Median Age at the Onset of Mental Disorders.*	
Type of Disorder	**Median Age at Onset**
	yr (interquartile range)
Any disorder	14 (7–24)
Anxiety disorder	11 (6–21)
Mood disorder	30 (18–43)
Impulse-control disorder	11 (7–15)
Substance-use disorder	20 (18–27)

* Data are from Kessler et al.[1]

studied over a long period in order to demonstrate efficacy. Still, preliminary evidence suggests that screening has some positive effects. In one follow-up survey of parents of children who were identified through TeenScreen as having clinically significant psychiatric symptoms, including suicidal tendencies, 72% reported that their child was doing very well or had significantly improved and was seeing a mental health professional.

Finally, there is concern about the high sensitivity but relatively low specificity of the screening instruments, a combination that leads to many false positive results. The potential consequences of falsely identifying a teen as needing a more thorough psychiatric evaluation seem far less dire, however, than those of failing to identify a suicidal teenager. Stigma is real, but unlike suicide, it doesn't kill.

It is accepted medical practice for teenagers to get frequent physical checkups, even though the odds of finding a serious physical disease in this population are very small. In contrast, the chance that a teen has a treatable psychiatric illness (such as anxiety, mood, or addictive disorder) is nearly 21%.[5] How can we not routinely screen young people for mental illness when it is such an important cause of suffering and death?

I believe that voluntary mental health screening of teens should be universal. But we need to go beyond school-based screening if we are optimally to reach young people who are at risk for psychiatric illness and suicide. Pediatric clinicians are in an ideal position to detect mental illness in young people, and they should be better trained to probe for and recognize the signs and symptoms of major psychiatric disorders.

Courtney put it bluntly: "I'm not sure where I would be today if I didn't get screened. I'm not even sure if I would be here at all."

An interview with Cynthia Montgomery, whose son took his life at the age of 14, can be heard at www.nejm.org.

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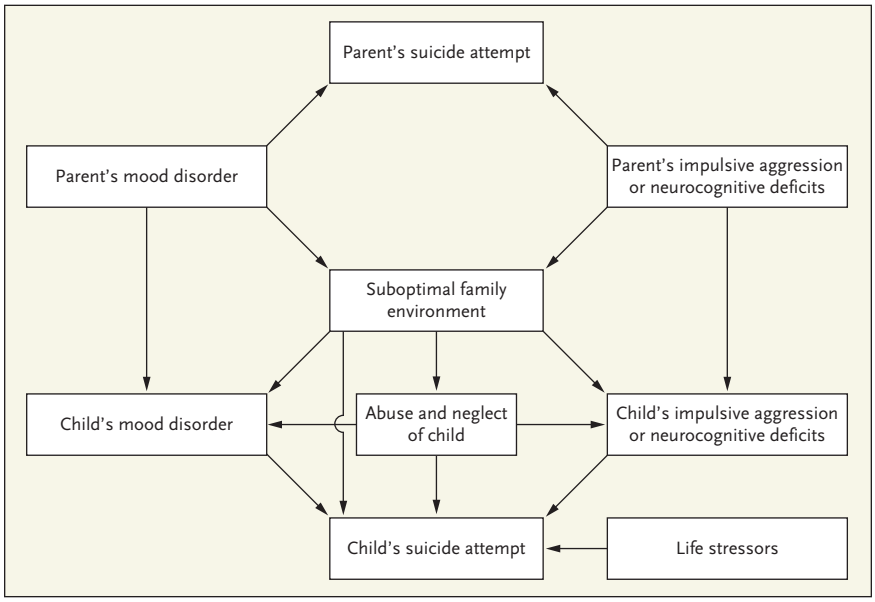
Familial Pathways to Suicidal Behavior — Understanding and Preventing Suicide among Adolescents

David A. Brent, M.D., and J. John Mann, M.D.

A 16-year-old boy whose brother recently committed suicide is seen in the emergency room after slashing his wrists. He reports having felt severely depressed and hopeless since his brother died and has markedly increased his alcohol intake. His depression actually began 4 years ago, after the death of his father, and has continued unabated. The patient has a history of being disciplined for fighting in school, usually after being teased or provoked by his peers. Immediately before his suicide attempt, he had a fight with his girlfriend, his mood plummeted, and he decided that he might as well be dead. His mother reports that the boy's father died of "accidental carbon monoxide poisoning." The father had had problems with depression, alcohol dependence, and aggression and most likely also committed suicide.

This patient has many of the known risk factors for suicide in a young person: a mood disorder, alcohol abuse, recent loss of a loved one, and a family history of suicidal behavior.[1] Although suicide is the third leading cause of death among young people, the vast majority of people who face personal losses, have mood



Familial Pathways to Early-Onset Suicidal Behavior.

disorders, and abuse alcohol neither attempt nor complete suicide. What additional characteristics might explain why this teenager would do so? We have proposed a stress-diathesis model for adults that, along with the familial transmission of vulnerabilities to suicidal behavior, may help to explain and predict suicide among young people (see diagram).[2] Important stressors that may originate outside the family include the acute despair associated with relationship crises or other personal losses or failures, especially if experienced in the context of a major depression. In combination with such stressors, the inherited diathesis predisposes people to suicidal behavior.

Such a model, of course, leaves room for great individual variation in the factors and processes that lead to suicide.[2] Many teenagers who attempt suicide show evidence of an inability to regulate their mood or tolerate distress. Faced with an upsetting situation, some vulnerable teenagers focus excessively on suicide as a solution and act impulsively, evincing limited cognitive flexibility, poor problem-solving abilities, and difficulty with inhibiting inappropriate responses. These same factors contribute to a common correlate of suicidal behavior: impulsive aggression, defined as the tendency to respond to provocation or frustration with hostility or aggression. For other young people, hopelessness and depression may play a more critical role. Ultimately, the confluence of multiple risk factors results in the highest risk for suicidal behavior.

The tendency toward such behavior is often familial and most likely has a genetic component. Studies of adopted children and twins show that familial concordance for suicidal behavior is explained by both genetic and environmental factors.[3] Although psychiatric disorders also run in families, suicidal behavior appears to be familially transmitted independently of these disorders. For example, among parents with a mood disorder, those who have attempted suicide are more than six times as likely as those who have not to have a child who attempts suicide, even though the offspring of both groups have similar rates of mood disorders.[3] Suicidal behavior that begins before 25 years of age is highly familial, and having a greater number of affected family members is associated with an earlier age at appearance of suicidal acts. A better understanding of the mechanisms of familial transmission of suicidal behavior could help us to identify vulnerability factors with greater precision, thereby informing treatment and prevention efforts.

Our knowledge about the sequence of and relation between salient factors leading up to suicidal behavior is incomplete, which limits our ability to build a causal model. However, impulsive aggression seems to be key in the network of relevant factors.[2,3] Within groups of diagnostically similar patients, impulsive aggression is strongly associated with suicidal behavior, because it increases the likelihood that a person will act on suicidal thoughts. Impulsive aggressive traits, which are highly heritable, are more severe in patients with greater numbers of family members manifesting suicidal behavior and appear to be transmitted from parent to child along with a tendency toward suicidal behavior. Neurobiologic and neuropsychological investigations seem to support this link.[3] Lower levels of the serotonin metabolite 5-hydroxyindoleacetic acid (5-HIAA) are found in persons with suicidal behavior or impulsive aggression than in diagnostically and demographically similar controls.

Postmortem and imaging studies of persons who have completed or attempted suicide have

identified alterations in the number and function of serotonin receptors in the regions of the prefrontal cortex that are involved in emotion regulation and behavioral inhibition.[2] Neurocognitive deficits in executive functioning, working memory, accurate assessment of risk, and problem solving have been found to correspond to these regional alterations in the brain in persons who have attempted suicide. These deficits may underlie the cognitive rigidity seen in our teenage patient: he was unable to think of alternatives to suicide, to weigh the benefits and risks of a suicide attempt, or to redirect his thoughts in order to find relief from his depressed mood. Moreover, in persons prone to suicide, both depression and a family history of suicidal behavior exacerbate difficulties with problem solving.

Early childhood abuse and neglect appear to contribute to the familial transmission of suicidal behavior by compounding genetic vulnerability.[1-3] Studies in nonhuman primates show that early neglect by parents results in alterations in serotonin function in the brain, with attendant increases in impulsivity and aggression, especially in those who are genetically vulnerable.[2] Parents who attempt suicide often have risk factors, such as impulsive aggression, that not only may be passed on to their children but also may affect the parent's ability to provide an optimal environment for child rearing.

Could bereavement or imitation help to explain the clustering of suicide within families? Our patient apparently did not realize that his father had committed suicide, but his own attempt followed his brother's suicide. His depression and drinking worsened after his brother's death, contributing to his risk of suicide. A suicide of a close friend or sibling, however, does not usually increase the risk of a suicide attempt; such imitation is more likely to be triggered

by a suicidal model who is not personally known to the imitator.[1,3] Furthermore, studies show concordance for suicidal tendencies between adoptees and their biologic relatives but not their adoptive families, suggesting that familial transmission is more closely linked to genetics than to imitation.

Unfortunately, these findings are insufficient to permit accurate prediction of who will commit suicide, but they do suggest that impulsive aggression, neurocognitive difficulties, and family adversity might be considered potential targets for treatment in persons who have attempted suicide. No one would question the need to treat our patient's depression and alcohol dependence, but his impulsive aggression, difficulties with the regulation of emotion, limited problem-solving skills, and cognitive inflexibility might still confer a significant risk of suicide the next time a crisis occurs. In fact, some promising treatments that reduce the recurrence of suicidal behavior focus on the enhancement of the regulation of emotions, tolerance for distress, and cognitive flexibility in order to improve the efficacy of generating viable alternatives to suicide during a crisis.[4] Mood stabilizers, such as lithium, prevent suicide in some populations and, despite their known side effects, deserve further study, since they may positively affect decision making or impulsive aggression.[2,5]

We believe that future treatment studies should incorporate neurocognitive indicators of risk, as well as interventions aimed at altering these core vulnerabilities. The development of complementary psychosocial and pharmacologic interventions that target emotional and cognitive difficulties common among suicide-prone persons could prove to be a major advance for the treatment of adolescents who attempt suicide and might aid in preventing suicide in those who have a high familial risk.

Dr. Mann reports having received consulting fees from Eli Lilly.

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