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3 Editorial  
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5 **Fukushima, Mental Health and Suicide**

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34 On March 11 in 2011, a huge tsunami struck the Tohoku area in Japan. The extensive  
35 damage to Fukushima Prefecture was further compounded by the severe accident of the  
36 Fukushima Daiichi Nuclear Power Plant (FDNPP). Specifically, the cooling system of  
37 the FDNPP was destroyed by the tsunami, leading to several explosions in the reactor  
38 buildings and subsequent massive diffusion of radioactive substances. The Japanese  
39 government decided to evacuate approximately 488,000 residents living within a 30-km  
40 radius of the FDNPP in the first 5 days after the accident. In spite of the gradual lifting  
41 of living restrictions within the evacuation zone, opinion surveys conducted by local  
42 governments showed that numerous former residents hesitated to return to their  
43 hometowns owing to fear of exposure to radioactivity, the delayed reconstruction and  
44 decontamination processes, and unclear future of their hometown. For example, in  
45 Naraha, a municipality where the entire territory was placed under evacuation orders  
46 since 2011, the government recently lifted the living restriction. However, an opinion  
47 survey of evacuees conducted by the Naraha government office about the question of  
48 return revealed that only 8 per cent wished to return as soon as possible.[1] To date,  
49 over 100,000 people have not returned to their homes in Fukushima Prefecture.  
50 Moreover, three types of discordance arose in Fukushima [2], each of which has led to  
51 dissonance within both families and the community: family members having different

52     opinions on the physical risk induced by radioactive exposure, interfamilial conflicts  
53     caused by differences in residential restrictions or compensations, frustrations between  
54     evacuees and people living in areas nearby about returning (e.g. Iwaki City). [2]

55           Fukushima Medical University (FMU) conducted a population-based survey of  
56     approximately 210,000 original residents living in the evacuation zone using self-  
57     administered questionnaires one year after the disaster.[3] The survey found that 65.7 %  
58     of the respondents had relocated more than three times since the disaster and 39.2 % of  
59     families had been separated.[3] Furthermore, 21.6% had possible post-traumatic stress  
60     disorder (PTSD) and 14.6% had probable depression.[3] These prevalence rates were  
61     considerably higher than those of the general population of Japan even 4 years after the  
62     disaster.[4] Compared with other prefectures affected mainly by the tsunami, such as  
63     Iwate or Miyagi Prefecture, the mental health problems in Fukushima evacuees seemed  
64     to be more complex and included not only PTSD and depression, but also chronic  
65     anxiety and guilt, a global sense of loss, separation of families and communities as  
66     described above, and both public and self-stigma.[2]

67           Suicide is another public health issue of growing concern in Fukushima. The rate  
68     of suicide in Fukushima Prefecture exceeded the average rate for Japan even before the  
69     Great East Japan Earthquake and Tsunami. After the 2011 disaster, the standardized

70 suicide mortality ratio decreased initially (108 in 2010, 107 in 2011, 94 in 2012, and 96  
71 in 2013) but then rose to 126 in 2014, thus exceeding the pre-disaster level.[5] In  
72 addition, despite the occurrence of less damage from the tsunami in Fukushima, the  
73 number of disaster-related suicides is much higher than rates in other prefectures  
74 sustaining greater damage from the tsunami (Japanese Cabinet Office, 2015). We note  
75 that the determination of “disaster-related” is made by a very rigorous process at the  
76 local governmental level (e.g. verification of evidences such as a last note or a statement  
77 of the bereaved), as it is necessary for approval of monetary compensation.

78 The patterns and mechanisms explaining the associations between natural or  
79 manmade disasters, and suicide and suicide-related behavior (thoughts, plans) are  
80 complex. Kölves et al. reviewed 42 empirical studies and found that the pattern was not  
81 consistent across disasters.[6] In some instances, the rate of suicide and non-fatal  
82 suicide behavior initially declined, as occurred in Fukushima (an effect thought to occur  
83 during the post-disaster “honeymoon phase”), and then was followed by a delayed  
84 increase.[6] Matsubayashi et al., examining the relationship between the severity of  
85 natural disasters in Japan and the suicide rates using prefecture-level panel data between  
86 1982 and 2010, further found that a decrease in suicide was only found after less  
87 destructive disasters, while massive disasters tended to be associated with an increased

88 rate.[7] They attributed this difference to a weakening connectedness of social ties  
89 among community members. In contrast, little is known about suicide behaviors  
90 following manmade disasters. To the best of our knowledge, the only studies to date  
91 reported an excess in suicide 3 years and 7+ years after Chernobyl among clean-up  
92 workers from Estonia.[8, 9]

93 With regard to relationship between disasters and suicide behaviors, Kölves et al.  
94 advocated for long-term monitoring of mental health after these events.[6] FMU and  
95 other local programs have embraced this aspect of health programming and have  
96 provided multiple, pro-active mental health programs (e.g., phone and visit services, or  
97 educational and self-help group meetings) to the population. The initial decrease in  
98 suicide in Fukushima may reflect the activities of these programs, though the lagged  
99 increase suggests that more needs to be done.[5] There are many difficulties that the  
100 Fukushima people are facing: delays in and lack of clarity regarding benefits; ongoing  
101 rumors and public stigma about radiation; distrust in government, management, and  
102 even medical authorities; and friction among community members stemming from  
103 different risk perceptions of radiation. These psychosocial factors, which serve to reduce  
104 pre-disaster community bonds and resilience, contributed to PTSD and depression,  
105 which are critical risk factors for suicide.

106 To prevent suicide or other self-destructive behaviors such as excessive drinking,  
107 we are trying to establish new facilities and care networks providing targeted psychiatric  
108 interventions as well as to enhance existing resources. For example, the FMU mental  
109 health survey department has a team providing telephone intervention for survey  
110 responders at risk of PTSD, depression and anxiety disorders.[10] Furthermore, a new  
111 facility (the Fukushima Center for Disaster Mental Health) with 40 staff consisting of  
112 psychologists, social workers and district nurses has been actively working in the  
113 disaster area since 2012. It is providing outreach services, including psychological  
114 assessment and psychoeducation, and is becoming a core organization in the care  
115 network system in Fukushima. The long-term goals of these new programs are to  
116 improve mental health and prevent suicide in Fukushima.

117 There are four important challenges that remain. The first is the need to clarify the  
118 risk factors for suicide in Fukushima so that targeted prevention programs can be  
119 designed. Case-control studies built on psychological autopsy methodology would help  
120 fill this gap. The second is insufficient number of staff working with the affected  
121 population of Fukushima, and a situation that has resulted in staff burn-out.[2] The third  
122 is to provide intensive care focusing on people vulnerable to suicide, especially middle-  
123 aged male unemployed. The sudden increase of the suicide rate in Japan from 1998

124 occurred mainly in middle aged males and was conceivably related to a major change in  
125 the employment system. [11] Finally, we should point out that people's stigma against  
126 psychiatric disorders is still strong in Japan.[12] Thus, Fukushima people often hesitate  
127 to receive psychiatric treatment, even if urgently needed. In order to provide effective  
128 interventions for people at risk of suicide, further efforts to dispel the stigma is needed.

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