

Jonathan Millar

SENIOR CLINICAL RESEARCH FELLOW

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Education

University of Queensland

Brisbane, Australia
2016-2021

PhD – Combining cell therapy and ECMO in ARDS

- Principal Supervisor: Prof. John Fraser
- Co-Supervisor: Prof. Danny McAuley
- Co-Supervisor: Dr. Jacky Suen

University College London Medical School

London, United Kingdom
2004-2009

MBBS

- Bernard Hart Prize for Clinical Neurosciences
- Bunzl and Hart Prize for Psychiatry

Royal College of Emergency Medicine

United Kingdom
2013

Membership – MRCEM

- All parts at first attempt

Faculty of Intensive Care Medicine

United Kingdom
2022

Fellowship – FFICM

- All parts at first attempt

Current appointments

Senior Clinical Research Fellow, University of Edinburgh

August 2023 -

Baillie-Gifford Pandemic Science Hub, Centre for Inflammation Research and The Roslin Institute

Two-year fixed term appointment – 9 PAs

Honorary Consultant in Intensive Care Medicine, NHS GG&C

August 2023 -

Intensive Care Unit, Queen Elizabeth University Hospital, Glasgow

Honorary appointment – 3 PAs

Medical training

2020-2023	Hon. Specialist Registrar in Intensive Care Medicine , South East Scotland
2018-2020	Specialist Registrar in Intensive Care Medicine , West of Scotland
2018	Clinical Research Fellow , RICU, Royal Victoria Hospital, Belfast
2016-2018	Resident Medical Officer , ICU, St. Andrew's War Memorial Hospital, Brisbane
2013-2015	Acute Care Common Stem Emergency Medicine StR , West of Scotland
2012-2013	Clinical Research Fellow , Emergency Department, Royal Victoria Hospital, Belfast
2011-2012	General Duties Medical Officer , Royal Army Medical Corps, British Army
2009-2011	Academic Foundation Trainee , Northern Ireland Deanery and Queen's University Belfast

Academic training

2020-2023	Clinical Lecturer in Intensive Care Medicine , Roslin Institute, University of Edinburgh
2018-2020	Hon. Clinical Lecturer , Dept. Anaesthesia, Critical Care, and Pain, University of Glasgow
2018	Clinical Research Fellow , Wellcome-Wolfson Institute for Experimental Medicine, Queen's University Belfast
2016-2018	NHMRC Doctoral Fellow , Critical Care Research Group, University of Queensland
2013-2015	Glasgow Clinical Academic Environment StR , University of Glasgow
2012-2013	Clinical Research Fellow , Emergency Dept., Royal Victoria Hospital, Belfast
2009-2011	Academic Foundation Trainee , Northern Ireland Deanery and Queen's University Belfast

Other appointments

2023-	Independent Contractor , Red Teaming Network, Open AI
2022-	Chair , Intervention Selection Committee, PANTHER tria
2022-2023	Associate Editor-in-Training , American Journal of Respiratory and Critical Care Medicine
2018-	Member , Innovations Workgroup, EuroELSO
2016-2020	Chair , NHMRC Centre for Research Excellence and EuroELSO collaboration on standards in pre-clinical ECMO research
2013-2015	Trainee Member , Scottish Trauma Audit Group

Publications

Citations = 6,138 h-index = 22 i10-index = 29

Original articles

2023

1. Swets MC, Kerr S, Scott-Brown J, ..., **Millar JE**, ..., Baillie JK. 2023. Evaluation of pragmatic oxygenation measurement as a proxy for Covid-19 severity. **Nat. Comms.**, 14:7374.
2. Malfertheiner MV, Garrett A, Passmore M, ..., **Millar JE**, ..., Fraser J. 2023. The effects of nitric oxide on coagulation and inflammation in ex-vivo models of extracorporeal membrane oxygenation and cardiopulmonary bypass. **Artif. Organs**, doi: 10.1111/aor.14608. Online ahead of print.
3. Pairo-Castineira E, Rawlik K, Bretherick AD, ..., **Millar JE**, ..., Baillie JK. 2023. GWAS and meta-analyses identifies 49 genetic variants underlying critical COVID-19. **Nature**, 617(7962):764-768.
4. See Hoe LE, Li Bassi G, Wildi K, ..., **Millar JE**, ..., Fraser JF. 2023. Donor heart ischemic time can be extended to 8 hours using hypothermic machine perfusion in sheep. **J. Heart Lung Transplant.**, S1053-2498(23)01819-3.

2022

5. **Millar JE**, Boyle AJ, Drake TD, et. al. 2022. Extracorporeal carbon dioxide removal in acute hypoxaemic respiratory failure: a systematic review, Bayesian meta-analysis, and trial sequential analysis. **Eur. Respir. Rev.**, 31:220030.
6. Wildi k, Hyslop K, **Millar JE**, et. al. 2022. Validation of mRNA markers expressed in human ARDS subgroups in an ovine model of ARDS phenotypes. **Front. Med.**, 9:961336.
7. **Millar JE**, Neyton L, Seth S, et. al. 2022. Distinct clinical symptom patterns in patients hospitalised with COVID-19 in an analysis of 59,011 patients in the ISARIC-4C study. **Sci. Rep.**, 12, 6843.
8. Kousathanas A, Pairo-Castineira E, Rawlik K, ..., **Millar JE**, ..., Baillie JK. 2022. Whole genome sequencing reveals host factors underlying critical COVID-19. **Nature**, 607(7917):97-103.
9. Reyes LF, Murthy S, Garcia-Gallo E, ..., **Millar JE**, ..., Olliaro PL. 2022. Clinical characteristics, risk factors and outcomes in patients with severe COVID-19 registered in the ISARIC WHO clinical characterisation protocol: a prospective, multinational, multicentre, observational study. **Eur. Respir. J. Open Res.**, 8(1):00552-2021.

10. Winslow RL, Zhou J, Windle EF, ..., Millar JE, ...Green CA. 2022. SARS-CoV-2 environmental contamination from hospitalised patients with COVID-19 receiving aerosol-generating procedures. *Thorax*, 77(3):259-267.

2021

11. Li Bassi G, Suen JY, Dalton HJ, ..., **Millar JE**, ..., Fraser JF. 2021. An appraisal of respiratory system compliance in mechanically ventilated COVID-19 patients. **Crit. Care**, 25: 199.
12. McNamee JJ, Gillies MA, Barrett NA, ..., **Millar JE**, ..., McAuley DF. 2021. Effect of lower tidal volume ventilation facilitated by extracorporeal carbon dioxide removal vs standard care ventilation on 90-day mortality in patients with acute hypoxemic respiratory failure: the REST randomized trial. **JAMA**, 326(11):1013-1023.
13. Dolby HW, Potey P, Wilder-Smith AB, ..., **Millar JE**, ..., Russell CD. 2021. Histological evidence of pulmonary microthrombosis and vasculitis in life-threatening respiratory virus disease. **Open Forum Inf. Dis.**, 8(2):ofaa640.
14. Ki KK, **Millar JE**, Langguth D, et. al. 2021. Current understanding of leukocyte phenotypic and functional modulation during extracorporeal membrane oxygenation: a narrative review. **Front. Immunol.**, 11:600684.
15. Fulton R, **Millar JE**, Merza M, et. al. 2021. Prophylactic postoperative high flow nasal oxygen versus conventional therapy in obese patients undergoing bariatric surgery (OXYBAR): a pilot randomised controlled trial. **Obes. Surg.**, 31(11):47994807.
16. **Millar JE**, Wildi K, Bartnikowski N, et. al. 2021. Characterizing preclinical sub-phenotypic models of acute respiratory distress syndrome: an experimental ovine study. **Physiol. Rep.**, 9(19):e15048.
17. See Hoe LE, Wildi K, Obonyo NG, ..., **Millar JE**, ..., Fraser JF. 2021. A clinically relevant sheep model of orthotopic heart transplantation 24 h after donor brainstem death. **Intensive Care Med. Exp.**, 9(1):60.
18. Pairo-Castineira E, Clohisey S, Klaric L, ..., **Millar JE**, ..., Baillie JK. 2021. Genetic mechanisms of critical illness in COVID-19. **Nature**, 591(7848):92-98.
19. COVID-19 Host Genetics Initiative. 2021. Mapping the human genetic architecture of COVID-19. **Nature**, 600(7889):472-477.

2020

20. Parkinson N, Rodgers N, Fourman MH, ..., **Millar JE**, ..., Clohisey S. 2020. Dynamic data-driven meta-analysis for prioritisation of host genes implicated in COVID-19. **Sci. Rep.**, 10(1):22303.
21. Soulsby CR, Hutchison, Gardner J, ..., **Millar JE**. 2020. Socio-economic deprivation and the risk of death after ICU admission with COVID-19: The poor relation. **J. Intensive Care Soc.**, doi:10.1177/1751143720978855.

22. Gorman E, **Millar** JE, McAuley D, et. al. 2020. Mesenchymal stromal cells for acute respiratory distress syndrome (ARDS), sepsis, and COVID-19 infection: optimizing the therapeutic potential. **Expert Rev. Respir. Med.**, 15(3):301-324.
23. Burton F, Lowe DJ, **Millar** JE, et. al. 2020. Propofol target-controlled infusion in emergency department sedation (Pro-TEDS): a multicentre, single-arm feasibility study. **Emerg. Med. J.**, 38(3):205-210.
24. Li Bassi G, Suen JY, Barnett AG, ..., **Millar** J, ..., Fraser JF. 2020. Design and rationale of the COVID-19 Critical Care Consortium international, multicentre, observational study. **BMJ Open**, 10(12):e041417.
25. Heinser S, Rozencwajg S, Suen JY, ..., **Millar** JE. 2020. Heart failure supported by veno-arterial extracorporeal membrane oxygenation (ECMO): a systematic review of pre-clinical models. **Intensive Care Med. Exp.**, 8:16.
26. Malfertheiner MV, Koch C, Fisser C, **Millar** JE, et. al. 2020. Incidence of early intra-cranial bleeding and ischaemia in adult veno-arterial extracorporeal membrane oxygenation and extracorporeal cardiopulmonary resuscitation patients: a retrospective analysis of risk factors. **Perfusion**, 35(1 suppl):8-17.
27. Malfertheiner MV, Broman LM, Vercaemst L, ..., **Millar** JE, ..., Fraser JF. 2020. Ex vivo models for research in extracorporeal membrane oxygenation: a systematic review of the literature. **Perfusion**, 35(1suppl):38-49.
28. **Millar** JE, Bartnikowski N, Passmore MR, et. al. 2020. Combined mesenchymal stromal cell therapy and ECMO in ARDS: a randomised controlled trial in sheep. **Am. J. Respir. Crit. Care Med.**, 202(3):383-392.
29. See Hoe LE, Wells MA, Bartnikowski N, ..., **Millar** JE, ..., Fraser JF. 2020. Heart Transplantation From Brain Dead Donors: A Systematic Review of Animal Models. **Transplantation**, 104(11):2272-2289.
30. Burton FM, Lowe DJ, **Millar** JE, et. al. 2020. Effect of target-controlled propofol infusion to reduce the incidence of adverse events for procedural sedation in the emergency department: a systematic review. **Eur. J. Emerg. Med.**, 27(4):253-259.

2019

31. Ki KK, Passmore MR, Chan CHH, ..., **Millar** JE, ..., Suen JY. 2019. Low flow rate alters haemostatic parameters in an ex-vivo extracorporeal membrane oxygenation circuit. **Intensive Care Med.**, 7:51.
32. **Millar** JE, Bartnikowski N, von Bahr V, et. al. 2019. Extracorporeal membrane oxygenation (ECMO) and the acute respiratory distress syndrome (ARDS): a systematic review of pre-clinical models. **Intensive Care Med. Exp.**, 7(1):18.
33. von Bahr, **Millar** JE, Malfertheiner MV, et. al. 2019. Mesenchymal stem cells may ameliorate inflammation in an ex-vivo model of extracorporeal membrane oxygenation. **Perfusion**, 34(1suppl):15-21.

34. von Bahr V, Kalzen H, Frenckner B, ..., **Millar** JE, ..., Holzgraefe B. 2019. Long-term pulmonary function and quality of life in adults after extracorporeal membrane oxygenation for respiratory failure. *Perfusion*, 34(1suppl):49-57.
35. Obonyo NG, Byrne L, Tung JP, ..., **Millar** JE, ..., Fraser JF. 2019. Pre-clinical study protocol: Blood transfusion in endotoxaemic shock. *Methods X*, 6:1124-1132.
36. Burton FM, Lowe DJ, **Millar** J, et. al. 2019. A study protocol for a feasibility study: Propofol Target-Controlled Infusion in Emergency Department Sedation (PRoTEDS) – a multicentre feasibility study protocol. *Pilot Feasibility Stud.*, 5:27.
37. Fanning JP, See Hoe LE, Passmore MR, ..., **Millar** JE, ..., Fraser JF. 2019. Neuron-Specific Enolase and matrix metalloproteinase 9 signal perioperative silent brain infarction during or after transcatheter aortic valve implantation. *Am. J. Cardiol.*, 123(3):434-439.
38. **Millar** JE, von Bahr V, Malfertheiner MV, et. al. 2019. Administration of mesenchymal stem cells during ECMO results in a rapid decline in oxygenator performance. *Thorax*, 74(2):194-196.

2018

39. Fulton R, **Millar** JE, Merza M, et. al. 2018. High flow nasal oxygen after bariatric (OXYBAR), prophylactic post-operative high flow nasal oxygen versus conventional oxygen therapy in obese patients undergoing bariatric surgery: a study protocol for a randomised controlled pilot trial. *Trials*, 19(1):402.
40. Fanning JP, See Hoe LE, Passmore MR, ..., **Millar** JE, ..., Fraser JF. 2018. Differential immunological profiles herald magnetic resonance imaging-defined perioperative cerebral infarction. *Ther. Adv. Neurol. Dis.*, 11:1756286418759493.

2017

41. Malfertheiner MV, Pimenta LP, von Bahr V, **Millar** JE, et. al. 2017. Acquired von Willebrand syndrome in respiratory extracorporeal life support: a systematic review of the literature. *Crit. Care Resusc.*, 19(Suppl 1):45-52.

2016

42. Millar JE, Fanning JP, McDonald CI, et. al. 2016. The inflammatory response to extracorporeal membrane oxygenation (ECMO): a review of the pathophysiology. *Crit. Care*, 20:387.

43. Devaney J, Smyth R, Lutton S, ..., **Millar** JE. 2016. The soda dipstick: A convenient and cost-effective means of identifying the sugar content of soft drinks. **J. Diabetes**, 8(6):877-878.
44. Lowe DJ, **Millar** JE, Dignon N, Ireland A. 2016. Top 10 lessons from the Glasgow major incidents. **Emerg. Med. J.**, 33(8):596-7

2014

45. Fitzgerald M, **Millar** J, Blackwood B, et. al. 2014. Extracorporeal carbon dioxide removal for patients with acute respiratory failure secondary to the Acute Respiratory Distress Syndrome: a systematic review. **Crit. Care**, 18(3):222.
46. **Millar** J, Lutton S, O'Connor P. 2014. The use of high flow nasal oxygen in the management of hypercarbic respiratory failure. **Ther. Adv. Respir. Dis.**, 8(2):63-4.

Editorials

1. **Millar** JE, O'Kane CM. 2023. Mesenchymal stromal cells and ARDS: more questions than answers. **Am. J. Respir. Crit. Care Med.**, 208(12):1257-1259.
2. **Millar** JE, McAuley DF, Marini JJ. 2023. Driving pressure - what's the harm? **Crit. Care Med.**, 51(7):967-970.
3. Russell CD, **Millar** JE, Baillie JK. 2020. Clinical Evidence Does Not Support Corticosteroid Treatment for 2019-nCoV Lung Injury. **Lancet**, 395(10223): 473-475.
4. **Millar** JE, Busse R, Fraser JF, et. al. 2020. Apples and oranges: international comparisons of COVID-19 observational studies in ICUs. **Lancet Respir. Med.**, 8(10):952-953.
5. **Millar** JE, Fraser JF, McAuley DF. 2015. Mesenchymal stromal cells and the acute respiratory distress syndrome (ARDS): challenges for clinical application. **Thorax**, 70(7):611-2.

Letters

1. **Millar** JE, Lutton S, McLaughlin R. Need for a systematic audit of trauma care in Northern Ireland. **BMJ**, 353:i2025.

Book chapters

1. **Millar JE, Shankar-Hari M.** 2024. Sepsis. Oh's Intensive Care Medicine 9th Edition. Elsevier. *In press*.
2. Hartley EL, **Millar JE**, Fraser JF. 2022. The unholy blood: biomaterial interaction in extracorporeal circulation. Extracorporeal Membrane Oxygenation: An interdisciplinary problem-based learning approach. Oxford University Press.
3. **Millar JE**, Gregory S, Stevens M, Fraser JF, Bartlett B. 2017. Past, Present, and Future. Mechanical Circulatory and Respiratory Support. Academic Press (Elsevier).

Grant funding

2023	Edinburgh Molecular Mechanisms Cluster Medical Research Council (MR/Y030877/1) £ 5,313,306 4 years Co-investigator (funded 2.5%)
2023	Precision medicine Adaptive Network platform Trial in Hypoxemic acute respiratory failure NIHR EME (NIHR158714) £ 6,530,146 5 years Co-investigator (funded 2.5%)
2022	Functional genomics and ARDS: <i>in-silico</i> and <i>in-vitro</i> gene editing to dissect genome wide associations in patients with Acute Respiratory Distress Syndrome Academy of Medical Sciences (SGL027\1017) £ 26,359.50 12 months Personal

- 2016 **Combining extracorporeal life support and cell therapy in critical illness (The CELTIC Project)**
 The Prince Charles Hospital Foundation Experienced Researcher (ER2016-22)
 \$ 98,584.82
 2 years
 Personal
- 2016 **Can mesenchymal stromal cells modify the inflammatory response to ECMO? A proof of concept study**
 Intensive Care Society New Investigator
 £ 14,373
 2 years
 Personal

Invited lectures

- 2023 GenOMICC. University College Hospital ICU Grand Round. Online.
- 2022 GenOMICC. Welsh Intensive Care Society Annual Meeting, Saunderfoot, UK.
- 2021 Cell therapy for ARDS and Sepsis. Continulus Critical Care Global Grand Rounds. Online.
- 2021 Non-heparin anticoagulation: which is best? EuroELSO Annual Scientific Meeting. Online.
- 2019 Emerging therapies in ARDS. Critical Care Updates Series, Royal College of Physicians & Surgeons Glasgow, Glasgow, UK.
- 2019 The future of anticoagulation during ECMO. EuroELSO Expert Webinar Series. Online.
- 2019 Identifying phenotypes of acute hypoxaemic respiratory failure during ECMO. International ECMONet Annual Scientific Meeting, London, UK.

- 2019 Where it went wrong for mesenchymal stem cells in ECMO. EuroELSO Annual Scientific Meeting, Barcelona, Spain.
- 2019 Anticoagulation during VA ECMO: Complexity made simple. EuroELSO Annual Scientific Meeting, Barcelona, Spain.
- 2018 Mesenchymal stem cells during ECMO. 5th Annual Korean ECMO Symposium, Gwangju, Republic of Korea.
- 2018 Applications for high flow nasal oxygen in the Emergency Department. European Society of Emergency Medicine Annual Scientific Meeting, Glasgow, UK.
- 2018 The CELTIC study. International ECMONet Annual Scientific Meeting, Rome, Italy.
- 2017 Novel monitoring techniques during ECMO. Asia-Pacific ELSO Bi-annual Scientific Meeting, Gold Coast, Australia.
- 2017 Swimming outside the flags: Cell therapy during ECMO. ANZICS Annual Scientific Meeting, Gold Coast, Australia.
- 2017 Mesenchymal stem cells and ECMO. 5th International ARDS Conference, Paris, France.
- 2017 The CELTIC Study. ANZICS Clinical Trials Group Annual Scientific Meeting, Noosa, Australia.

Supervision

- 2024 **Julia Anderson**, intercalated BSc, University of Edinburgh
- 2022 **Nureen Mohamad Zaki**, MSc, University of Edinburgh
- 2022 **Megan McManus**, BSc Hons, University of Edinburgh
- 2018 **Mengyao Yang**, BSc Hons, University of Queensland
- 2017 **Michael Cavaye**, BSc Hons, University of Queensland