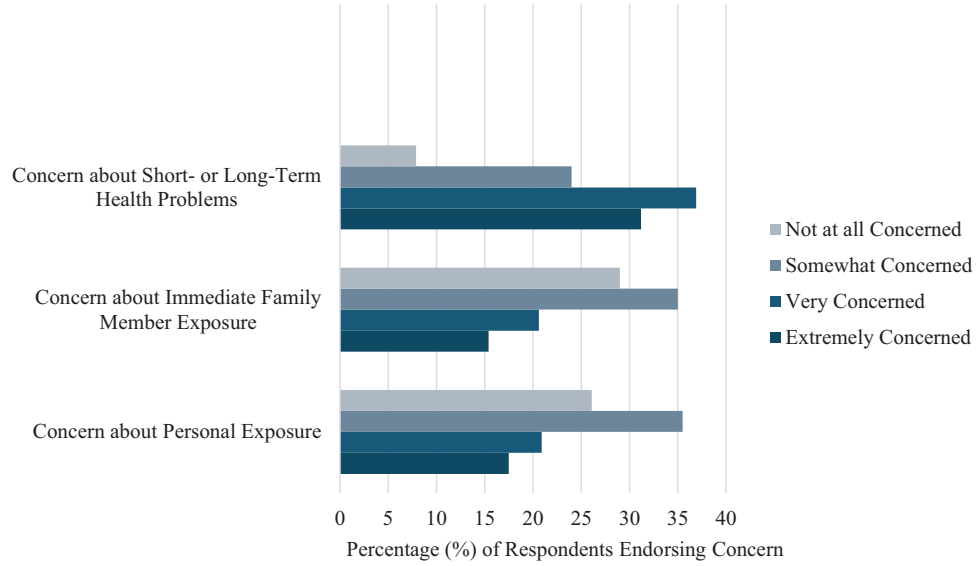

FIGURE 2 *Prevalence of concern about personal, immediate family member, and short- and long-term health problems associated with toxic substance exposure in residents exposed to the East Palestine train derailment*

interval (CI) [12.9%, 17.9%], of participants met the *DSM-5* criteria for presumptive past-month PTSD; 13.3%, 95% CI [10.9%, 15.7%], for presumptive past-month major depression; and 8.7%, 95% CI [6.7%, 10.7%], for comorbid PTSD and major depression. Respondents living closer to the derailment site were no more likely to meet the criteria for a presumptive disorder or comorbid disorder than those living further away, odds ratio (*OR*) = 1.02, 95% CI [0.90, 1.14], $p = .800$, for each 10-mile–additional distance past a 25-mile radius from the derailment site. For example, PTSD prevalence was 13.6% within the 25-mile radius and 16.7% outside the 25-mile radius.

To identify potentially meaningful correlates of mental disorder after the derailment, we used separate bivariate logistic regression models to examine variables in each category of the following disorder correlates: (a) sociodemographic characteristics (gender, race/ethnicity, education, and household income), (b) derailment proximity and negative psychological experiences and beliefs related to the derailment (concerns about the likelihood of exposure and health problems associated with contaminated air, water, and soil; confidence in information from public officials), and (c) negative psychosocial factors unrelated to the derailment (past PTE exposure and low social support). The results of the bivariate models are displayed in Supplementary Table S3. After identifying significant correlates, we estimated a final stepwise multivariate model that included all correlates within a category simultaneously, adjusted for other correlate categories in previous steps. Model results are shown in Table 3. For parsimony, we focus here primarily on the results from the more conservative multivariate model.

Sociodemographic characteristics were associated with presumptive past-month PTSD, major depression, and comorbidity. Specifically, after adjusting for covariates, female respondents had higher likelihood of PTSD, adjusted *OR* (*aOR*) = 1.87, 95% CI [1.27, 2.74]; major depression, a*OR* = 1.58, 95% CI [1.06, 2.34]; and comorbidity, a*OR* = 1.86, 95% CI [1.15, 3.01], compared to male respondents. Compared to White respondents, non-White respondents were 1.49 times more likely to meet the criteria for PTSD, 95% CI [1.12, 2.00]; 1.47 times more likely to meet the criteria for major depression, 95% CI [1.09, 1.99]; and 1.51 times more likely to meet the criteria for both, 95% CI [1.07, 2.14]. Compared to respondents who completed at least a college-level education, those who did not were 1.95 times more likely to meet the criteria for PTSD, 95% CI [1.21, 3.14]; 1.92 times more likely to meet the criteria for major depression, 95% CI [1.17, 3.15]; and 1.94 times more likely to meet the criteria for both, 95% CI [1.05, 3.59]. Income was associated with disorder risk in bivariate models, but not in the multivariate model, and ethnic identity was not associated with disorder risk in any model.

Negative psychological beliefs and experiences were also associated with presumptive mental disorder. After adjusting for sociodemographic characteristics, respondents who were concerned about exposure and adverse health-effects were 1.91 times more likely to meet the criteria for PTSD, 95% CI [1.52, 2.40]; twice as likely to meet the criteria for major depression, 95% CI [1.57, 2.53]; and 1.92 times more likely to meet the criteria for both, 95% CI [1.45, 2.54]. Respondents less confident in the accuracy of information from public officials were more likely to meet the criteria for PTSD, a*OR* = 1.26, 95% CI [1.03, 1.54], and comorbidity,

TABLE 3 Weighted prevalence of correlates of psychiatric disorders 9 months after the East Palestine train derailment

Correlate	PTSD (n = 214, 15.4%)[a]		Major depression (n = 174, 13.3%)[a]		Comorbidity (n = 120, 8.7%)[a]	
	a*OR*	95% CI	a*OR*	95% CI	a*OR*	95% CI
Sociodemographic characteristics						
Gender						
Male	Reference					
Female	1.87**	[1.27, 2.74]	1.58*	[1.06, 2.34]	1.86*	[1.15, 3.01]
Race[b]						
White	Reference					
Non-White	1.49**	[1.12, 2.00]	1.47*	[1.09, 1.99]	1.51*	[1.07, 2.14]
Educational attainment						
College or higher	Reference					
Lower than college	1.95**	[1.21, 3.14]	1.92*	[1.17, 3.15]	1.94*	[1.05, 3.59]
Annual income (USD)						
Greater than $25,000	Reference					
Less than $25,000	1.26	[0.82, 1.94]	1.30	[0.83, 2.02]	1.45	[0.87, 2.42]
Train derailment–related factors						
Concerns about exposure/health	1.91***	[1.52, 2.40]	2.00***	[1.57, 2.53]	1.92***	[1.45, 2.54]
Low confidence in public official information	1.26*	[1.03, 1.54]	1.15	[0.94, 1.42]	1.32*	[1.03, 1.70]
Preexisting psychosocial factors						
Total lifetime PTE exposure	1.32***	[1.20, 1.45]	1.23***	[1.12, 1.35]	1.23***	[1.11, 1.38]
Interpersonal trauma history						
No interpersonal trauma exposure	Reference					
Interpersonal trauma exposure	3.94***	[2.02, 7.72]	2.32**	[1.24, 4.33]	4.71***	[1.93, 11.46]
Social support						
High	Reference					
Low	1.87**	[1.17, 2.99]	2.83***	[1.71, 4.70]	2.65***	[1.44, 4.91]

Note: Correlate categories were entered stepwise (sociodemographic characteristics in Step 1, train derailment-related factors in Step 2, and preexisting psychosocial factors in Step 3), with all predictors within each category entered simultaneously. PTSD = posttraumatic stress disorder; a*OR* = adjusted odds ratio; CI = confidence interval.

[a]Weighted prevalence.

[b]Respondents who identified as Asian, American Indian/Alaskan Native, Native Hawaiian/Pacific Islander, and other/more than one race were collapsed into the Non-White category due to low cell sizes.

* $p < .05$. ** $p < .01$. *** $p < .001$.

a*OR* = 1.32, 95% CI [1.03, 1.70], but not major depression alone, a*OR* = 1.15, 95% CI [0.94, 1.42]. As described, geographical distance from the train derailment site was not associated with disorder risk.

Negative psychosocial factors—prior PTE exposure and low social support—were also associated with presumptive mental disorder. After adjusting for sociodemographic characteristics and derailment-related beliefs, respondents who reported a higher number of prior PTEs were more likely to experience PTSD, a*OR* = 1.32, 95% CI [1.20, 1.45], major depression, a*OR* = 1.23, 95% CI [1.12, 1.35]; and comorbidity, a*OR* = 1.23, 95% CI [1.11, 1.38]. Relative to respondents exposed to noninterpersonal PTEs, those exposed to at least one interpersonal PTE (e.g., sexual assault) were more likely to meet the criteria for PTSD, a*OR* = 3.94, 95% CI [2.02, 7.72]; major depression, a*OR* = 2.32, 95% CI [1.24, 4.33]; and comorbidity, a*OR* = 4.71, 95% CI [1.93, 11.46]. Finally, respondents with low social support were more likely to experience PTSD, a*OR* = 1.87, 95% CI [1.17, 2.99]; major depression, a*OR* = 2.83, 95% CI [1.71, 4.70]; and comorbidity, a*OR* = 2.65, 95% CI [1.44, 4.91].

DISCUSSION

This mental health survey of 1,000 adults living within 65 miles of the East Palestine train derailment produced four primary findings. First, building on early data suggesting a high incidence of physical and mental health problems among residents in the weeks following the derailment

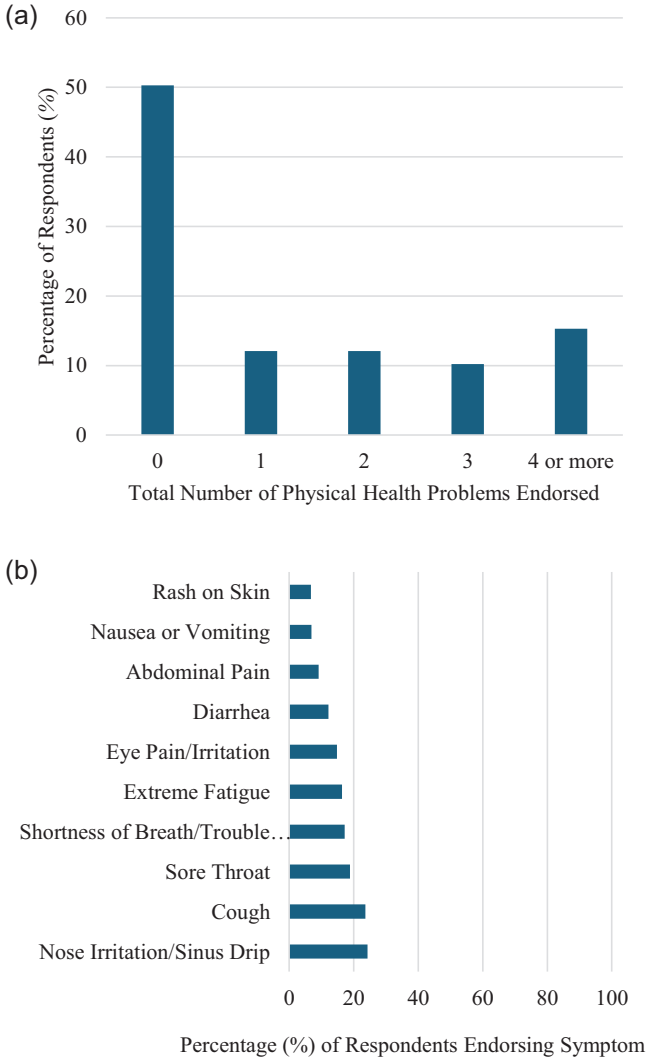

FIGURE 3 *Prevalence of (a) total physical health problems and (b) specific physical health conditions in residents exposed to the East Palestine train derailment*

(Caudill, 2023), we found high rates of self-reported physical health problems in the weeks after the derailment and high rates of mental health problems that persisted up to 9 months postdisaster. Over half of all respondents endorsed at least one physical symptom (e.g., cough, sore throat, extreme fatigue, eye irritation or pain) that started or worsened after the derailment. One in six respondents qualified for presumptive past-month PTSD, one in seven qualified for presumptive past-month major depression, and one in 12 qualified for both.

Comparisons of reported mental health problems to national and global prevalence benchmarks suggest that residents were at increased risk for presumptive mental disorders 9 months postderailment. The prevalence of past-month PTSD in derailment-exposed residents (15.5%) exceeds national estimates of the lifetime PTSD prevalence in U.S. veterans (9.4%; Wisco et al., 2022), the general U.S. population (6.1%; Goldstein et al., 2016), and global population (2.8%; Koenen et al., 2017). Similarly, the prevalence of past-month major depression in derailment-exposed residents (13.3%) exceeds past-year rates of major depression in the general U.S. population (8.3%; Substance Abuse and Mental Health Services Administration, 2023) and the global population (7.2%; Lim et al., 2018). Our estimates align with and are lower than previously reported mental health disorder prevalence in communities potentially exposed to toxicants following human-caused technological disasters (Galea et al., 2005; Neria et al., 2008). For example, using the same survey interview, Reuben and colleagues (2022) reported a high presumptive past-year prevalence of PTSD (24.4%) and major depression (22.1%) 5 years after the onset of the Flint, Michigan, water crisis among residents who lived through the event.

Second, negative derailment-related experiences and beliefs were highly prevalent among residents. Over three quarters of respondents reported concerns about possible exposure to toxicants, and over half reported engaging in activities to prevent possible exposure and little confidence or trust in information disseminated by public officials. These experiences and beliefs were associated with an increased risk of presumptive PTSD and major depression 9 months postderailment. Specifically, respondents who were more concerned about possible exposure and adverse short- and long-term health concerns were twice as likely to meet the criteria for PTSD, major depression, or both (i.e., comorbidity). Individuals who had less trust in the information reported by public officials were similarly at an increased risk for disorder. These negative experiences can be viewed as chronic stressors that might be expected to increase the risk of these mental disorders.

Closer physical proximity to the derailment site, measured via ZIP code centroid, was associated with higher levels of concern about potential toxic substance exposure. However, objective physical proximity to the derailment site was not associated with an increased risk of reported mental or physical health problems. This is somewhat consistent with preliminary biological evidence suggesting that proximal distance to the derailment was not strictly associated with a higher body burden of toxic chemicals within a few months of the accident (Haynes et al., 2024). In this case, subjective perceptions of possible toxic exposure and the stress that the uncertainty and unpredictability around exposure generate may influence event-linked physical and mental health problems when the risk or knowledge of actual exposure may be quite low (Baum & Fleming, 1993).

Third, in this sample weighted to match regional demographic characteristics, sociodemographic and psychosocial risk factors unrelated to the derailment were related to mental health problems 9 months later. Female,

non-White, and less-educated respondents were one-and-a-half-to-two times as likely to report presumptive PTSD, major depression, and comorbidity even after simultaneous statistical adjustment for these and other sociodemographic characteristics. Likewise, individuals who reported exposure to at least one past interpersonal traumatic event or ongoing low social support were, on average, two-to-five times more likely to meet the criteria for presumptive mental disorder even after adjusting for significant sociodemographic and train derailment–related experiences. These findings support past research findings that indicate that prior PTE exposure increases the risk of PTSD and major depression following disaster-related trauma (Kilpatrick, 2016; Neria et al., 2008; Reuben et al., 2022). Future research and public policy efforts following disasters could consider screening for past PTE exposure and social support to better identify individuals at risk for persistent mental health problems after disaster.

Fourth, the results highlight the feasibility and utility of a novel, area-based sampling method to rapidly collect data from individuals in disaster-exposed communities (McFarlane & Williams, 2012; Roudini et al., 2017). The gold standard for this type of study is recruitment using area-based probability sampling methods. However, such methods are expensive, time-consuming, and characterized by declining response rates. The existence of large national panels, constructed primarily for marketing purposes using nonprobability sampling methods, that include geolocation data about panel members provides a less expensive, faster way to locate and interview a diverse sample of adults from a specified area in which a disaster occurred.

Finally, the findings provide clinical implications for understanding and intervening on mental health problems following human-caused technological disasters. The associations between psychiatric disorder risk 9 months postdisaster and both negative beliefs and experiences in the weeks following the derailment and low social support prior to the derailment highlight the potential for brief psychosocial interventions that may be effective for individuals experiencing distress in the acute postdisaster period. Programs like psychological first aid (PFA; Brymer et al., 2006) exist to provide advice and support in the hours to days following disasters. Initial meta-analytic evidence suggests that PFA may both help reduce symptoms of posttraumatic stress, depression, and anxiety and increase a sense of control, social connectedness, and safety among individuals exposed to disaster (Hermosilla et al., 2023). PFA can also be provided by community members with only basic training, highlighting its potential for rapid dissemination after disasters. Identifying individuals who exhibit distress in the acute postdisaster period may also be important for symptom monitoring, as these individuals may benefit from triage to more intensive interventions in the weeks to months following exposure (North & Pfefferbaum, 2013). For example, subthreshold symptoms may be targeted via strengths-based programs to improve coping and promote recovery in the months following disaster (e.g., skills for psychological recovery; Berkowitz et al., 2010), whereas persistent PTSD and major depression may require more trauma-informed, evidence-based treatments delivered by experienced clinicians. Given the elevated rates of PTSD and major depression observed 9 months following the derailment, the current findings suggest that increasing availability and access to these mental health services could be critical to addressing chronic psychiatric burden in the region.

This study has limitations. First, we used a non–probability-based sampling strategy that could have yielded a nonrepresentative sample. Survey weighting partially addresses this limitation, but the results should be confirmed in probability samples. Second, this cross-sectional study precludes any temporal or causal links between perceptions of the derailment and mental disorders. As such, we cannot rule out the influence of prior mental health history on perceptions of the derailment. Notwithstanding, the findings suggest a consistent association between derailment-related perceptions and adverse mental health outcomes. Longitudinal studies are needed to establish temporal sequences and causal relationships, thereby informing targeted interventions and policy strategies to mitigate the long-term psychological impacts of such incidents. Third, although the self-administered diagnostic survey of PTSD provided a careful assessment of symptoms with respect to timing and severity, symptoms were not assessed solely in reference to the train derailment. The current PTSD prevalence rate is likely also impacted by other lifetime trauma exposure (see Supplementary Table S1) and pre-existing non–derailment-related symptoms, consistent with research showing that cumulative trauma exposure is associated with increased rates of PTSD (e.g., Kilpatrick et al., 2013). Nevertheless, the results suggest that exposure to and negative perceptions of the derailment are linked to higher PTSD risk in this region. Finally, although we used geographical distance as a proxy for objective levels of exposure, biological measures of exposure would provide a more direct assessment of toxicant exposure, which would support direct comparisons of actual exposure, perceived exposure and health concerns, and outcomes of interest.

Nine months following the East Palestine, Ohio, train derailment, residents of the affected communities are experiencing high rates of presumptive PTSD, major depression, and comorbid psychiatric disorders, as well as lasting negative beliefs and experiences related to the derailment, including an experience of exacerbated

respiratory health–related physical symptoms. Technological disasters with uncertain chemical exposures may have widespread and long-term psychological sequelae. Future technological disaster response programs may need to provide more attention to assessing and managing post-disaster stress of uncertainty as well as delivering timely, credible information about toxicant exposure and the potential health consequences. Ohio, Pennsylvania, and West Virginia residents potentially exposed to the East Palestine train derailment may benefit from expanded services to address continuing physical and mental health concerns.

OPEN PRACTICES STATEMENT

Data are not openly available. Questions regarding these data should be addressed to the corresponding author.

AUTHOR NOTE

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REFERENCES

American Psychiatric Association. (2022). *Diagnostic and statistical manual of mental disorders*. (5th ed., text rev.) https://doi.org/10.1176/appi.books.9780890425787

Baum, A., & Fleming, I. (1993). Implications of psychological research on stress and technological accidents. *American Psychologist*, *48*(6), 665–672. https://doi.org/10.1037/0003-066X.48.6.665

Berkowitz, S., Bryant, R., Brymer, M., Hamblen, J., Jacobs, A., Layne, C., & Watson, P. (2010). *Skills for psychological recovery: field operations guide*. National Center for PTSD & the National Child Traumatic Stress Network. https://www.nctsn.org/sites/default/files/resources/special-resource/spr_complete_english.pdf

Brymer, M., Jacobs, A., Layne, C., Pynoos, R., Ruzek, J., Steinberg, A., Vernberg, E., & Watson, P. (2006). *Psychological first aid: Field operations guide* (2nd ed.). National Center for PTSD & the National Child Traumatic Stress Network. https://www.nctsn.org/sites/default/files/resources//pfa_field_operations_guide.pdf

Caudill, M. (2023). *CDC/ATSDR assessment of chemical exposures (ACE)/epi Aid investigation: East Palestine Train Derailment*. https://stacks.cdc.gov/view/cdc/147412

Chen, G., Rosalina, S., Padilla-Crespo, E., He, G., Chen, Q., Arosemena, A., Rosado-Maldonado, B. E., Swift, C. M., Coelho, P. B., Whelton, A. J., Taggart, D., & Loffler, F. E. (2024). Natural attenuation potential of vinyl chloride and butyl acrylate released in the East Palestine, Ohio train derailment accident. *Environmental Science & Technology*, *58*(40), 17743–17755. https://doi.org/10.1021/acs.est.4c04198

Coelho, P. B., Fitzgerald, G., Isaacson, K., Diop, R., Prabhakar, G., Heffner, S., Verma, A., Youngblood, J. P., Choi, Y. J., Surdyka, S., Spears, S. A., Frisbee, M. D., Del Real, K. R., Gustafson, L. A., Nunez-Torres, A. M., Proctor, C. R., Lee, L. S., Whitehead, H. D., … Whelton, A. J. (2024). Environmental and private property contamination following the Norfolk Southern chemical spill and chemical fires in Ohio. *Environmental Science: Water Research & Technology*, *10*, 3007–3023. https://doi.org/10.1039/D4EW00456F

Galea, S., Ahern, J., Resnick, H., Kilpatrick, D. G., Bucuvalas, M., Gold, J., & Vlahov, D. (2002). Psychological sequelae of the September 11 terrorist attacks in New York City. *New England Journal of Medicine*, *346*(13), 982–987. https://doi.org/10.1056/NEJMsa013404

Galea, S., Nandi, A., & Vlahov, D. (2005). The epidemiology of post-traumatic stress disorder after disasters. *Epidemiologic Reviews*, *27*(1), 78–91. https://doi.org/10.1093/epirev/mxi003

Gay, D. A., Blaydes, K., Schauer, J. J., & Shafer, M. (2024). Widespread impacts to precipitation of the East Palestine Ohio train accident. *Environmental Research Letters*, *19*, Article 074022. https://doi.org/10.1088/1748-9326/ad52ac

Goldstein, R. B., Smith, S. M., Chou, S. P., Saha, T. D., Jung, J., Zhang, H., Pickering, R. P., Ruan, W. J., Huang, B., & Grant, B. F. (2016). The epidemiology of *DSM-5* posttraumatic stress disorder in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions–III. *Social Psychiatric & Psychiatric Epidemiology*, *51*, 1137–1148. https://doi.org/10.1007/s00127-016-1208-5

Hauser, C. (2023, June 23). After the Ohio train derailment: Evacuations, toxic chemicals, and water worries. *New York Times*. https://www.nytimes.com/article/ohio-train-derailment.html?action=click&module=Well&pgtype=Homepage&section=US%20News

Haynes, E. N., Eskenazi, B., Hilbert, T. J., Brancato, C., Holland, N., Kim, C., Calafat, A. M., Jones, R., Davis, M., Birnbaum, L. S., & Sjodin, A. (2024). Serum dioxim levels in a subset of participants of the East Palestine, Ohio train derailment health tracking study. *Environmental Science & Technology Letters*, *11*(7), 673–678. https://doi.org/10.1021/acs.estlett.4c00263

Hermosilla, S., Forthal, S., Sadowska, K., Magill, E. B., Watson, P., & Pike, K. M. (2023). We need to build the evidence: A systematic review of psychological first aid on mental health and well-being. *Journal of Traumatic Stress*, *36*(1), 5–16. https://doi.org/10.1002/jts.22888

Kilpatrick, D. G. (2016, November 1–2). *Lessons learned from other disasters* [Conference presentation]. National Academies of Sciences Gilbert W. Beebe Symposium on 30 years After the Chernobyl Accident, Washington, DC, USA.

Kilpatrick, D. G., Koenen, K. C., Ruggiero, K. J., Acierno, R., Galea, S., Resnick, H. S., Roitzsch, J., Boyle, J., & Gelernter, J. (2007). The serotonin transporter genotype and social support and moderation of posttraumatic stress disorder and depression in hurricane-exposed adults. *American Journal of Psychiatry*, *164*(11), 1693–1699. https://doi.org/10.1176/appi.ajp.2007.06122007

Kilpatrick, D. G., Resnick, H. S., Milanak, M. E., Miller, M. W., Keyes, K. M., & Friedman, M. J. (2013). National estimates of exposure to traumatic events and PTSD prevalence using *DSM-IV* and *DSM-*

5 criteria. *Journal of Traumatic Stress*, *26*(5), 537–547. https://doi.org/10.1002/jts.21848

Kilpatrick, D. G., Ruggiero, K. J., Acierno, R., Saunders, B. E., Resnick, H. S., & Best, C. L. (2003). Violence and risk of PTSD, major depression, substance abuse/dependence, and comorbidity: Results from the National Survey of Adolescents. *Journal of Consulting and Clinical Psychology*, *71*(4), 692–700. https://doi.org/10.1037/0022-006X.71.4.692

Koenen, K. C., Ratanatharathorn, A., Ng, L., McLaughlin, K. A., Bromet, E. J., Stein, D. J., Karam, E. G., Ruscio, A. M., Benjet, C., Scott, K., Atwoli, L., Petukhova, M., Lim, C. C. W., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Bunting, B., … Kessler, R. C. (2017). Posttraumatic stress disorder in the World Mental Health Surveys. *Psychological Medicine*, *47*(13), 2260–2274. https://doi.org/10.1017/S0033291717000708

Lim, G. Y., Tam, W. W., Lu, Y., Ho, C. S., Zhang, M. W., & Ho, R. C. (2018). Prevalence of depression in the community from 30 countries between 1994 and 2014. *Scientific Reports*, *8*(1), Article 2861. https://doi.org/10.1038/s41598-018-21243-x

McFarlane, A. C., & Williams, R. (2012). Mental health services required after disasters: Learning from the lasting effects of disasters. *Depression Research & Treatment*, *1*, Article 970194. https://doi.org/10.1155/2012/970194

Moreland, A. D., Rancher, C., Bottomley, J., Galea, S., Abba-Aji, M., Abdalla, S. M., Schmidt, M. G., Vena, J. E., & Kilpatrick, D. G. (2024). Posttraumatic stress disorder among adults in communities with mass violence incidents. *JAMA Network Open*, *7*(7), Article e2423539. https://doi.org/10.1001/jamanetworkopen.2024.23539

Neria, Y., Nandi, A., & Galea, S. (2008). Post-traumatic stress disorder following disasters: A systematic review. *Psychological Medicine*, *38*(4), 467–480. https://doi.org/10.1017/S0033291707001353

North, C. S., & Pfefferbaum, B. (2013). Mental health response to community disasters: A systematic review. *JAMA*, *310*, 507–518. https://doi.org/10.1001/jama.2013.107799

Norris, F. H., Friedman, M. J., Watson, P. J., Byrne, C. M., Diaz, E., & Kaniasty, K. (2002). 60,000 disaster victims speak: Part I. An empirical review of the empirical literature, 1981—2001. *Psychiatry*, *65*(3), 207–239. https://doi.org/10.1521/psyc.65.3.207.20173

Ohio Emergency Management Agency. (2023, March 3). *East Palestine update*. https://ema.ohio.gov/media-publications/news/030323-east-palestine-update

Oladeji, O., Saitas, M., Mustapha, T., Johnson, N. M., Chiu, W. A., Rusyn, I., Robinson, A. L., & Presto, A. A. (2023). Air pollutant patterns and human health risk following the East Palestine, Ohio train derailment. *Environmental Science & Technology Letters*, *10*(8), 680–685. https://doi.org/10.1021/acs.estlett.3c00324

Podoll, K., Berg-Dammer, E., & Noth, J. (1990). Neurologic and psychiatric disorders in vinyl chloride disease. *Fortschritte der Neurologie-Psychiatrie*, *58*(11), 439–443. https://doi.org/10.1055/s-2007-1001207

Reuben, A., Moreland, A., Abdalla, S. M., Cohen, G. H., Friedman, M. J., Galea, S., Rothbaum, A. O., Schmidt, M. G., Vena, J. E., & Kilpatrick, D. G. (2022). Prevalence of depression and posttraumatic stress disorder in Flint, Michigan 5 years after the onset of the water crisis. *JAMA Network Open*, *5*(9), Article e2232556. https://doi.org/10.1001/jamanetworkopen.2022.32556

Roudini, J., Khankeh, H. R., & Witruk, E. (2017). Disaster mental health preparedness in the community: A systematic review study. *Health Psychology Open*, *4*(1), Article 2055102917711307. https://doi.org/10.1177/2055102917711307

Sherbourne, C. D., & Stewart, A. L. (1991). The MOS Social Support survey. *Social Science & Medicine*, *32*(6), 705–714. https://doi.org/10.1016/0277-9536(91)90150-B

Smith, E., Wasiak, J., Sen, A., Archer, F., & Burkle Jr, F. M. (2009). Three decades of disasters: A review of disaster-specific literature from 1977–2009. *Prehospital and Disaster Medicine*, *24*(4), 306–311. https://doi.org/10.1017/S1049023X00007020

Substance Abuse and Mental Health Services Administration. (2023). *2023 National Survey of Drug Use and Health (NSDUH) annual national report*. https://www.samhsa.gov/data/report/2023-nsduh-annual-national-report

U.S. Census Bureau. (2023). *American Community Survey: 2022 data release*. https://www.census.gov/programs-surveys/acs/news/data-releases.2022.html#list-tab-1133175109

U.S. Department of Health and Human Services. (2024). *Agency for toxic substances and disease registry*. https://www.atsdr.cdc.gov/

U.S. Environmental Protection Agency. (2024). *East Palestine, Ohio Train Derailment*. http://www.epa.gov/east-palestine-oh-train-derailment

Venkatesh, V. (2024, April 3). *East Palestine: One year later*. https://yipinstitute.org/policy/east-palestine-one-year-later

von Elm, E., Altman, D. G., Egger, M., Pocock, S. J., Gøtzsche, P. C., & Vandenbroucke, J. P. (2007). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Statement: Guidelines for reporting observational studies. *Annals of Internal Medicine*, *147*(8), 573–577. https://doi.org/10.7326/0003-4819-147-8-200710160-00010

Wisco, B. E., Nomamiukor, F. O., Marx, B. P., Krystal, J. H., Southwick, S. M., & Pietrzak, R. H. (2022). Posttraumatic stress disorder in US military veterans: Results from the 2019–2020 National Health and Resilience in Veterans Study. *Journal of Clinical Psychiatry*, *83*(2), Article 39779. https://doi.org/10.4088/JCP.20m14029

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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