HOT-ICU
Handling Oxygenation Targets in the Intensive Care Unit

HOT-ICU trial synopsis

Title	Handling oxygenation targets in the intensive care unit
Short title	HOT-ICU
Objectives	To assess the benefits and harms of a lower versus a higher oxygenation target in adult Intensive Care Unit (ICU) patients with acute hypoxaemic respiratory failure
Population	Adults acutely admitted to the ICU with hypoxaemic respiratory failure
Interventions	Partial pressure arterial oxygen (PaO_2) of 8 kPa (60 mmHg) as the target for oxygen administration
Comparator	PaO_2 of 12 kPa (90 mmHg) as the target for oxygen administration
Outcomes	***Primary*** All cause 90-day mortality post-randomisation ***Secondary*** 1. Number of patients with one or more SAEs in the ICU after randomisation; SAEs are defined as new episodes of ischaemic events including myocardial ischaemia, intestinal ischemia and stroke and new episodes of shock defined as need of vasopressors and serum lactate above 2 mmol/L 2. Days alive without the use of mechanical ventilation, renal replacement therapy or circulatory support in the 90-day period 3. Days alive and out of hospital in the 90-day period 4. Mortality 1-year after randomisation 5. EQ-5D-5L after 1-year after randomisation. Patients who have died will be assigned the lowest possible EQ-5D-5L score 6. Cognitive function 1-year after randomisation as assessed using RBANS in selected sites 7. A health economic analysis will be performed. The analytic details will be based on the result of the trial and specified (cost-benefit versus cost-minimisation analyses) The specific elements of the composite outcomes will be reported in a supplement to the primary publication
Eligibility	***Inclusion criteria*** 1. Acutely admitted to the ICU **AND** 2. Aged ≥ 18 years **AND** 3. Receiving supplemental oxygen with a flow of at least 10 L per minute in an open system or at least a FiO_2 of 0.50 in a closed system including invasive and non-invasive ventilation and closed CPAP systems **AND** 4. Expected to receive supplemental oxygen for at least 24 hours in the ICU **AND** 5. Having an arterial line for PaO_2 monitoring ***Exclusion criteria*** 1. Cannot be randomised within 12 hours after present acute ICU admission 2. Chronic mechanical ventilation for any reason 3. Use of home oxygen 4. Previous treatment with bleomycin 5. Solid organ transplant during current hospital admission 6. Withdrawal from active therapy or brain death deemed imminent 7. Fertile woman (< 50 years of age) with positive urine human gonadotropin (hCG) or plasma-hCG 8. Carbon monoxide poisoning 9. Cyanide poisoning 10. Methaemoglobinaemia 11. Paraquat poisoning

	12. Any condition expected to involve the use of hyperbaric oxygen 13. Sickle cell disease 14. Consent not obtainable according to national regulations 15. Previously randomised into the HOT-ICU trial
Sample size	2 x 1464 (20% relative risk reduction or increase (4% absolute risk reduction or increase) in the primary outcome measure, assuming a baseline 90-day mortality of 25% (two-sided α=0.05 and β=0.1)
Study duration	The trial intervention will continue for maximum of 90 days post-randomisation; follow-up will be done at 90 days and 1-year post-randomization. Estimated recruitment period is 2 years commencing June 2017