

# Jonathan Millar

SENIOR CLINICAL RESEARCH FELLOW

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## Education

### University of Queensland

Brisbane, Australia

PHD - COMBINING CELL THERAPY AND ECMO IN ARDS

2016 - 2021

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

### University College London Medical School

London, United Kingdom

MBBS

2004 - 2009

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

### Royal College of Emergency Medicine

United Kingdom

MEMBERSHIP - MRCEM

2013

- All parts at first attempt

### Faculty of Intensive Care Medicine

United Kingdom

FELLOWSHIP - FFICM

2022

- All parts at first attempt

## Professional Experience

- 2023 **Senior Clinical Research Fellow**, BG Pandemic Science Hub, University of Edinburgh
- 2023 **Honorary Consultant in Intensive Care Medicine**, Queen Elizabeth University Hospital Glasgow
- 2020 - 2023 **Clinical Lecturer in Intensive Care Medicine**, Roslin Institute, University of Edinburgh
- 2020 - 2023 **Honorary Specialist Registrar in Intensive Care Medicine**, South East Scotland
- 2018 - 2020 **Specialist Registrar in Intensive Care Medicine**, West of Scotland
- 2018 - 2020 **Honorary Clinical Lecturer**, Dept. of 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
- 2016 - 2018 **Resident Medical Officer**, ICU, St. Andrew's War Memorial Hospital, Brisbane
- 2013 - 2015 **Acute Care Common Stem StR**, West of Scotland
- 2013 - 2015 **Glasgow Clinical Academic Environment StR**, University of Glasgow
- 2012 - 2013 **Clinical Research Fellow**, Emergency Dept., 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

## Publications

Citations = 5,718   h-index = 20   i10-index = 28

### ORIGINAL ARTICLES

2023

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.

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.

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

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.

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.

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.

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.

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.

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

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.

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.

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.

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.

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):4799-4807.

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.

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.

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.

COVID-19 Host Genetics Initiative. 2021. Mapping the human genetic architecture of COVID-19. **Nature**, 600(7889):472-477.

2020

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.

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.

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.

- Burton F, Lowe DJ, Millar JE, et. al. 2020. Propofol target-controlled infusion in emergency department sedation (Peo-TEDS): a multicentre, single-arm feasibility study. **Emerg. Med. J.**, 38(3):205–210.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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

- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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

- 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.
- 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

- 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

- 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.
- 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.
- 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

- 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.
- 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

- Millar JE, McAuley DF, Marini JJ. 2023. Driving pressure - what's the harm? **Crit. Care Med.**, 51(7):967-970.
- Russell CD, Millar JE, Baillie JK. 2020. Clinical Evidence Does Not Support Corticosteroid Treatment for 2019-nCoV Lung Injury. **Lancet**, 395(10223): 473-475.
- 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.
- 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

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

## BOOK CHAPTERS

- 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.
- Millar JE, Gregory S, Stevens M, Fraser JF, Bartlett B. 2017. Past, Present, and Future. **Mechanical Circulatory and Respiratory Support**. Academic Press (Elsevier).

## Awards & Grants

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- 2022 **Clinical Lecturer Starter Grant**, Academy of Medical Sciences
- 2022 **Junior editor-in-training, Am. J. Respir. Crit. Care Med.**, American Thoracic Society
- 2021 **ICS Gold Medal Finalist**, Intensive Care Society
- 2016 **ICS New Investigator Award**, Intensive Care Society
- 2016 **TPCH Foundation Experienced Researcher Grant**, The Prince Charles Hospital Foundation
- 2013 **Northern Ireland Trauma Audit Project Grant**, Guidance & Audit Implementation Network

## Presentations

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### INVITED LECTURES

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

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- 2022 **Nureen Mohamad Zaki**, MSc, University of Edinburgh
- 2021-2022 **Megan McManus**, BSc Hons, University of Edinburgh
- 2018 **Mengyao Yang**, BSc Hons, University of Queensland
- 2017 **Michael Cavaye**, BSc Hons, University of Queensland

## Committees, Peer Review & Memberships

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### COMMITTEES

Chair, Intervention selection committee, PANTHER trial

Chair, NHMRC Centre for Research Excellence and EuroELSO collaboration on standards in pre-clinical ECMO research

Member, Innovations workgroup, EuroELSO

Member, Biobank committee, International ECMO Network

### PEER REVIEW

Nat. Comms., Am. J. Respir. Crit. Care Med., Intensive Care Med., Crit. Care, Crit. Care Resusc., J. Crit. Care, Respir. Care, ASAIO J., PLoS One, Emerg. Med. J., Oncotarget, J. Vis. Exp., China Med. J.

### PROFESSIONAL MEMBERSHIPS

European Society of Intensive Care Medicine

American Thoracic Society

Extracorporeal Life Support Organization

Faculty of Intensive Care Medicine