Changing the System: Improving Outcome From Major Trauma by Developing a National System of Regional Major Trauma Networks

Christopher G. Moran, MD, FRCS(Ed)[1]*; Maralyn Woodford*[2]*; Fiona Lecky, FRCS, MSc, PhD*[2]*; Antoinette Edwards, BA*[2]*; Timothy Coats, MBBS, FRCS, MD*[2]*; Keith Willett, MD, FRCS*[3]*;*
[1]NHS England, Nottingham University Hospital, Nottingham, United Kingdom;
[2]Trauma Audit and Research Network, University of Manchester, Manchester, United Kingdom;
[3]NHS England, Oxford, United Kingdom

Background/Purpose: International evidence suggests that trauma care improves with organized trauma systems. In England, trauma care for the entire population (58.5 million) was reorganized in 2012 with the development of Trauma Networks. All hospitals in the country were designated as either Major Trauma Center (MTC; Level-1: n = 26) or Trauma Units (TU; Level-2), or Local Emergency Hospitals (LEH; Level-3). Prehospital care was also reorganized so that patients identified with major trauma were taken directly to the MTC if within 45 minutes travel time from accident. Other patients are taken to the nearest TU for resuscitation and expert triage before secondary transfer to the MTC. All Level-3 centres are bypassed. This paper reviews the early results.

Methods: From April 2008 until April 2014, data on 118,801 patients with an ISS >8 was prospectively collected by the national Trauma Audit and Research Network (TARN). The probability of survival was calculated using a model including ISS, age, blood pressure on arrival at hospital, and Glasgow Coma Scale (GCS). The odds ratio of survival (+95% confidence interval) was then calculated for each year and normalized to the year 2008-2009.

Results: From 2008 until 2011 there was a no significant change in the odds of surviving major trauma in England. However, following introduction of the Major Trauma Networks there was a significant ($P < 0.008$) 19% increase in the odds of survival during the first year of the new system and a further 17% increase in the odds of survival during the second year as the system matures so that the odds of survival for the population is now 1.36 compared to 2008. Process measures within the trauma system have shown significant increases in reception by an attending-led trauma team, more rapid intubation and CT scan, and increased use of tranexamic acid and massive transfusion protocols (all $P < 0.001$).

Conclusion: We believe this is the first attempt at an organized change in the system for major trauma care on a national level and covering a population of over 50 million. We have observed a significant improvement in the care process together with a significant improvement in the odds of surviving. This demonstrates that improvements seen in smaller state or regional trauma systems can be translated into a national trauma system with similar improvements for the whole population.

See pages 99 - 147 for financial disclosure information.