WEB APPENDIX 3

SUMMARY OF STUDIES EVALUATING FLUID RESUSCITATION IN CHILDREN WITH SHOCK

S no.	*Study citation [Ref.]*	*Location*	*Participants*	*Design*	*Results*	*Conclusions*
01.	*Carcillo JA, Davis AL, Zaritsky A. Role of early fluid resuscitation in pediatric septic shock. JAMA. 1991; 266:1242–45.*	U.S.A.	Pediatric patients with septic shock presenting to the emergency department over a 6-year period and having a pulmonary artery catheter inserted by 6 hours after presentation.	Patients were analyzed together and in three groups based on fluid volume in the first hour: group 1, less than 20 mL/kg; group 2, 20 to 40 mL/kg; and group 3, more than 40 mL/kg. Occurrence of the adult respiratory distress syndrome (ARDS), cardiogenic pulmonary edema, and persistent hypovolemia during the resuscitation were recorded.	Survival in group 3 (eight of nine patients) was significantly better than in group 1 (six of 14 patients) or group 2 (four of 11 patients). ARDS and pulmonary edema was not increased in any specific fluid group. Hypovolemia occurred in six patients in group 1 and two patients in group 2; all eight subsequently died.	Rapid fluid resuscitation in excess of 40 mL/kg in the first hour following emergency department presentation was associated with improved survival, decreased occurrence of persistent hypovolemia, and no increase in the risk of cardiogenic pulmonary edema or adult respiratory distress syndrome in this group of Pediatric patients with septic shock.
02.	*Booy R, Habibi P, Nadel S, et al; Meningococcal Research Group: Reduction in case fatality rate from meningococcal disease associated with improved healthcare delivery. Arch Dis Child 2001; 85:386–90.*	U.K.	Total 331 children with meningococcal disease admitted to PICU.	Logistic regression analysis was used to correct for clinical severity, age, and sex; death was the outcome, and year of admission, a temporal trend variable, was the primary exposure.	The case fatality rate fell year on year. After adjustment for age, sex, and disease severity, the overall estimate for improvement in the odds of death was 59% per year (odds ratio for the yearly trend 0.41).	A significant improvement in outcome for children admitted with MD to a PICU has occurred in association with improvements in initial management of patients with MD at referring hospitals, use of a mobile intensive care service, and centralisation of care in a specialist unit.
03.	*Maat M, Buysse CM, Emonts M, et al: Improved survival of children with sepsis and purpura: Effects of age, gender, and era. Crit Care 2007; 11:R112.*	The Netherlands.	287 children consecutively admitted with sepsis and purpura.	Data regarding age, gender, ethnicity, serogroup of Neisseria meningitidis, severity, therapy, and survival were collected prospectively. These data were pooled into one database and analyzed retrospectively.	Younger age was significantly associated with more severe disease and a higher CFR. Children under the median age of 3.0 years had an increased risk of case fatality (odds ratio 4.3, 95% confidence interval 2.1 to 9.2; $p < 0.001$). Gender was not associated with CFR. However, males did have higher Paediatric Risk of Mortality scores, fewer PICU-free days, and more presence of shock. The course of sepsis and purpura	Age and gender are determinants of severity of paediatric sepsis and purpura. Survival rates have improved during the last two decades.

05.	*de Oliveira CF, de Oliveira DS, Gottschald AF, et al: ACCM/PALS haemodynamic support guidelines for paediatric septic shock: An outcomes comparison with and without monitoring central venous oxygen saturation. Intensive Care Med 2008; 34:1065–75.*	Brazil	Ninety patients with severe sepsis or septic shock were included in this study.	Retrospective chart review and prospective analysis of septic shock treatment in a pediatric intensive care unit of a tertiary care teaching hospital.	Patients with septic shock who received less than a 20-mL/kg dose of resuscitation fluid in the first hour of treatment had a mortality rate of 73%, whereas patients who received more than a 40-mL/kg dose in the first hour of treatment had a mortality rate of 33% (P G 0.05). Patients treated less than 30 minutes after diagnosis of severe sepsis and septic shock had a significantly lower mortality rate (40%) than patients treated more than 60 minutes after diagnosis (P G 0.05). Early fluid resuscitation was associated with a 3-fold reduction in the odds of death (odds ratio, 0.33; 95% confidence interval, 0.13-0.85).	The mortality rate was higher for children older than 2 years, for those who received less than 40 mL/kg in the first hour, and for those whose treatment was not initiated in the first 30 minutes after the diagnosis of septic shock.
06.	*Carcillo JA, Kuch BA, Han YY. Mortality and Functional Morbidity after Use of PALS/APLS by Community Physicians. Pediatrics 2009; 124; 500 -8.*	U.S.A.	All children consecutively transported to 5 regional, tertiary care children's hospitals over 4 years.	A prospective cohort study comparing outcomes in children who did or did not receive PALS/APLS resuscitation in the community hospital.	Children with shock had an increased mortality rate compared with those without shock (all patients: 11.4% vs 2.6%), trauma patients (28.3% vs 1.2%), and non trauma patients (10.5% vs 2.8%).Early shock reversal was associated with reduced mortality (5.06% vs 16.37%) and functional morbidity (1.56% vs 4.11%) rates. Early use of PALS/APLS-recommended interventions was associated with reduced mortality (8.69% vs 15.01%) and functional morbidity (1.24% vs 4.23%) rates. Early shock reversal was associated with reduced mortality (5.06% vs 16.37%) and functional morbidity (1.56% vs 4.11%) rates. Early use of PALS/APLS-recommended interventions was associated with reduced mortality (8.69% vs 15.01%) and functional morbidity (1.24% vs 4.23%) rates.	Pediatric shock recognition and resuscitation in the community hospital improves survival and functional outcome regardless of diagnostic category.
07.	*Akech S, Karisa J, Nakamya P, Boga M, Maitland K. Phase II trial of isotonic fluid*	Kenya	A Phase II randomised controlled, safety and efficacy trial in	Eligible children were randomised to HSD/5D or Ringer's Lactate (RL). A maximum of two boluses of 15 ml/kg of HSD/5D were given	61 children were enrolled: 41 had shock and severe dehydrating diarrhoea, 20 had presumptive septic shock; 69% had decompensated shock. By 8 hours response to volume resuscitation was poor with	Isotonic fluid was associated with modest improvement in shock and survival when compared to HSD/5D but inconclusive due to the limitations of design and