I am medical director of the Clinical Coordinating Center for the National Heart, Blood, and Lung Institute-funded ARDS Clinical Trials Network, and a co-investigator in the ALTA trial.

1 Smith FG, Perkins GD, Gates S, et al, for the BALTI-2 study investigators. Effect of intravenous β-2 agonist treatment on clinical outcomes in acute respiratory distress syndrome (BALTI-2): a multicentre, randomised controlled trial. *Lancet* 2011; published online Dec 12. DOI:10.1016/S0140-6736(11)61623-1.

2 Folkesson HG, Matthay MA. Alveolar epithelial ion and fluid transport: recent progress. *Am J Respir Cell Mol Biol* 2006; **35:** 10–19.

3 Ware LB, Matthay MA. Alveolar fluid clearance is impaired in the majority of patients with acute lung injury and the acute respiratory distress syndrome. *Am J Respir Crit Care Med* 2001; **163:** 1376–83.

4 Perkins GD, McAuley DF, Thickett DR, Gao F. The β-agonist lung injury trial (BALTI): a randomised placebo-controlled clinical trial. *Am J Respir Crit Care Med* 2006; **173:** 281–87.

5 Grant AM, Altman DG, Babiker AB, et al, for the DAMOCLES study group. Issues in data monitoring and interim analysis of trials. *Health Technol Assess* 2005; **9:** 1–235.

6 Wiedemann HP, Wheeler AP, Bernard GR, et al, for the National Heart, Lung, and Blood Institute Acute Respiratory Distress Syndrome (ARDS) Clinical Trials Network. Comparison of two fluid-management strategies in acute lung injury. *N Engl J Med* 2006; **354:** 2564–75.

7 Matthay MA, Brower RG, Carson S, et al. The National Heart, Lung, and Blood Institute ARDS Clinical Trials Network. Randomized, placebo-controlled clinical trial of an aerosolized β-2 agonist for treatment of acute lung injury. *Am J Respir Crit Care Med* 2011; **184:** 561–68.

8 Perkins GD, McAuley DF. Pro: β-agonist in acute lung injury—the end of the story? *Am J Respir Crit Care Med* 2011; **184:** 503–04.

9 Papazian L. Con: β2-adrenergic agonists in ALI/ARDS—not recommended or potentially harmful? *Am J Respir Crit Care Med* 2011; **184:** 504–06.

10 Gonzalez-Muñoz C, Fuente T, Medin-Aguerre S, Hernández-Cascales J. The increase in rat ventricular automaticity induced by salbutamol is mediated through β(1)- but not β(2)-adrenoceptors: role of phosphodiesterases. *Life Sci* 2011; **88:** 1095–101.

11 Schmittinger CA, Wurzinger B, Deutinger M, et al. How to protect the heart in septic shock: a hypothesis on the pathophysiology and treatment of septic heart failure. *Med Hypotheses* 2010; **74:** 460–65.

12 Singer M, Glynne P. Treating critical illness: the importance of first doing no harm. *PLoS Med* 2005; **2:** e167.

13 Novotny NM, Lahm T, Markel TA, et al. β-blockers in sepsis: reexamining the evidence. *Shock* 2009; **31:** 113–19.

14 Herndon DN, Hart DW, Wolf SE, et al. Reversal of catabolism by beta-blockade after severe burns. *N Engl J Med* 2001; **345:** 1223–29.

Self-harm in adolescence and future mental health

Published Online November 17, 2011 DOI:10.1016/S0140-6736(11)61260-9

See Articles page 236

Results of several school-based community studies have shown that self-harm (intentional self-injury or self-poisoning) is very common in adolescents, being reported by around 10% of 15 and 16 year olds,[1–3] although with some international variation in prevalence.[4] In *The Lancet* Paul Moran and colleagues[5] report a study in which they found that about 8% of adolescents in a sample of nearly 2000 Australian pupils, recruited from schools in the state of Victoria, said they had self-harmed. As in other studies, self-harm was more frequent in girls than boys (risk ratio 1·6, 95% CI 1·2–2·2), and the most common method was self-cutting, which is by stark contrast with the pattern in samples presenting to hospitals, in which overdoses predominate.[6] Factors associated with adolescent self-harm in Moran and colleagues' study were much the same as those found in other community studies[1–3,7] and included anxiety and depression, heavy alcohol use, smoking, and antisocial behaviour.

Corbis

Self-harm by an adolescent understandably causes great concern for parents and friends, and for school staff and clinicians. A crucial issue that is often raised is about the relevance of this behaviour in adolescence for future mental health, including possible persistence and worsening of self-harm. Moran and colleagues' study makes a special contribution to this topic. The authors repeatedly surveyed their study participants in nine waves between ages 14–15 years and young adulthood; data on self-harm were collected in waves three (mean age 15·9 years) to nine (mean age 29·0 years). Of the participants who self-harmed in adolescence, nine out of ten reported no self-harm in young adulthood, although young women were more likely than young men to continue to self-harm. Self-cutting in particular became less common. Persistence of self-harm into young adulthood was associated with reporting of self-harm at several assessment points during adolescence. Although the numbers are small, the data seem to show that the proportion of individuals self-harming with suicidal intent increased

with age, which accords with findings from a birth cohort study in New Zealand.[8] The emergence of self-harm in young adulthood was associated with symptoms of anxiety and depression in adolescence.

One issue is why self-harm should peak in adolescence. Moran and colleagues[5] suggest that this behaviour might be related to developmental changes that undermine emotional control and make coping with stresses more difficult. As personality develops with age,[9] an individual could be less likely to act on thoughts of self-harm than previously. In a study by Patton and colleagues,[10] self-harm was related to completion or near-completion of puberty, rather than age, especially in girls, and to alcohol consumption, depressive symptoms, and engagement in sexual activity. Bullying, worry about sexual orientation, and history of sexual abuse also seem to be relevant.[3,7,11]

Why does self-harm become less common in later adolescence and early adulthood? In addition to maturation resulting in better coping, the effect of family difficulties might lessen as young people become more independent and more skilled at problem-solving. A further important contributor to onset and persistence of self-harm in adolescence is the contagious effect of exposure to self-harm by peers.[3,11,12] As the closeness and intensity of adolescent peer relationships diminish with age, their potential effect on behaviour is likely to lessen. Thus, as young people move from adolescence to young adulthood the extent of exposure to peer self-harm might decrease. A possibility not addressed by Moran and colleagues is the extent to which clinical interventions might have contributed to the reduction in self-harm.

Another issue is whether individuals who are likely to continue to self-harm as they age can be more clearly defined. This idea could not be addressed in Moran and colleagues' study because of the low incidence of persistent self-harm. Also, although the investigators[5] draw attention to the importance of anxiety and depression in adolescence for onset of self-harm in young adulthood, other predictive factors might exist. This notion is especially important in view of the finding from this and other studies[8] that the self-harm of those who persist with the behaviour tends to become more serious, thereby partly contributing to the well-recognised association between self-harm and future suicide.[13] Identification of the symptoms of adolescent anxiety and depression that are uniquely associated with self-harm in young adulthood would be useful.

The results of Moran and colleagues' study will offer some reassurance to parents of adolescents who self-harm and to health and educational agencies. Clinicians can offer encouragement to both young people who are self-harming and their families. Their findings raise important questions relevant to the prevention of persistent self-harm and the onset of self-harm and suicidal behaviour in early adulthood.

Keith Hawton, Rory C O'Connor
Centre for Suicide Research, Department of Psychiatry, University of Oxford, Oxford OX3 7JX, UK (KH); and Suicidal Behaviour Research Group, School of Natural Sciences, University of Stirling, Stirling, UK (RCO'C)
keith.hawton@psych.ox.ac.uk

We declare that we have no conflicts of interest.

1 Hawton K, Rodham K, Evans E, Weatherall R. Deliberate self-harm in adolescents: self-report survey in schools in England. *BMJ* 2002; **325:** 1207–11.
2 De Leo D, Heller TS. Who are the kids who self-harm? An Australian self-report survey. *Med J Aust* 2004; **181:** 140–44.
3 O'Connor RC, Rasmussen S, Miles J, Hawton K. Self-harm in adolescents: self-report survey in schools in Scotland. *Br J Psychiatry* 2009; **194:** 68–72.
4 Madge N, Hewitt A, Hawton K, et al. Deliberate self-harm within an international community sample of young people: findings from the Child & Adolescent Self-harm in Europe (CASE) study. *J Child Psychol Psychiatry* 2008; **49:** 667–77.
5 Moran P, Coffey C, Romaniuk H, et al. The natural history of self-harm from adolescence to young adulthood: a population-based cohort study. *Lancet* 2011; published online Nov 17. DOI:10.1016/S0140-6736(11)61141-0.
6 Hawton K, Hall S, Simkin S, et al. Deliberate self-harm in adolescents: a study of characteristics and trends in Oxford, 1990–2000. *J Child Psychol Psychiatry* 2003; **44:** 1191–98.
7 McMahon EM, Reulbach U, Corcoran P, Keeley HS, Perry IJ, Arensman E. Bullying victimisation, self-harm and associated factors in Irish adolescent boys. *Soc Sci Med* 2010; **71:** 1300–07.
8 Fergusson DM, Horwood LJ, Ridder EM, Beautrais AL. Suicidal behaviour in adolescence and subsequent mental health outcomes in young adulthood. *Psychol Med* 2005; **35:** 983–93.
9 Donnellan MB, Conger RD, Burzette RG. Personality development from late adolescence to young adulthood: differential stability, normative maturity, and evidence for the maturity-stability hypothesis. *J Personality* 2007; **75:** 237–63.
10 Patton GC, Hemphill SA, Beyers JM, et al. Pubertal stage and deliberate self-harm in adolescents. *J Am Acad Child Adolesc Psychiatry* 2007; **46:** 508–14.
11 O'Connor RC, Rasmussen S, Hawton K. Predicting deliberate self-harm in adolescents: a six month prospective study. *Suicide Life Threat Behav* 2009; **39:** 364–75.
12 Hawton K, Harriss L, Rodham K. How adolescents who cut themselves differ from those who take overdoses. *Eur Child Adolesc Psychiatry* 2010; **19:** 513–23.
13 Owens D, Horrocks J, House A. Fatal and non-fatal repetition of self-harm: systematic review. *Br J Psychiatry* 2002; **181:** 193–99.