Crisis such as natural disasters, wars, and terrorist attacks take a heavy mental health toll not only on those immediately affected but also on first responders, who are often asked to perform their duties in extremely challenging and sometimes life-threatening circumstances that may bear little resemblance to their everyday work environments and training. Clinically significant symptoms of posttraumatic stress disorder (PTSD) occur in approximately 10% of first responders and can persist long after their deployment. Cross-sectional studies have identified multiple risk factors for PTSD in the immediate aftermath of a crisis, but PTSD can also emerge slowly, many months after the event. Relatively few studies have tracked participants longitudinally, and they focused primarily on first responders to the September 11, 2001, terrorist attacks. Consequently, how PTSD symptoms evolve over time and how various risk factors are used to estimate short- vs long-term outcomes in other contexts is not well understood. Longitudinal efforts to identify modifiable risk factors will be critical for designing more effective interventions and are especially timely during the coronavirus disease 2019 (COVID-19) pandemic, which is exposing health care workers and other first responders to similar stressors. Nagamine and colleagues characterize the longitudinal trajectories and risk factors used to estimate PTSD symptoms in a remarkable 6-year prospective cohort study tracking more than 56,000 first responders to the Great East Japan Earthquake of 2011.

On March 11, 2011, a 9.0 magnitude earthquake—an among the largest ever recorded—triggered massive tsunami waves that inundated Japan’s east coast and caused meltdowns at a nuclear power plant in Fukushima Prefecture. Approximately 70,000 first responders from the Japan Ground Self-Defense Forces were deployed to the region and tasked with search and rescue efforts, providing humanitarian support, and recovering the remains of approximately 10,000 persons who died. In a previous study, approximately 2% to 3% of first responders were found to develop clinically significant PTSD symptoms and identified several acute risk factors, but the long-term outcomes were unknown.

In this longitudinal follow-up study, Nagamine and colleagues were able to track 56,388 of the 70,000 first responders for 6 years. Symptoms of PTSD were assessed using the Impact of Events Scale—Revised (IES-R) at 1, 6, and 12 months after the first responders’ deployment, and then annually for as long as 6 years. They also tested whether various risk factors were associated with PTSD symptoms in this cohort, including age, sex, working conditions, traumatic exposures, and being personally affected by the disaster.

The investigators found that the prevalence of probable PTSD—defined as an IES-R score of at least 25—was approximately 2.7% one month after deployment, and the cumulative probability during 6 years was approximately 6.75%. Impressively, 80.6% of eligible first responders were enrolled in the study, and 90.4% of participants completed at least 1 follow-up assessment. On average, PTSD symptoms were more severe in those who dropped out, suggesting that these modest attrition rates did not inflate their estimates of PTSD prevalence, and the real rates may actually have been higher. Severity of PTSD symptoms tended to decrease over time, but their rank order across individuals was stable, such that individuals with the highest symptom scores 1 month after deployment also tended to have higher scores at subsequent assessments. At the same time, only 40.7% of those who eventually developed probable PTSD met criteria in the first month, and 19.3% of them did not meet criteria until 5 to 6 years after the event. Together, these findings suggest that initial assessments in the immediate aftermath of a traumatic event are useful estimates of
long-term outcomes, but they may fail to detect PTSD that will develop in most individuals months or years later.

The authors also identified multiple risk factors. The strongest associations were for age and being personally affected by the disaster; those who self-reported being affected by the disaster were 1.96 times more likely to develop PTSD, and individuals older than 46 years were approximately 2.28 times more likely than those younger than 25 years. In contrast to previous studies, female sex was not associated with increased PTSD risk in this sample, but 97.1% of participants were male, so the study may not have been powered to detect sex effects. Counterintuitively—but consistent with earlier reports—traumatic experiences, such as recovering bodies (hazard ratio [HR], 1.19; 95% CI, 1.07-1.32) and exposure to radiation (HR, 1.18; 95% CI, 1.05-1.33), were less important than modifiable factors, such as duration of deployment (HR, 1.75; 95% CI, 1.52-2.02) and postdeployment overwork (HR, 1.61; 95% CI, 1.39-1.87), defined as struggling to catch up on routine work that accumulated during the deployment and failing to take leave.

These findings have potential implications for managing responses to current and future crises. Of note, recent studies suggest that approximately 70% of health care workers and other first responders to the COVID-19 pandemic may develop at least mild PTSD symptoms, and 45% to 50% may develop moderate to severe symptoms of depression and anxiety. Further work will be needed to determine whether similar risk factors apply to first responders in the COVID-19 pandemic or other crises, whether mood and anxiety symptoms follow similar trajectories, and why some individuals develop highly disabling symptoms while others are relatively unscathed. In the meantime, the results by Nagamine and colleagues suggest that efforts to reduce the duration of deployments to highly stressful work environments and to facilitate recovery periods could be useful and warrant further consideration.
