



# Changes in transfusion and fluid therapy practices in severely injured children: an analysis of 5118 children from the TraumaRegister DGU®

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## Abstract

**Purpose** Trauma is the leading cause of death in children. In adults, blood transfusion and fluid resuscitation protocols changed resulting in a decrease of morbidity and mortality over the past 2 decades. Here, transfusion and fluid resuscitation practices were analysed in severe injured children in Germany.

**Methods** Severely injured children (maximum Abbreviated Injury Scale (AIS)  $\geq 3$ ) admitted to a certified trauma-centre (TraumaZentrum DGU®) between 2002 and 2017 and registered at the TraumaRegister DGU® were included and assessed regarding blood transfusion rates and fluid therapy.

**Results** 5,118 children (aged 1–15 years) with a mean ISS 22 were analysed. Blood transfusion rates administered until ICU admission decreased from 18% (2002–2005) to 7% (2014–2017). Children who are transfused are increasingly seriously injured. ISS has increased for transfused children aged 1–15 years (2002–2005: mean 27.7–34.4 in 2014–2017). ISS in non-transfused children has decreased in children aged 1–15 years (2002–2005: mean 19.6 to mean 17.6 in 2014–2017). Mean prehospital fluid administration decreased from 980 to 549 ml without affecting hemodynamic instability.

**Conclusion** Blood transfusion rates and amount of fluid resuscitation decreased in severe injured children over a 16-year period in Germany. Restrictive blood transfusion and fluid management has become common practice in severe injured children. A prehospital restrictive fluid management strategy in severely injured children is not associated with a worsened hemodynamic state, abnormal coagulation or base excess but leads to higher hemoglobin levels.

**Keywords** Paediatric trauma patients · Transfusion practice · Patient blood management · Outcome · Mortality · Fluid therapy · Volume therapy · Serious injured children · TraumaRegister DGU® (TR-DGU)

**Registration** Registered under the TR-DGU project ID: 2019-049.

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## Introduction

Trauma is the leading cause of death in children [1], with severe haemorrhage as the primary contributing factor [2–4]. Massive transfusion in children is known to be associated

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