THE UNIVERSITY OF MELBOURNE

Welcome to Critical Care Connections

Department of Critical Care

Wednesday 7th June 2023

Co-convenors:

Kimberley Haines and Yasmine Ali Abdelhamid

THE UNIVERSITY OF MELBOURNE

Faculty of Medicine, Dentistry and Health Sciences

Critical Care Connections

Presentations

Professor David Story	Connecting the Critical Care Community
Professor Christobel Saunders	Mentoring the Next Generation of Researchers
Professor Alicia Dennis	Critically Ill Pregnant People
Professor Eugenie Kayak	Critical Care, Carbon Care: Challenges and Opportunities
Dr Urmi Dhagat	Navigating the Grants Landscape
A/Professor Adam Deane	The Stars are Rising: Meet our Graduate Researchers

Additional links

THE UNIVERSITY OF MELBOURNE

Faculty of Medicine, Dentistry and Health Sciences

DoCC: Connecting the Critical Care Community

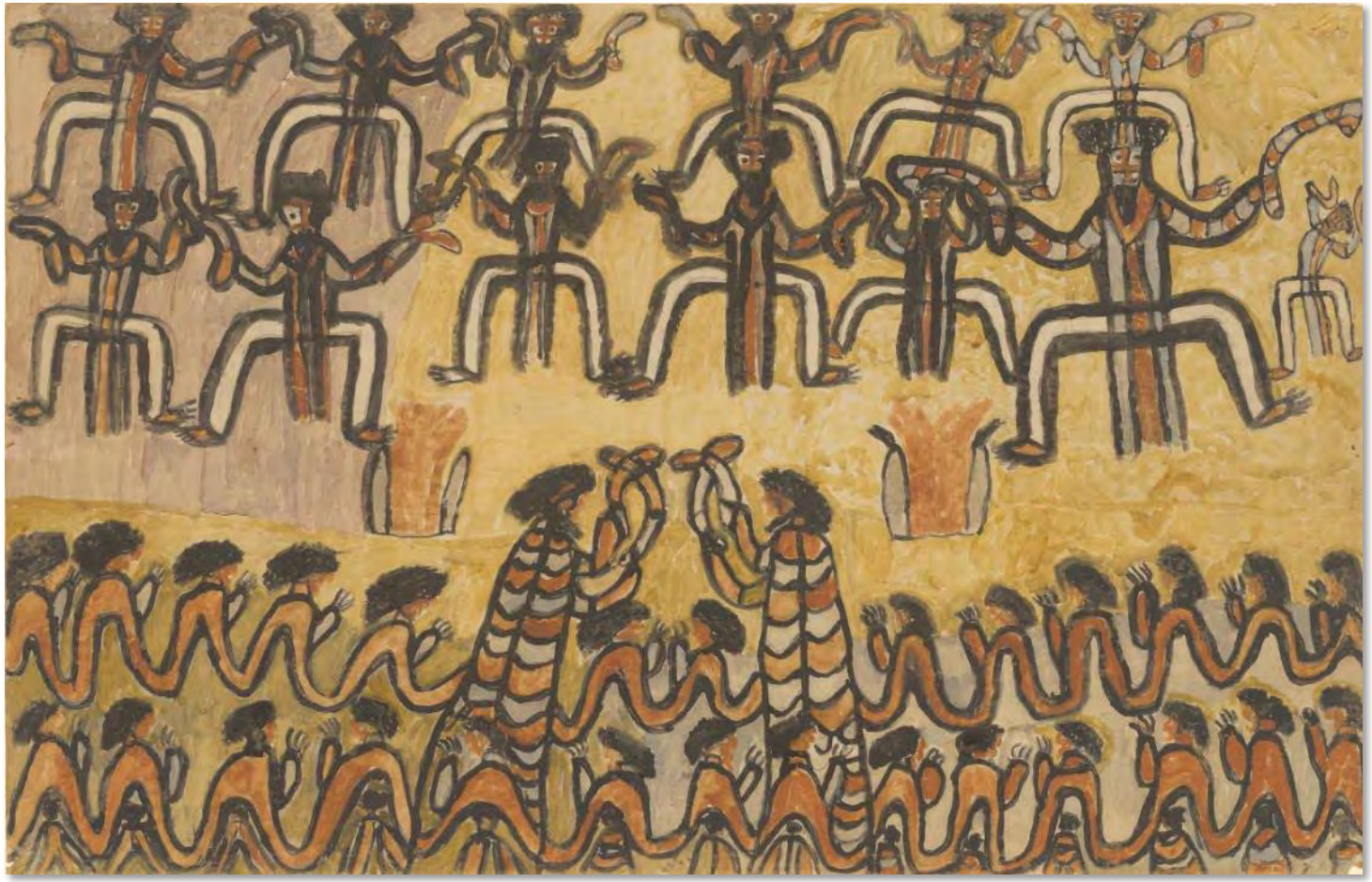
Dave Story; MBBS, MD, BMedSci, DipPOM, FANZCA

Professor and Chair of Anaesthesia

Head, University Department of Critical Care

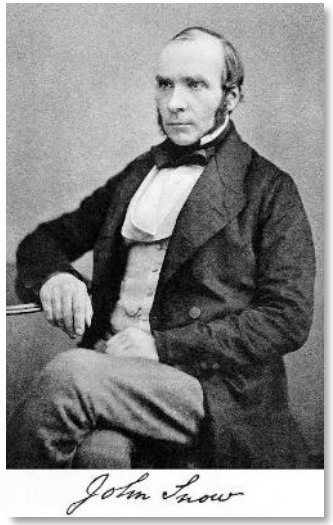
Staff Anaesthetist, Austin Health

Vice President, ANZCA



Ceremony [1898], Wurundjeri Elder: William Barak
National Gallery of Victoria

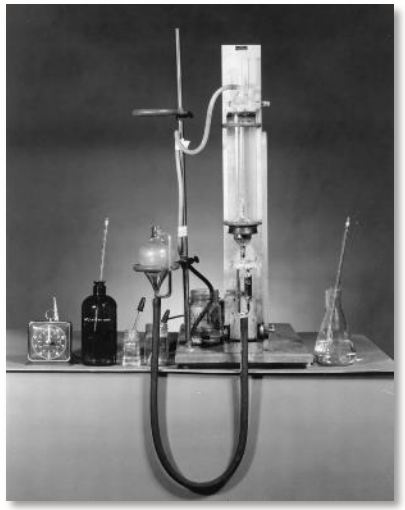
How we've evolved…



John Snow
London

Chloroform
James Simpson,
Edinburgh

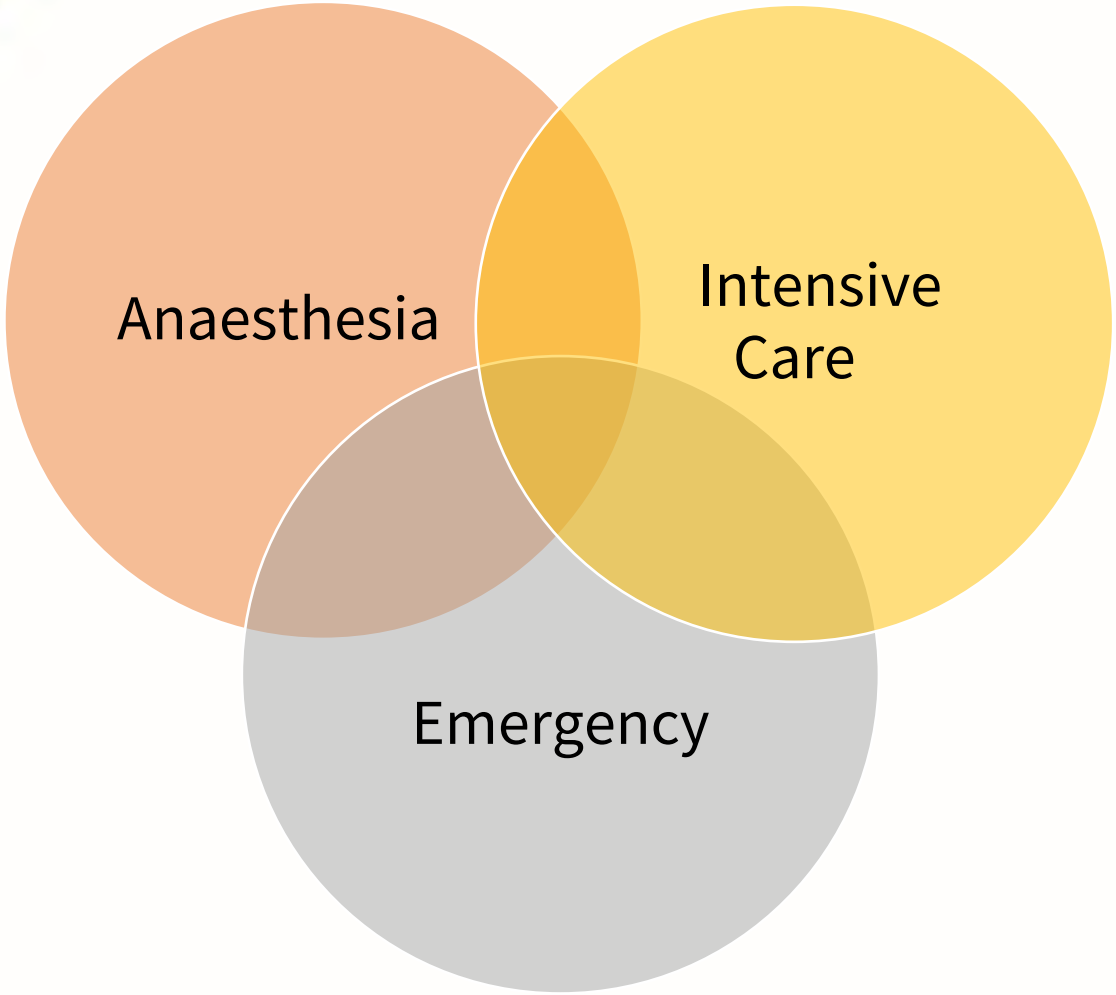
Anaesthesia



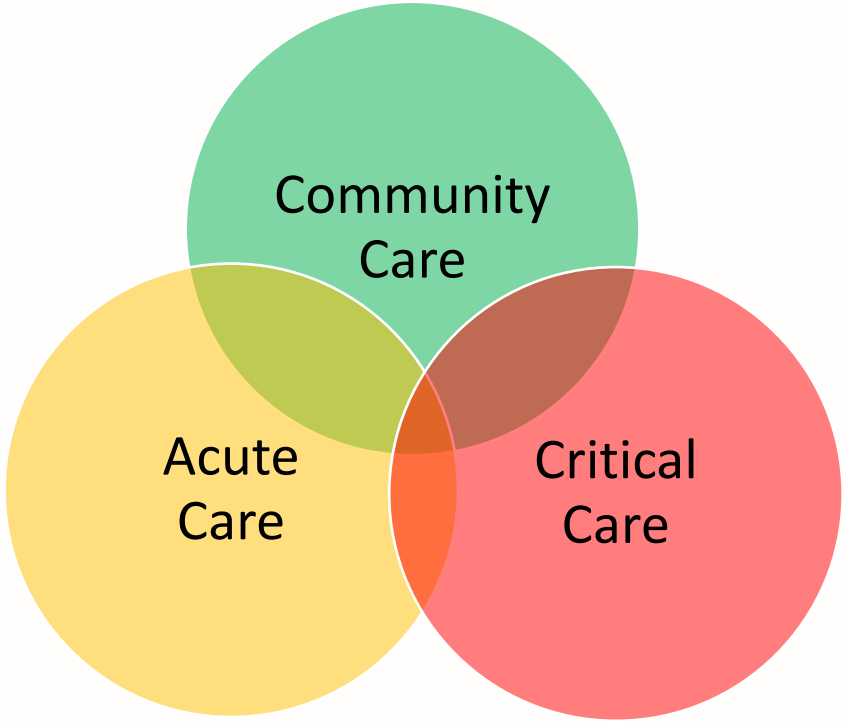
Intensive Care Medicine

Emergency Medicine

Critical Care Specialties



...and themes



Our purpose

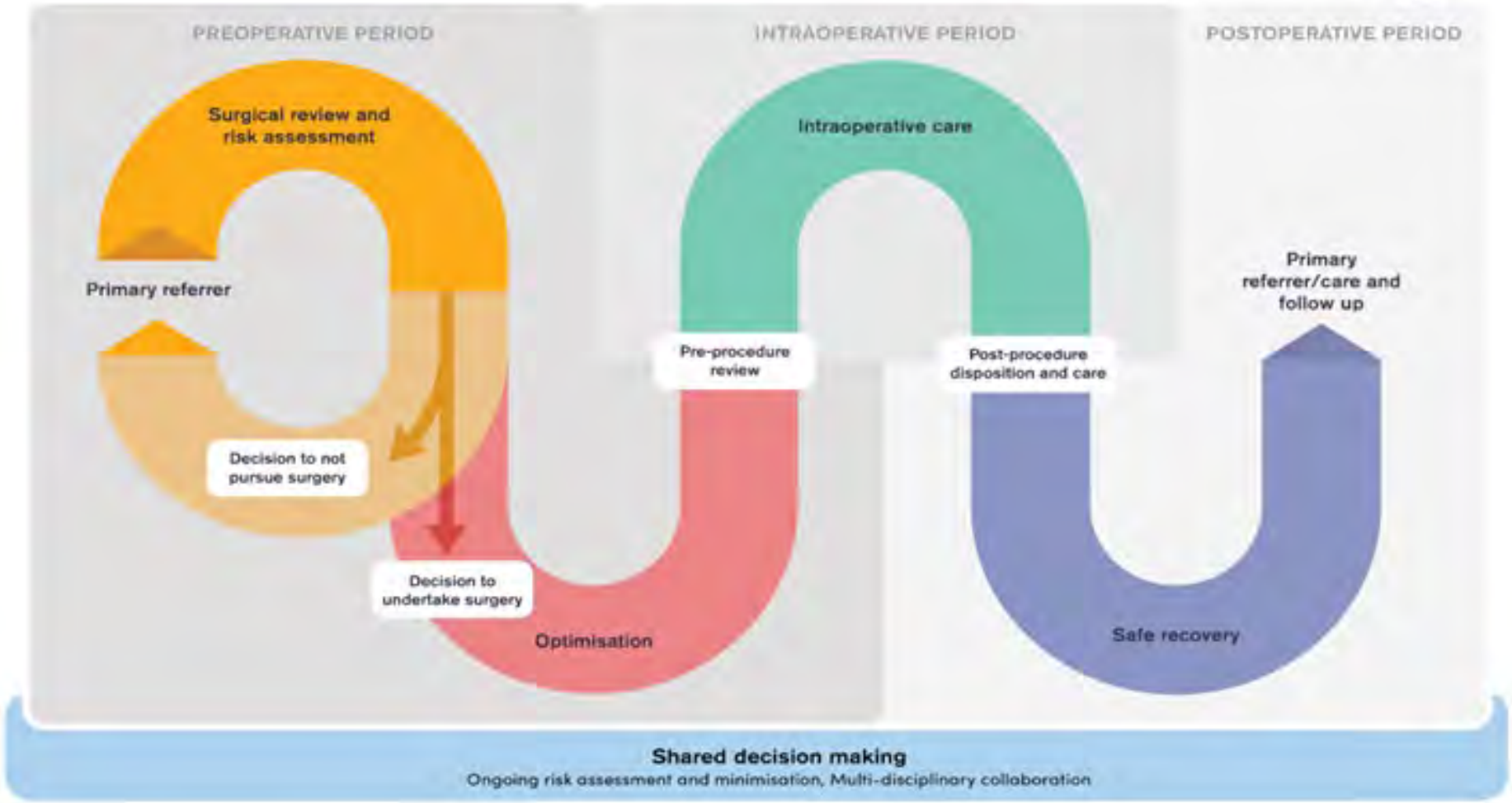
The need for DoCC stems from the unfortunate fact that many high-risk, deteriorating, and critically ill patients have poor outcomes. Both preventing and managing health care crises is a key common feature of the three critical care specialties.

The Department of Critical Care works to improve the health of critically ill and high-risk patients through collaborative research, education, and advocacy.

Perioperative Medicine is a Team Sport

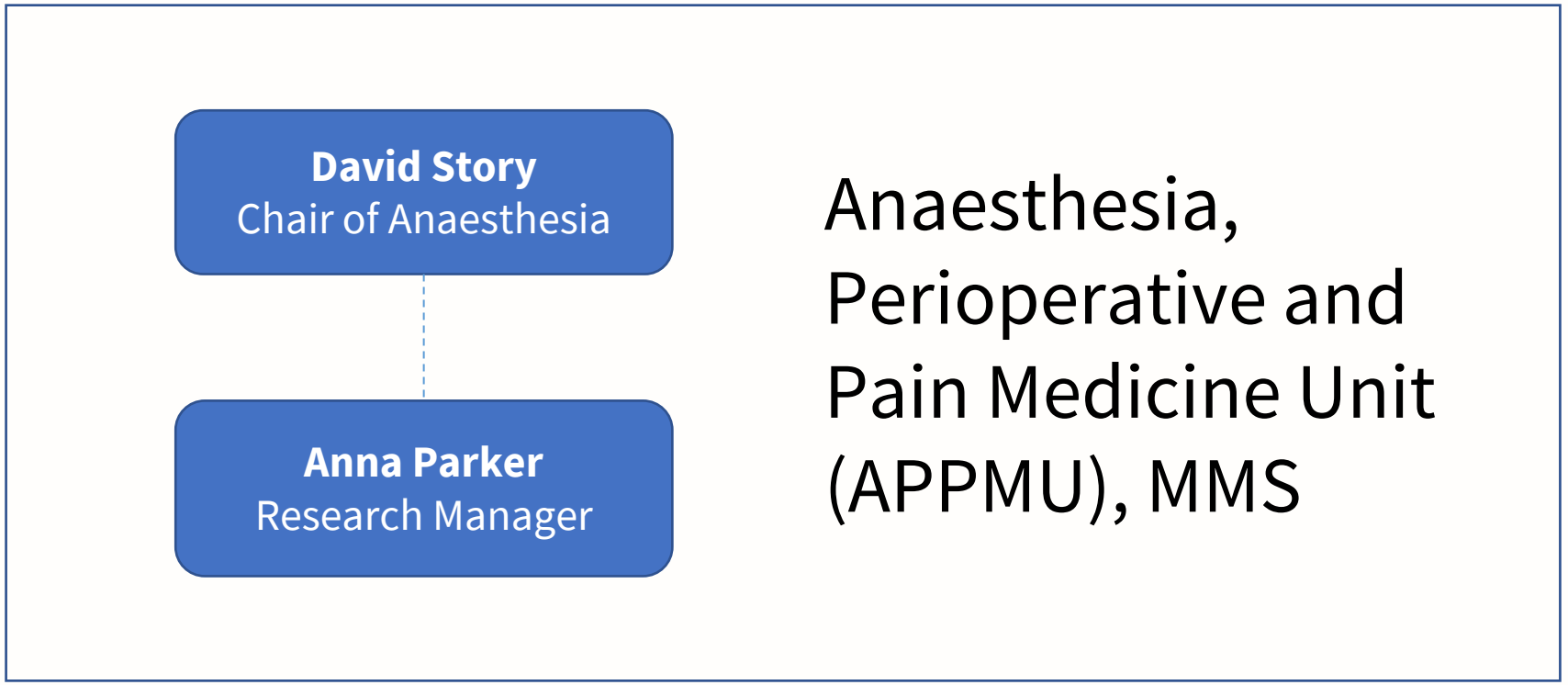
The Perioperative Care Framework

From the contemplation of surgery to an optimal outcome



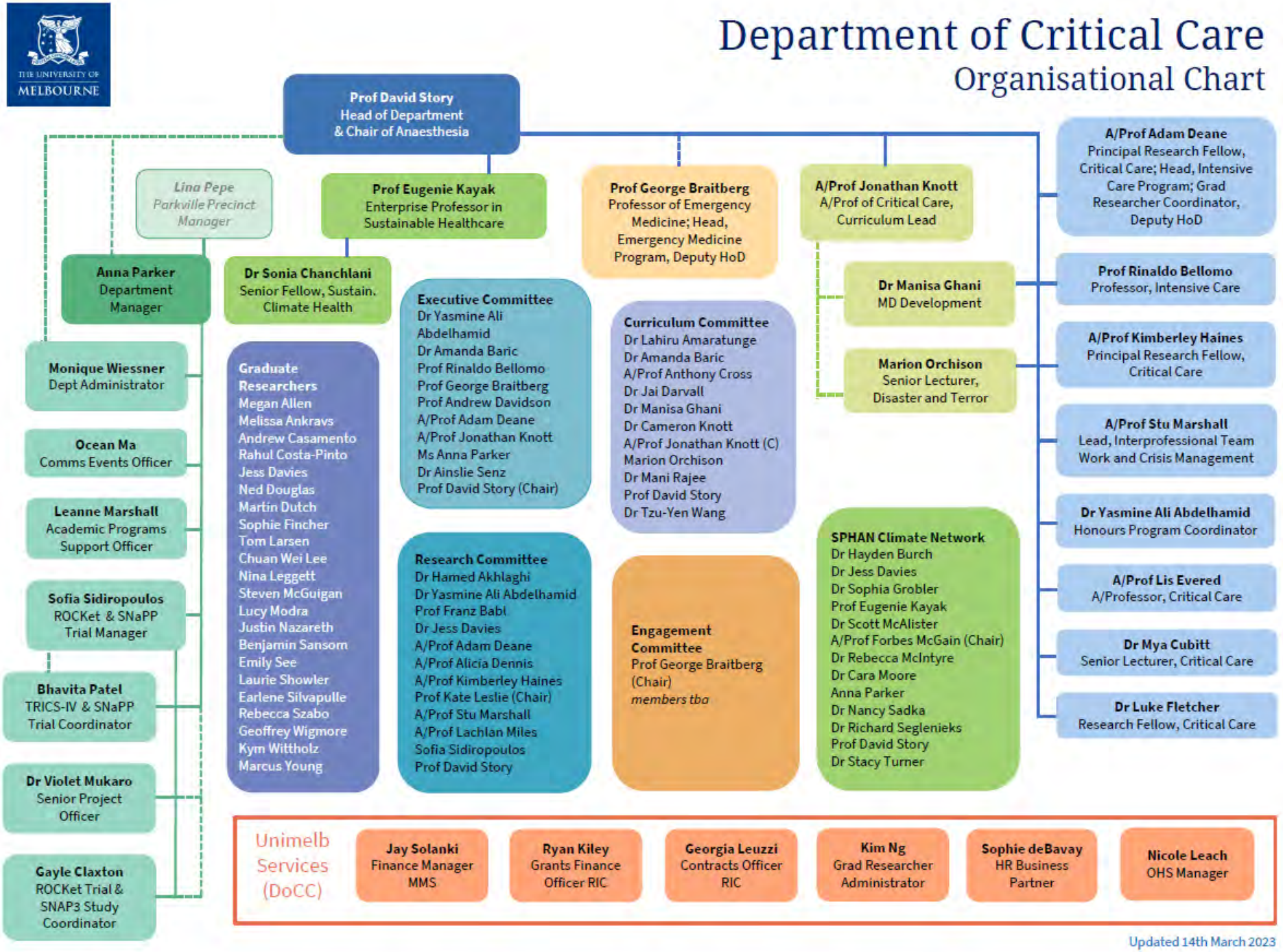
ANZCA acknowledges the work of the POM Care Working group in the development of this framework.

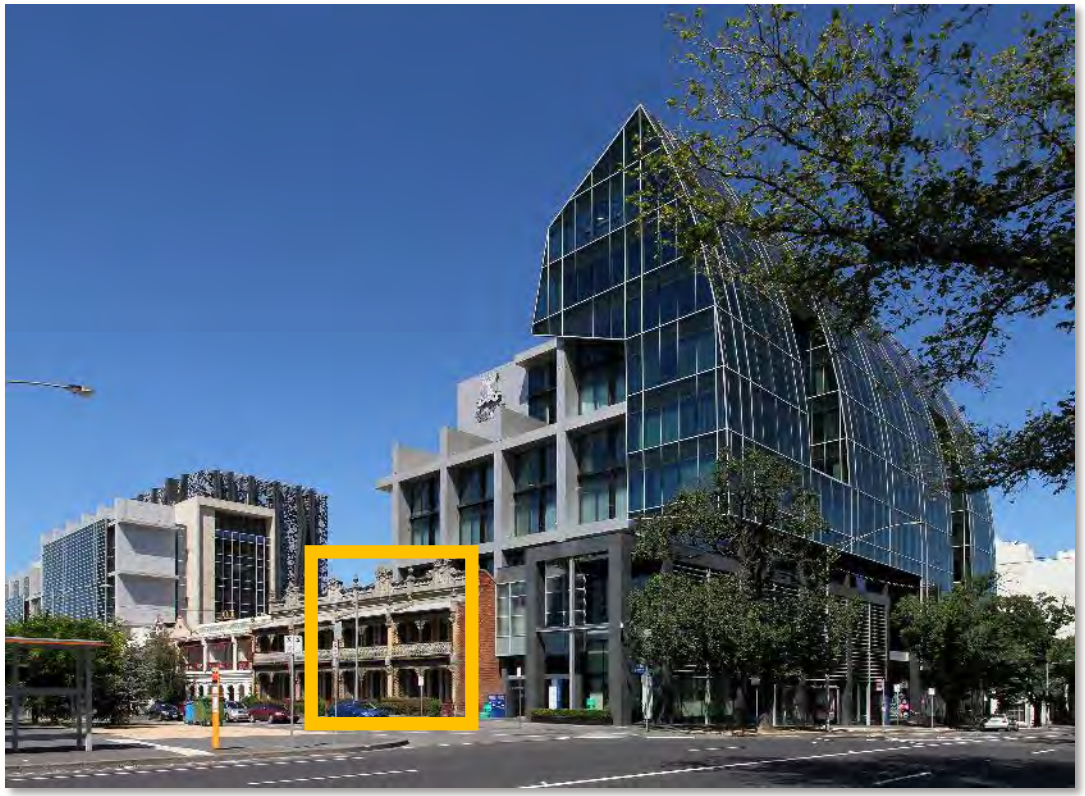
DoCC: how it started…2013



How it's going...

2023





Department of Critical Care

157 to 159 Barry Street

Research

$18,000,000
in competitive grants since 2017

Teaching: Consolidating our Courses, Exploring New Opportunities

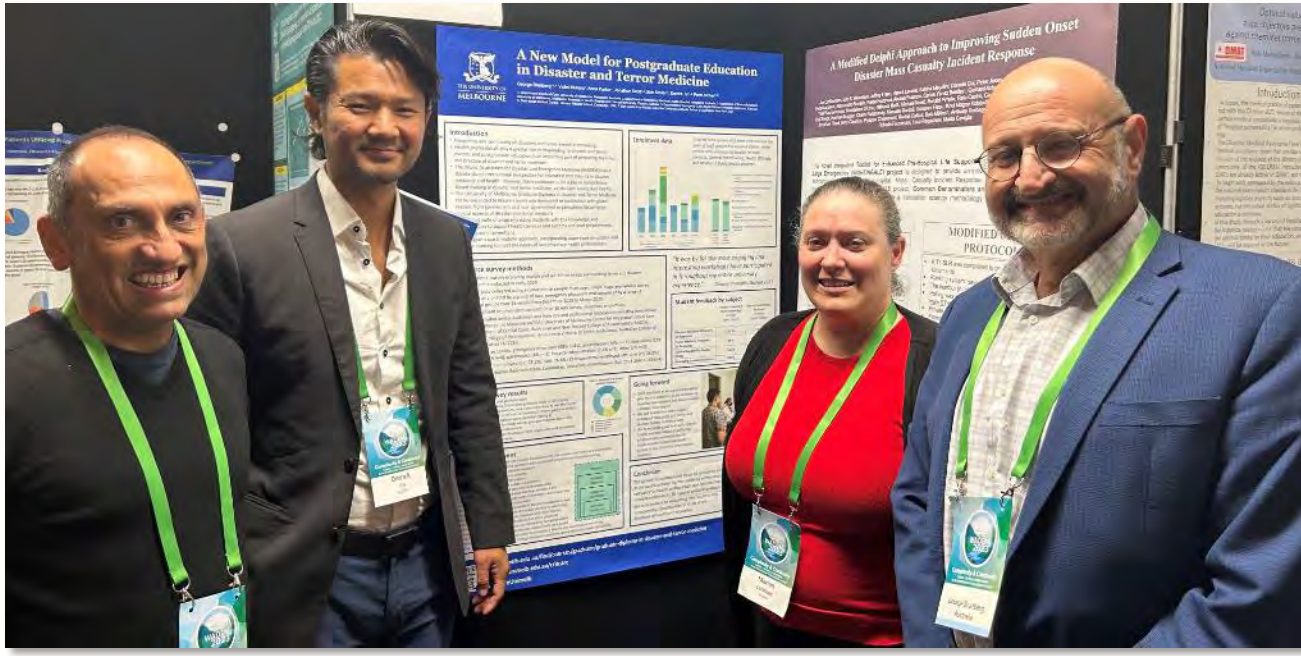
Disaster and Terror Medicine (since 2021)

- MicroCert
- Specialist Certificate
- Graduate Certificate
- Graduate Diploma

Honours (since 2022)

Revamped MD2 content (2023)

New courses in development



What's next?

- Interdisciplinary **roadshows** to hospital sites (How can we help you?)
- Identify the **big research questions**
- Strengthen critical care **research networks** and pipeline (grant pitching sessions)
- **New courses** (MD4 Critical Care Discovery, Critical Care Leadership, Master of Disaster and Terror Medicine)
- Leading **Sustainable Healthcare** initiatives
- Explore further **funding opportunities** with industry, government and philanthropy

Get involved!

Critical Care Honours Class of 2022

- Enrol in a PhD
- Ideas for new courses
- Clinical teaching (EXCITE)
- Public advocacy (academic freedom)
- Honours co-supervision, seminars and tours
- PhD supervision and advisory committee members
- Research proposals, collaboration, development, grants, UoM sponsorship and support

THE UNIVERSITY OF MELBOURNE

THE UNIVERSITY OF MELBOURNE

Faculty of Medicine, Dentistry and Health Sciences

Department of Critical Care

157-159 Barry St, Parkville

www.medicine.unimelb.edu.au/critcare

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dastory@unimelb.edu.au

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Critical Care Connections

Department of Critical Care

Wednesday 7th June 2023

Developing researcher capability in MMS – mentoring the next generation of researchers

Christobel Saunders
Research Director, Melbourne Medical School
Department of Critical Care Symposium, 7 June 2023

Acknowledgement of country…

The typical academic clinician – the stereotype

Why do research as a student/junior doctor?

Practicing medicine and doing clinical research are complementary. Doing one makes you better at the other

When we see patients, we realize how little we know and how many questions need to be answered

The first step in clinical research is going the next step in clinical care and formulating those unanswered questions

Only a small percentage of all clinical questions have been rigorously studied

What does it take to be an "academic" clinician over and above routine practice?

Research

Curiosity - using your intellect and your hands

Skills of observing

Always asking "How can I do better for my patients?"

Taking ideas, information, and observations from the bedside and asking how we can do better

- working out who to talk to help solve them – collaborating with scientists, or taking bedside observations to the lab themselves - need to learn skills

Disseminating evidence

- Publishing, talking at conferences, writing guidelines, being a leader in a field

What does it take to be an "academic" surgeon over and above routine practice?

Love of teaching

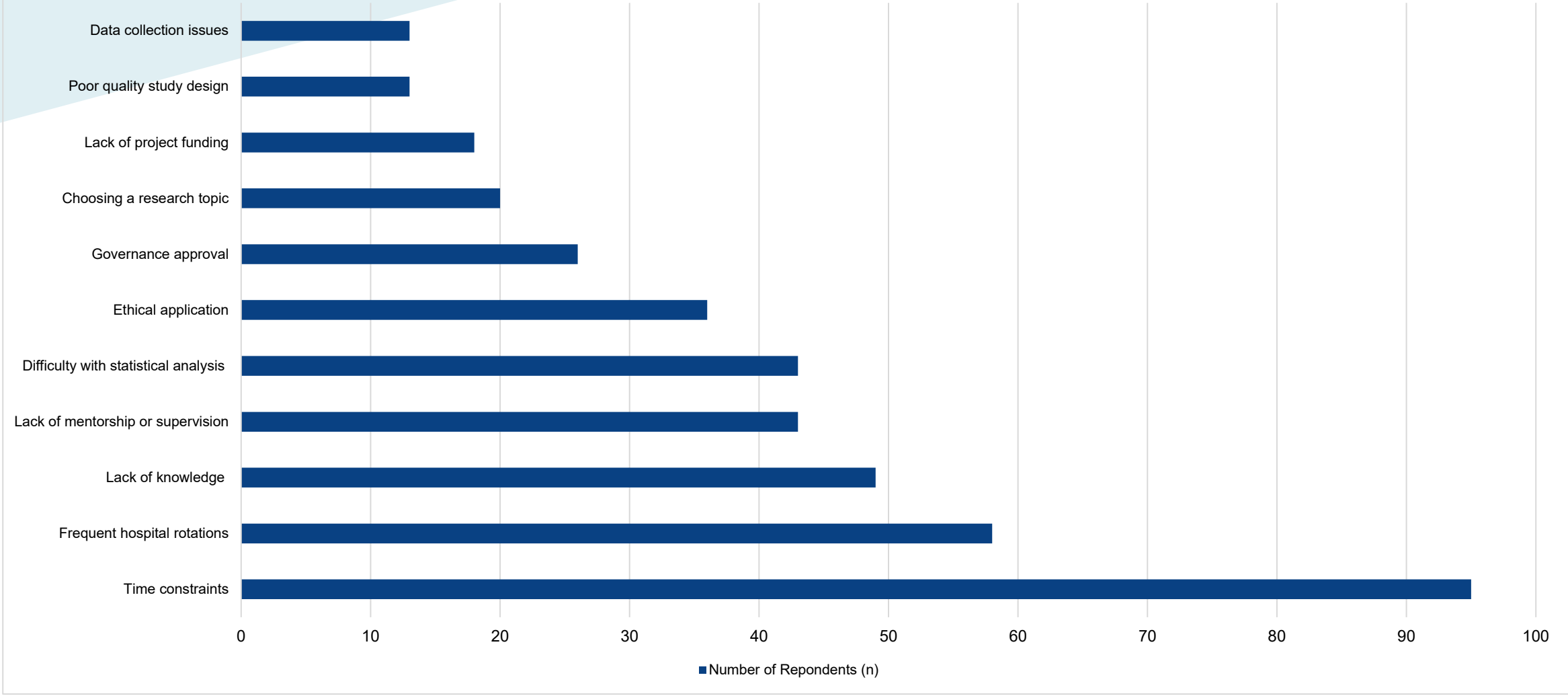
Teach scientific method - critically evaluating literature; developing a hypothesis; planning experiments; statistical analyses; writing manuscripts and grant proposals; and giving cogent presentations.

Mentoring

Guide next generation of academic clinicians

Barriers to research

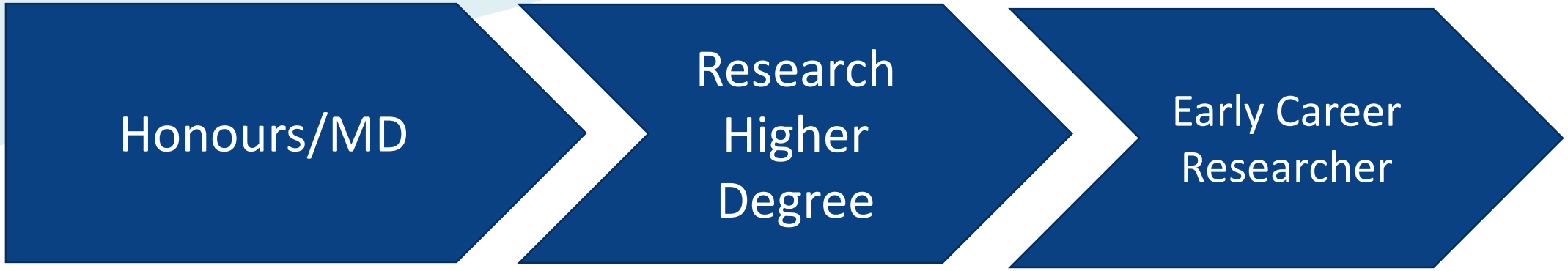
Figure 2 Barriers to Research: Number of respondents that 'Strongly Agree' a barrier is significant



What is an academic clinician?

1. Innovate to advance treatment and patient outcomes
2. Ask important questions to further improve care
3. Identify complex clinical problems ignored or thought unsolvable by others
4. Observe outcomes of "experimental" interventions to further improve and innovate
5. Become an expert
6. Disseminate knowledge and expertise
7. Train the next generation of surgeons and scientists
8. Are leaders in both the hospital and profession
9. Manage departments – HR, budgetary responsibility
10. Government advisors
11. Professional college and society leaders
12. Medical school leaders, curriculum development
13. Media contributors

Key objectives: researcher development



Advancing Health 2030 – MDHS Strategy

Train multiskilled, diverse and inclusive research and innovation leaders

Equip graduates with the job-ready skills and attributes to make positive societal impact

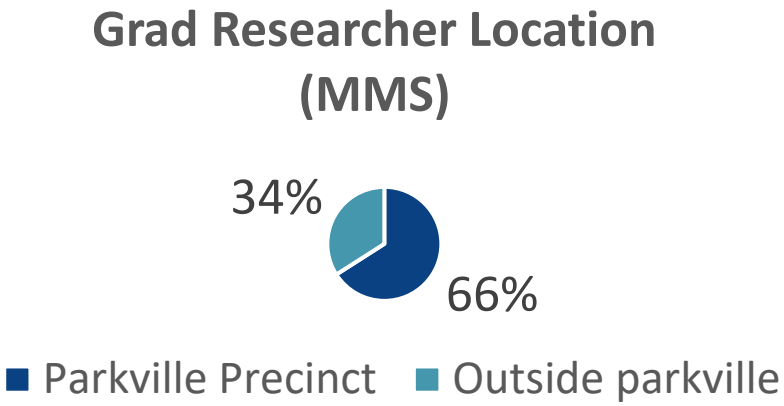
Expose our researchers to the best of health, industry and research practice

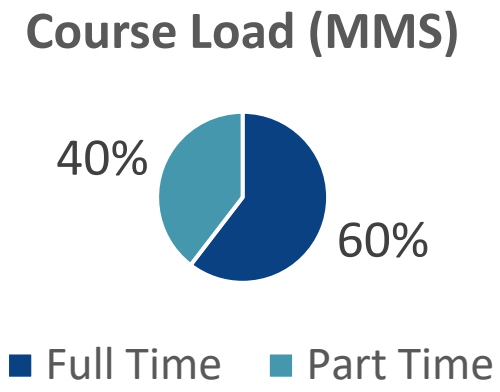
Graduate Research in MMS

Graduate Research Candidates: 615

Honorary staff who are GR principal Supervisors: 58%

Graduate Research Candidates in Critical Care: 23





The MMS Research Support Team

Professor Christobel Saunders
Research Director

A/Prof Cathy Quinlan
Academic Lead (Graduate Research)

Prof Margie Danchin
Director, Clinician Scientist Pathways

A/Prof Sarah Dunstan
Deputy Research Lead

Prof Alex Thompson
Lead for Honorary / Precinct Engagement

Dr David Lane
Research Manager

Ruth Benke
Research Support Officer

Karla Fallon
Project Officer (Research Training)

Early and Mid Career Academic Development

Early and Mid Career Academics (EMCA) Advisory Group

- Critical care reps: Kimberley Haines (Co-Chair), Lachlan Miles

Three main projects – proposed and developed by EMCA

- Mentoring
- Industry collaborations development
- Communication and events

MMS Opportunities

- Participate in committees, reviews and assessment panels
- MMS led activities designed to be inclusive of Honorary staff and equitable across levels
- ECR Publication Prize (to be confirmed)

Graduate Researcher Opportunities

MMS Support

- MMS Grad Research Consultation Group (includes Geoff Wigmore)
- Provide feedback on current offerings and suggest new initiatives

Faculty of MDHS Support

- Graduate Research Conference (GR led) – 22 & 23 November
- Strive and Thrive Orientation (for all first year candidates) – Friday 7 July- register
- MDHS Innovation student bootcamp -25-27 June

No Bell Prize – Tuesday 11 July 1-3pm

- Graduate researchers pitch their research for 5 minutes
- Great Prizes - $1,000 winner, $500 runner up, $200 people's choice (voted by audience)
- Hosts: Cathy Quinlan and Alastair Sloan (Head, Melbourne Dental School)
- Enter by Monday 12 June: https://medicine.unimelb.edu.au/research/research-training/clear-as-a-bell/No-Bell-Prize

PhDone and Dusted – Career Pathways

Monday 30 October

- Clinician Scientist Pathways
- Policy and Change Practice Pathways

Tuesday 31 October

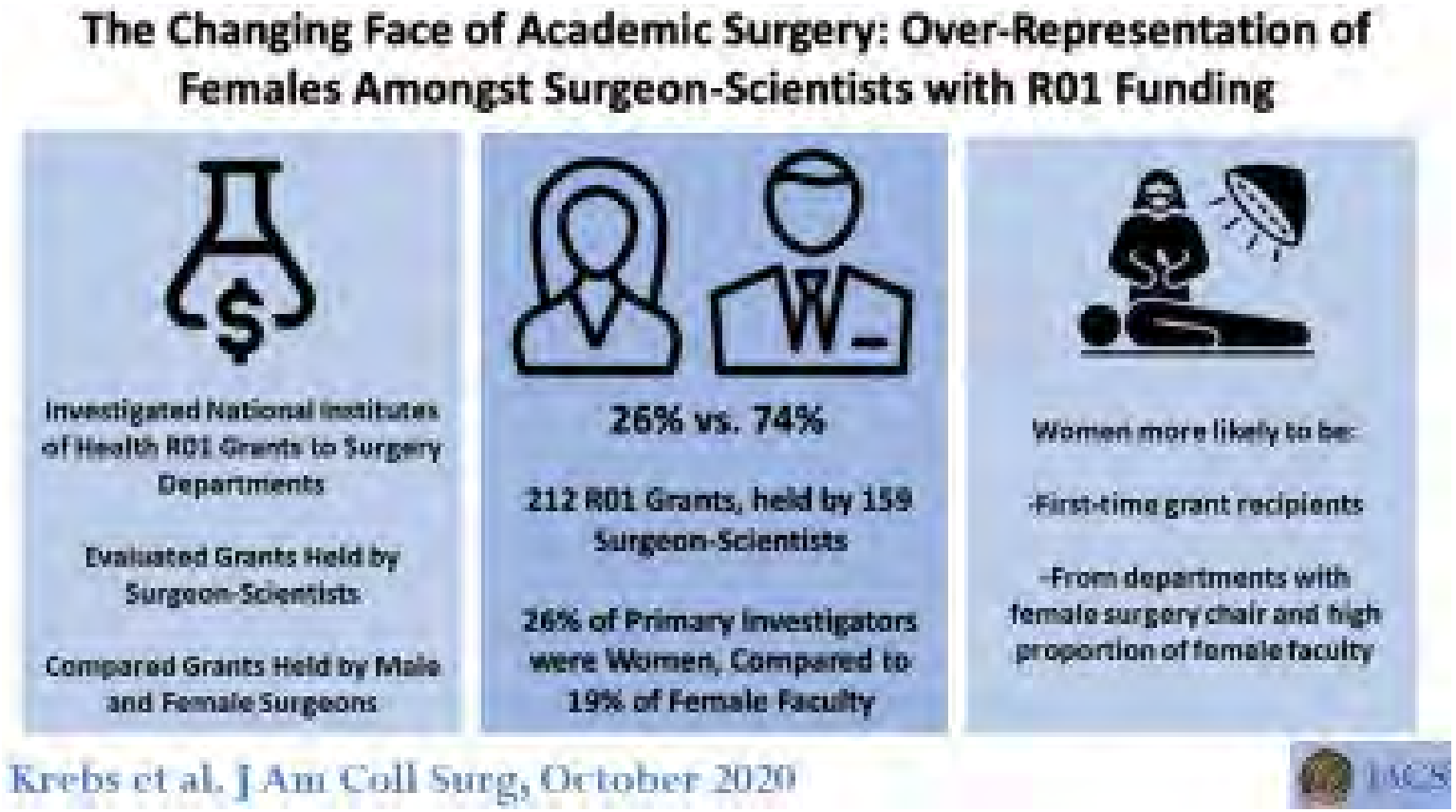
- Fundamental Science Pathways
- How did I end up here?

Wed 1 November

- View from the Recruitment Panel
- Identifying my unique skills for the workforce – workshop style

Are women the future?

Female clinicians in academic medicine hold a greater than anticipated proportion of NIH funding, with a high number of first-time grants, especially if female HoD. Yet few female HoD!



Strategic Grants for Outstanding Women

- Launched by the Melbourne Medical School in 2019 to support mid career (Level B-D) women in academia to advance their careers
- **Open to salaried and honorary staff in MMS**.
- Grants of up to $60,000 awarded across a two-year period
- Runs every two years. 10 grants awarded in 2021
- **2023 round opening on 10 July**
  - https://medicine.unimelb.edu.au/about/diversity-and-inclusion/strategic-grants-for-outstanding-women

Why bother? Why not just be a good private clinician?

Doctor. "WHAT DID YOU OPERATE ON JONES FOR?"
Surgeon. "A HUNDRED POUNDS."
Doctor. "NO, I MEAN WHAT HAD HE GOT?"
Surgeon. "A HUNDRED POUNDS."

38. Doctor and surgeon discussing a patient. Punch *cartoon, 1925.*

Christobel.saunders@unimelb.edu.au

Thank you

MMS Research Support team
mms-research@unimelb.edu.au

THE UNIVERSITY OF MELBOURNE

Critical Care Connections

Department of Critical Care

Wednesday 7th June 2023

Critically ill pregnant people

adennis@unimelb.edu.au
@aliciatdennis

Professor Alicia Dennis (she/her)

MBBS PhD MPH PGDipEcho FANZCA GAICD

2023 Fulbright Scholar

Staff Specialist Anaesthetist and Director of Anaesthesia Research
The Royal Women's Hospital Parkville Australia

Specialist Anaesthetist
Joan Kirner Women's and Children's Hospital Western Health Sunshine Australia

An older woman with a young girl in Atapeu province, Laos.
Phong Tran/Photoshare

“Malignant hypertension doesn’t exist anymore”

Mortality and Morbidity

Professor Janet McCalman
AC, FAHA, FASSA
Redmond Barry
Distinguished Professor
Centre for Health Equity in
the Melbourne School of
Population & Global Health,
University of Melbourne

1856
Melbourne
Lying-in
Hospital

Sex and suffering : women's health and a women's hospital : the Royal Women's Hospital, Melbourne, 1856 - 1996 / Janet McCalman Carlton, Vic.: Melbourne University Press, 1999 420 p., ill., ports. ; 25 cm. ISBN 0522849024 (paperback)

Appendix II

Obstetrical Deaths, 1939–1940

Clinical Report, 1939–1940,
pp. 26–32

TABLE XIX.—OBSTETRICAL DEATHS.
Admitted Before Delivery.

No.	History No.	A. or E.	Age	Para	Cause	Notes.
1	H/359 (1939)	E	18	1	Pre-eclamptic Toxaemia. Post-partum Haemorrhage.	Admitted at full time in labour—history of oedema of legs for two months, and spots before the eyes for twenty-four hours. Urine contained much albumen, and blood pressure 170/130. Given eliminative treatment and sedatives. Baby born eight hours after admission. Fairly severe post-partum haemorrhage occurred—Crede's expression of placenta. Patient in condition of shock afterwards, improved with treatment, but collapsed and died two hours later. Post-mortem performed.
2	E/22 (1939)	E	22	2	Eclampsia. Pulmonary Oedema.	Admitted when thirty-four weeks pregnant in semi-conscious condition with history of one eclamptic fit. One fit occurred in hospital. Baby delivered normally fourteen hours afterwards, but condition of patient gradually deteriorated till death, thirty hours after admission. Post-mortem performed.
3	E/28 (1939)	E	30	4	Eclampsia. Pulmonary and Cerebral Oedema.	Admitted when thirty-six weeks pregnant with history of two eclamptic fits before admission. Was conscious on admission. Improved slightly with elimination and sedatives. Stillborn baby delivered naturally ten hours after admission. Patient collapsed and died twenty minutes later. Post-mortem performed.
4	E/34 (1939)	E	25	1	Eclampsia.	Admitted unconscious at full time with history of several eclamptic fits before admission. Several fits occurred before death five hours later, despite treatment. Post-mortem Caesarean section—stillborn baby. Post-mortem performed.
5	E/12 (1940)	E	18	1	Post-partum Eclampsia. Bronchopneumonia.	Admitted in strong labour at full time and was rapidly delivered. An eclamptic fit occurred seven hours later, and was followed by nine others in the next eight hours. Treatment by elimination and sedatives was carried out, but bronchopneumonia developed and the patient died 36 hours after admission. Post-mortem performed.
6	E/20 (1939)	A	24	3	Eclampsia. Chronic Nephritis.	Admitted when thirty-two weeks pregnant with history of five eclamptic fits. Past history—first pregnancy terminated for severe pyelitis at five months, second pregnancy resulted in stillborn baby at full time. Despite eliminative treatment and morphia had eight fits before delivery of stillborn baby by forceps four hours after admission. There was gross peripheral circulatory failure after delivery and patient died in four hours. Post-mortem performed.
7	E/37 (1939)	A	19	1	Eclampsia. Gangrene of Lungs.	Admitted when thirty-two weeks pregnant in early labour. Urine contained no albumen. Blood pressure 170/130. An eclamptic fit occurred twenty-four hours later, followed by other fits before delivery by forceps, under nitrous oxide and oxygen anaesthesia of living male child three hours later. Blood pressure fell rapidly, patient became cyanosed within a few hours and temperature rose to 103 deg. Death occurred forty-eight hours after delivery. Post-mortem performed.
8	E/8 (1940)	A	24	1	Eclampsia. Sub-arachnoid Haemorrhage.	Attended ante-natal six times, last attendance one month before admission when one week post-mature. Had an eclamptic fit shortly before admission and remained unconscious until death 7½ hours afterwards. Lumbar puncture yielded pure blood. Died undelivered. Post-mortem performed.
9	E/11 (1940)	A	42	11	Eclampsia. Bronchopneumonia.	Admitted to hospital when thirty-four weeks pregnant with mild albuminuria and hypertension (blood pressure 150/140). Quickly improved, and was discharged. Re-admitted one week before due date with history of one eclamptic fit. Blood pressure 240/140 and urine contained 1/3 albumen. Four fits occurred before delivery twelve hours later, despite eliminative treatment, morphia, and venesection. One fit occurred after delivery. On the following day blood pressure fell to 75 mms. Hg. and patient was very cyanosed. Blood pressure gradually rose again, but bronchopneumonia developed, and the patient died on the fifth day. Post-mortem performed.

Mortality and Morbidity

Los Angeles 1933 1 in 3 people with eclampsia died

EDMOND M. LAZARD, M.D., F.A.C.S., LOS ANGELES, CALIF.
(From the Obstetrical Department, Los Angeles General Hospital)

TO BE orthodox, one should start a paper on the treatment of the eclamptic toxemias with the statement, that until the cause of eclampsia is discovered, a satisfactory treatment is not possible. This statement, or a similar one, is made by nearly all the writers on this subject, but I find myself unable to subscribe to this stand.

Before discussing treatment, it might not be amiss to consider the etiology; not with the idea of adding a new theory as to the etiology of this "disease of theories" but rather to explain clinical results in preventing the occurrence of this clinical syndrome in properly supervised pregnancies.

The problem may be divided into three parts, first and most important, the proper supervision of the pregnant woman. Hygienic and dietary regulation, the elimination, as far as possible, of all local foci of infection, and protection against acute infections, will in the great majority of pregnancies prevent the occurrence of a toxemia; second, the treatment of preeclamptic toxemias, whether of the nephritic type or the so-called true or hepatic type; and third, the treatment of the eclamptic attack itself.

Lazard E A An analysis of 575 cases of eclamptic and preeclamptic toxaemias treated by intravenous injections of magnesium sulphate Am J Obs Gyn 1933 26: 647

Mortality and Morbidity

Longest running audit in the world

Catalogue description

Ministry of Health's Report on Confidential Enquiries into Maternal Deaths in England...

Reference:	MH 55/2373
Description:	Ministry of Health's Report on Confidential Enquiries into Maternal Deaths in England and Wales 1952-1954 (HMSO 1957)
Date:	1956-1957; 1960
Held by:	The National Archives, Kew
Former reference in its original department:	93215/1/54/1/1
Legal status:	Public Record(s)
Closure status:	Open Document, Open Description

Ordering and viewing options

This record has not been digitised and **cannot be downloaded.**

You can order records in advance to be ready for you when you visit Kew. You will need a reader's ticket to do this. Or, you can request a quotation for a copy to be sent to you.

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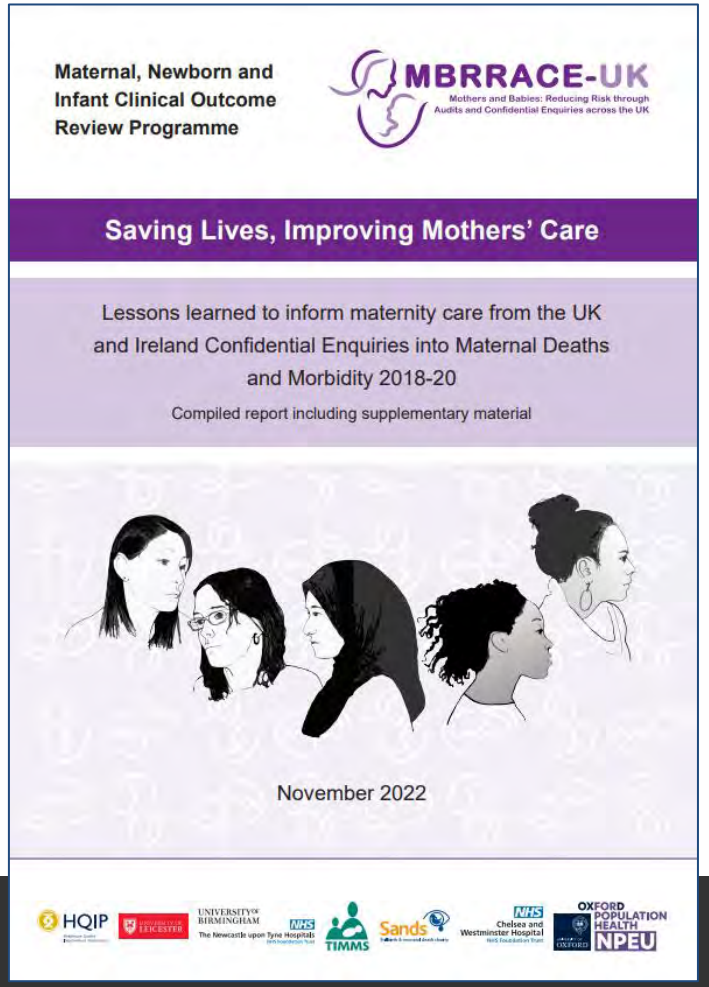


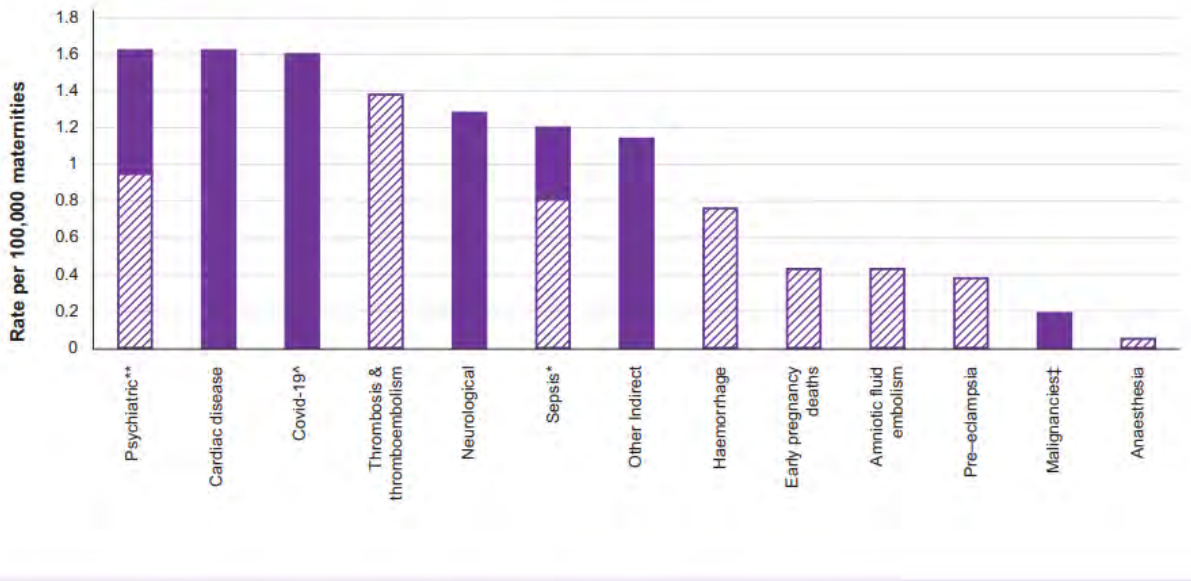
https://discovery.nationalarchives.gov.uk/details/r/C657790 Viewed 7/6/2023

Mortality and Morbidity

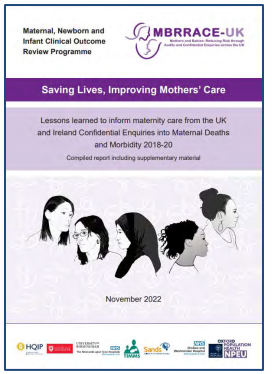
United Kingdom 2023

Maternal mortality ratio 6 per 100,000 pregnant people (1 in 17,000 people)

Figure 2.3: Maternal mortality by cause 2018-20



Hatched bars show direct causes of death, solid bars indicate indirect causes of death;



Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022

Mortality and Morbidity

Australia 2023

Risk of dying during pregnancy

1 in 17,780 (MMR 5.6 per 100,000)

Neonatal deaths
2.5 per 1000 live births
1 in 500 live births

Australian Institute of Health and Welfare (2023) Maternal deaths in Australia 2018–2020, catalogue number PER 121, AIHW, Australian Government.

Mortality and Morbidity

Risk of severe morbidity

1 in 200 pregnant people

Centre for Maternal and Child Enquiries (CMACE). Saving Mothers' Lives: Reviewing maternal deaths to make motherhood safer: 2006-2008. The Eighth Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG 2011;118 (Suppl. 1):1-203

Table 1. Numbers and rates of categories of severe maternal morbidity in Scotland: 2006–08

Morbidity	*n*	Rate per 1000 births* (95% CI)
Major obstetric haemorrhage	787	4.51 (4.20–4.84)
Renal or liver dysfunction	52	0.30 (0.22–0.39)
Eclampsia	48	0.28 (0.20–0.36)
Pulmonary oedema	28	0.16 (0.11–0.23)
Septicaemic shock	19	0.11 (0.07–0.17)
Acute respiratory dysfunction	14	0.08 (0.04–0.13)
Massive pulmonary embolism	13	0.07 (0.04–0.13)
Anaesthetic problem	11	0.06 (0.03–0.11)
Cardiac arrest	4	0.02 (0.01–0.06)
Anaphylactic shock	4	0.02 (0.01–0.06)
Cerebrovascular event	3	0.01 (0.00–0.05)
Coma	2	0.00 (0.00–0.04)
Status epilepticus	0	–
Intensive-care or coronary-care admission	252	1.44 (1.27–1.63)

*Registered with General Registry Office for Scotland.[4]

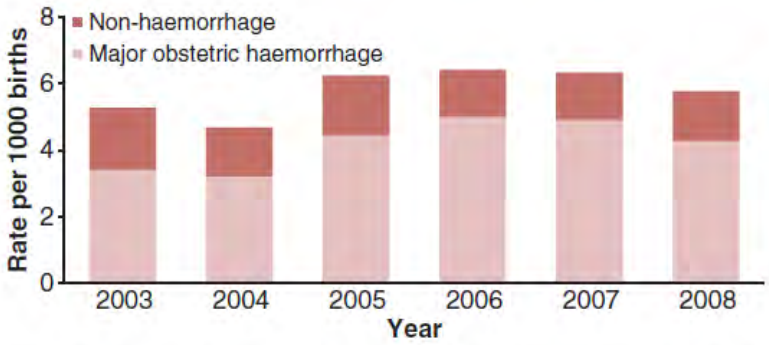


Figure 1. Rates of women with major obstetric haemorrhage and all other reported severe morbidities 2003–08.

Pregnant people

High risk

Quickly deteriorate

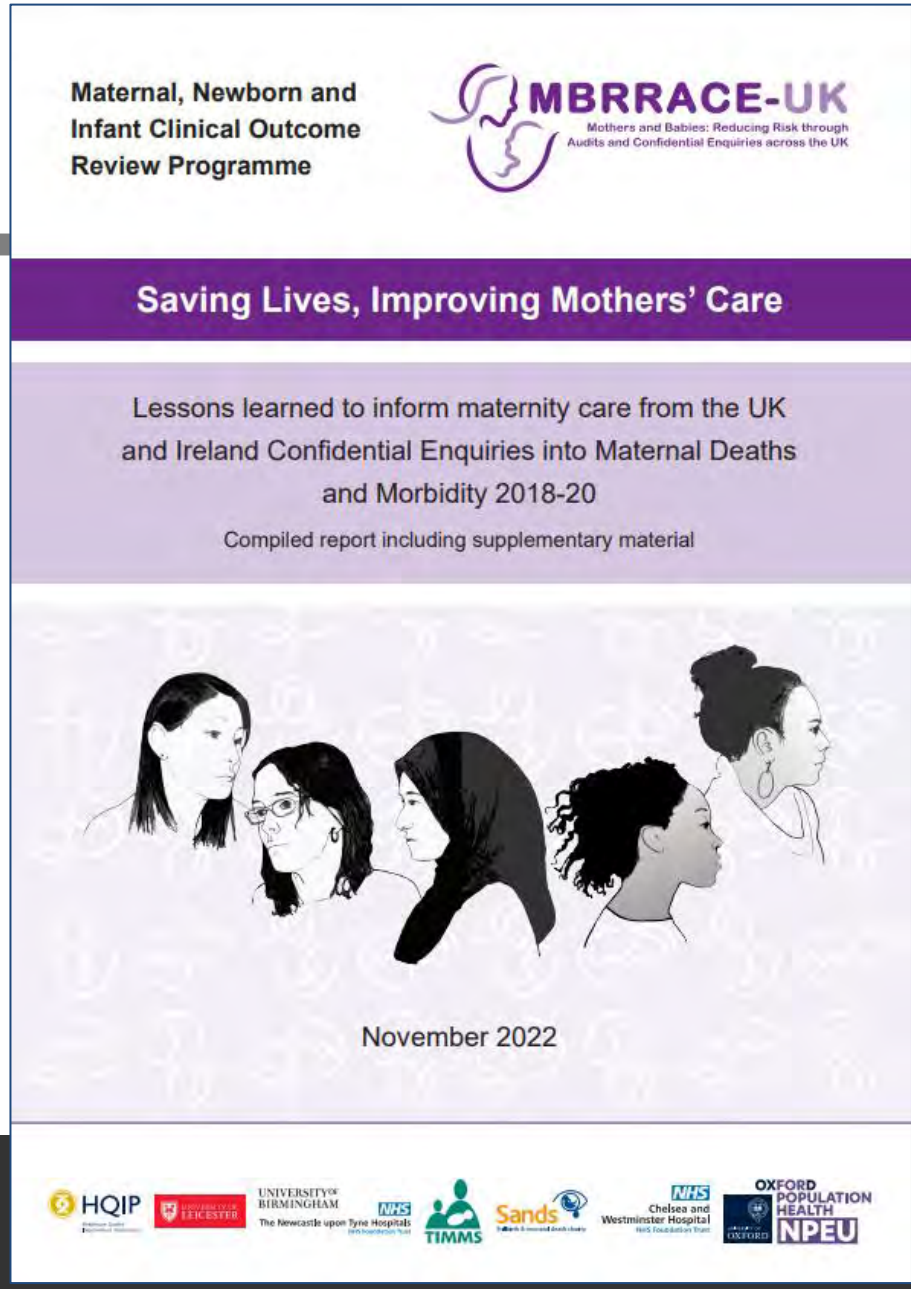
Critically ill

Clinical care – Education – Research
Integration
Collaboration
Engagement
Advocacy

Mortality and Morbidity

Key chapters about people with:

- Mental health problems
- Diabetic ketoacidosis
- Multiple morbidities
- Cardiovascular disease
- Hypertensive disorders of pregnancy
- Early pregnancy disorders
- Critical care



Pregnant people with mental health problems

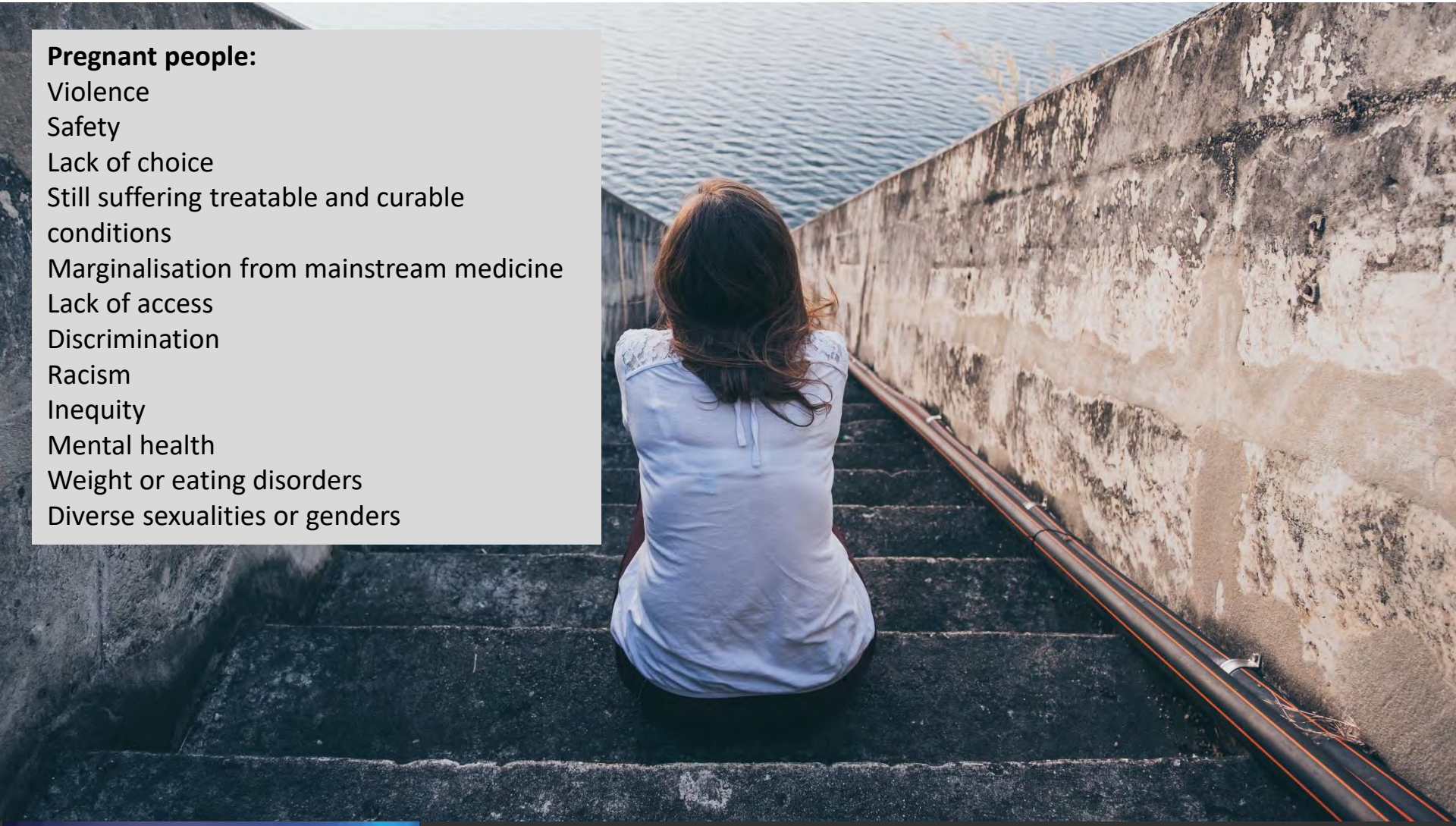
- Insomnia is a red flag
- Trauma history
- Stigma
- Coordinated care in working hours
- Free text boxes in electronic medical records

THE UNIVERSITY OF MELBOURNE

Critical Care Connections

Wednesday 7th June 2023

3pm to 6pm



Pregnant people:

Violence
Safety
Lack of choice
Still suffering treatable and curable conditions
Marginalisation from mainstream medicine
Lack of access
Discrimination
Racism
Inequity
Mental health
Weight or eating disorders
Diverse sexualities or genders

Pregnant people with diabetic ketoacidosis

A multiparous ethnic minority woman with poorly controlled Type 1 diabetes mellitus had known peripheral neuropathy, chronic pain and hypertension. She was admitted with abdominal pain and vomiting and found to be 12 weeks pregnant. Her HbA1c was 92 mmol/mol on admission. Her medications (ACE inhibitor, statin and pregabalin) were stopped and she was started on methyldopa. She subsequently had multiple readmissions with poorly controlled hypertension and DKA; on one occasion she tested positive for cocaine. She had a caesarean section at 30 weeks and was readmitted two days after discharge with poorly controlled hypertension. Two months postpartum she was admitted again with DKA; at this point all her children were taken into care because of her poor self-management of diabetes and continued use of crack cocaine. She had a termination of pregnancy eight months later because of progressive complications of her diabetes. M

Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022

Pregnant people with diabetic ketoacidosis

- Diabetes with end organ disease and chronic hypertension
- Complex social issues
- Reactive not proactive care
- Outdated treatment of hypertension
- No coordinated multidisciplinary care

Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022

Pregnant people with diabetic ketoacidosis

New recommendations

Consider skills and drills training on the management of diabetic ketoacidosis in pregnancy to ensure that all maternity staff are aware of the symptoms and signs of diabetic ketoacidosis. **[ACTION: Service Planners/ Commissioners, Hospitals/Trusts/Health Boards]**.

Develop guidance on ketone testing in pregnancy and the subsequent response to an abnormal test **[ACTION: Royal Colleges of Obstetricians and Gynaecologists, Midwives, Physicians and General Practitioners]**.

Ensure that guidance on the management of diabetic ketoacidosis in pregnancy is included in all guidelines used outside of the maternity setting **[ACTION: Joint British Diabetes Societies for Inpatient Care]**.

Ensure the appropriate national Maternity Early Warning Score is used to monitor a pregnant woman wherever in the hospital she receives care **[ACTION: Service Planners/Commissioners, Hospitals/Trusts/Health Boards]**.

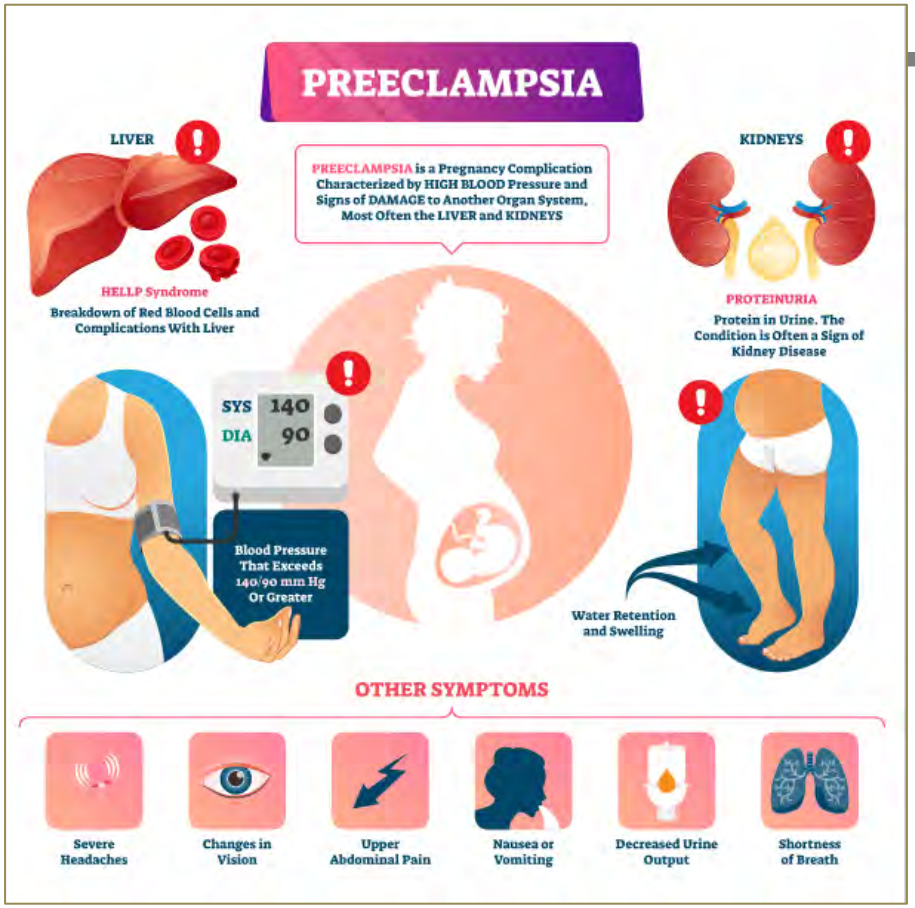
Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022

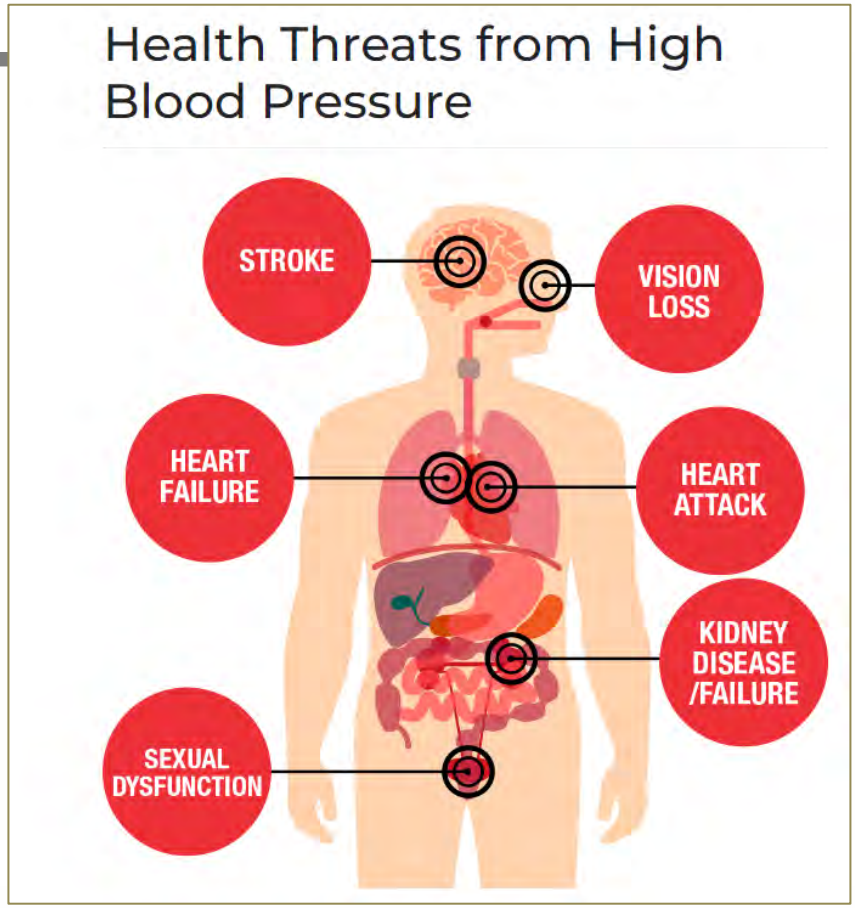
Pregnant people with cardiovascular disease

Symptoms and signs

An older white British woman was experiencing cough and wheeze when visited at home during the week after she gave birth. Her community midwife attributed this to the inhalational analgesia used during labour. The following week she presented to hospital with increasing symptoms, severe cardiomyopathy was diagnosed and she was admitted. Her condition deteriorated but her care was not escalated. She died a few days later. There was no post-mortem and the final definitive cardiac diagnosis was not clear. Cardiac genetic tests were not performed.

Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022





https://www.heart.org/en/health-topics/high-blood-pressure/health-threats-from-high-blood-pressure Viewed 7 May 2023

Hypertension

Complications of preeclampsia

Table 6.1: Causes of death among women who died from hypertensive disorders of pregnancy (1997-2020)

	1997-2002§	2003-8§	2009-14¶	2015-17¶	2018-20¶
Intracranial Haemorrhage	16	18	7*	3*	2**
Eclampsia/ cerebral oedema	0	6	3	1	2
Pulmonary oedema	3	0	0	0	2
Hepatic rupture	2	1	0	0	0
Hepatic Necrosis/HELLP	9	5	4*	2*	2**
AFLP	7	7	1	1	2
Total	37	37	14	6	8

*One woman died due to both intracranial bleed and HELLP syndrome.

**Two women died due to both intracranial bleed and HELLP syndrome.

§ Figures for UK only

¶ Figures for UK and Ireland but note no deaths occurred in Ireland in 2018-20

Five of the women who died were aged 30 or over and two women were obese (Table 6.2). Half of women who died were Black or Asian. One woman died from a hypertensive disorder of pregnancy following IVF. The majority of women died in the immediate postnatal period (Table 6.3).

During labour measure blood pressure hourly in women with hypertension

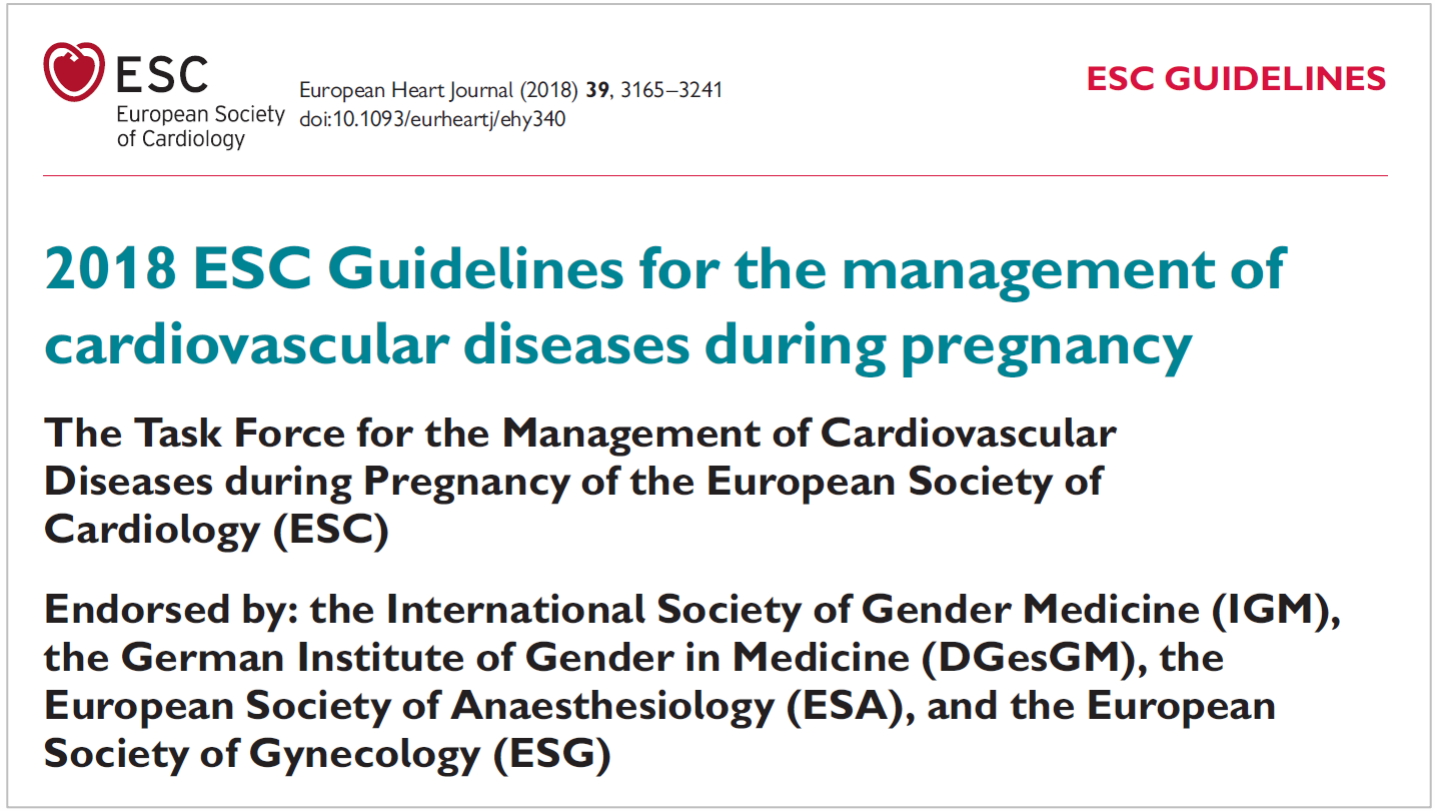
NICE Guideline NG133 Hypertension in pregnancy (National Institute for Health and Care Excellence 2019c)

Transfer the woman to obstetric-led care if any of the following are observed at any point, unless the risks of transfer outweigh the benefits:

- a single reading of either raised diastolic blood pressure of 110 mmHg or more or raised systolic blood pressure of 160 mmHg or more
- either raised diastolic blood pressure of 90 mmHg or more or raised systolic blood pressure of 140 mmHg or more on 2 consecutive readings taken 30 minutes apart

NICE Intrapartum care guideline CG190 (National Institute for Health and Care Excellence 2017)

Heart failure



ESC European Society of Cardiology

European Heart Journal (2018) **39**, 3165–3241
doi:10.1093/eurheartj/ehy340

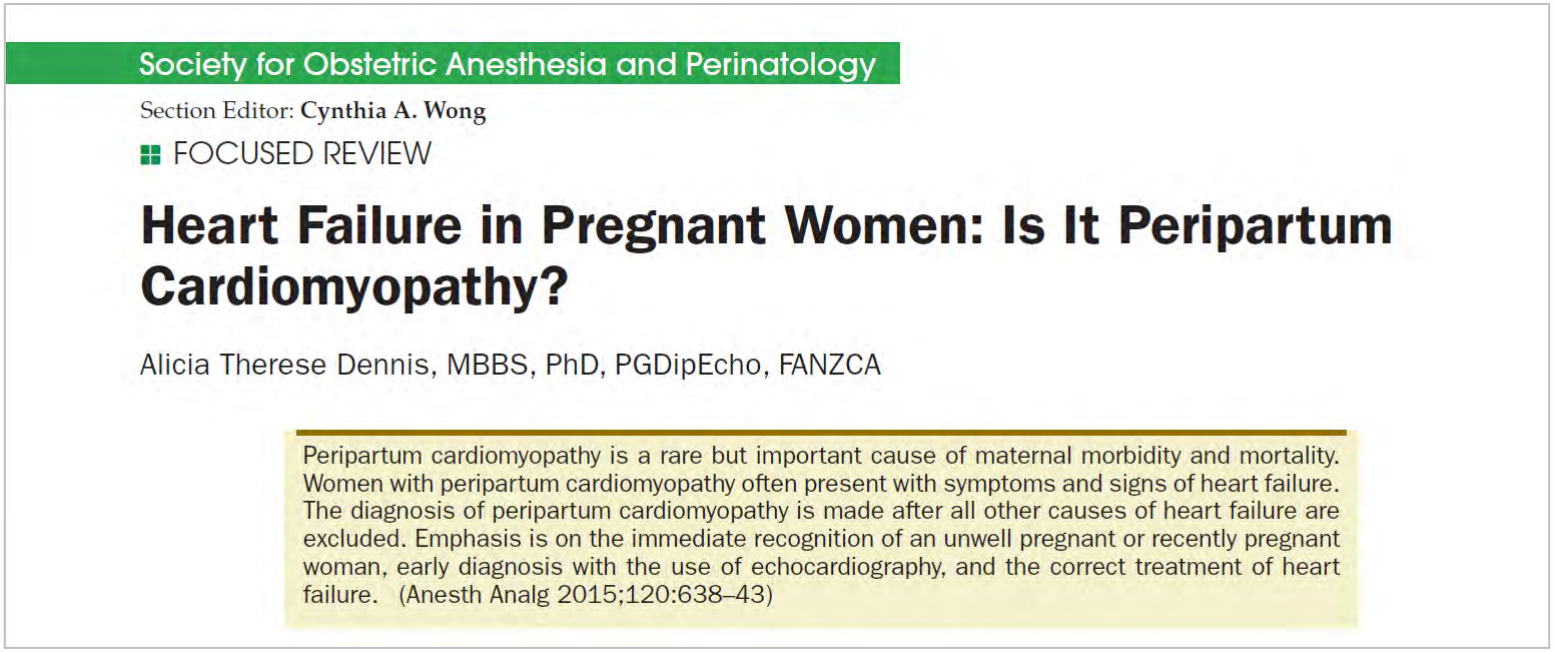
ESC GUIDELINES

2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy

The Task Force for the Management of Cardiovascular Diseases during Pregnancy of the European Society of Cardiology (ESC)

Endorsed by: the International Society of Gender Medicine (IGM), the German Institute of Gender in Medicine (DGesGM), the European Society of Anaesthesiology (ESA), and the European Society of Gynecology (ESG)

Heart failure



Society for Obstetric Anesthesia and Perinatology

Section Editor: **Cynthia A. Wong**

FOCUSED REVIEW

Heart Failure in Pregnant Women: Is It Peripartum Cardiomyopathy?

Alicia Therese Dennis, MBBS, PhD, PGDipEcho, FANZCA

Peripartum cardiomyopathy is a rare but important cause of maternal morbidity and mortality. Women with peripartum cardiomyopathy often present with symptoms and signs of heart failure. The diagnosis of peripartum cardiomyopathy is made after all other causes of heart failure are excluded. Emphasis is on the immediate recognition of an unwell pregnant or recently pregnant woman, early diagnosis with the use of echocardiography, and the correct treatment of heart failure. (Anesth Analg 2015;120:638–43)

Table 1. Cardiac Symptoms, Signs, and Investigations in Pregnant or Recently Pregnant Women

	Key considerations
Symptoms	
Agitation	May indicate hypoxemia
Cough	May indicate pulmonary congestion
Nausea and vomiting	Consider myocardial ischemia as atypical presentations are common in pregnancy
Breathlessness	Cardiac and respiratory causes need to be evaluated; consider pulmonary hypertension
Pain (chest, back interscapular, and epigastric)	Consider myocardial ischemia (coronary occlusion or dissection), ischemic heart disease, aortic dissection (especially Marfan syndrome), and pre-eclampsia
Signs	
Tachypnea	Respiratory rate must be measured
Tachycardia	Resting heart rates >100 bpm should be evaluated
Irregular heartbeat	
Hypotension	Consider systolic and/or diastolic heart failure, right heart failure, sepsis, and hypovolemic
Severe hypertension	Acute pulmonary edema may occur in the setting of critical hypertension (pre-eclampsia)
New heart murmur	Consider valvular heart disease, especially mitral stenosis
Additional heart sound	May be present in heart failure
Wheeze	Consider acute pulmonary edema as well as acute asthma
Febrile	The presence of fever should prompt examination and investigation for sepsis. Consider endocarditis, myocarditis, and rheumatic heart disease
Investigations	
Full blood examination	Assessment of blood smear, hemoglobin, platelet count, and white cell count
B-natriuretic peptide	Commonly elevated in heart failure
Cardiac enzymes	Elevated serum troponin may indicate myocardial ischemia
Arterial blood gases	Hypoxemia and metabolic acidemia may indicate low cardiac output
Chest x-ray	May shown cardiomegaly and pulmonary congestion
Electrocardiography	Heart rate and rhythm and ST-segment elevation or depression may indicate myocardial ischemia
Transthoracic echocardiography[a]	Cardiac structure and function, regional wall motion abnormalities, and reduced contractility may indicate ischemia/cardiac assessment of ejection fraction—preserved or reduced?
Computer tomography pulmonary angiography	Ventilation perfusion mismatching in the case of pulmonary emboli
Coronary angiograph with angioplasty with or without stenting	Myocardial infarction and ischemic heart disease—diagnosis and treatment
Cardiac magnetic resonance imaging	Cardiac structure and function/presence of ventricular thrombus

bpm = beats per minute.

[a]Transthoracic echocardiography or transesophageal echocardiography.

Adapted from Dennis A. Managing the pregnant woman with cardiac disease. In: Sia A, Chan YK, Gatt S. Obstetric Anaesthesia and Analgesia—Practical Issues. Singapore, Republic of Singapore: Singhealth Academy, 2012:222–35. ISBN 978-981-07-1475-8.

Table 2. Ten Management Principles for Managing a Woman with Heart Failure in Pregnancy

Management with a core supervising team
Manage with appropriately trained staff in the safest location
Ensure good lines of communication with the woman and the multidisciplinary team
Minimize cardiac work by optimal preload, contractility, lusitrophy, heart rate, rhythm, and afterload
Avoid aortocaval compression
Intensive hemodynamic monitoring
If general anesthesia is required, plan strategies to reduce the likelihood of hypertension, hypotension, arrhythmias, acute pulmonary edema, and cardiac arrest
If general anesthesia is required, plan strategies to manage hypertension, hypotension, arrhythmias, acute pulmonary edema, and cardiac arrest
Avoid oxytocin and ergometrine because these cause significant life-threatening cardiac complications
Plan a management strategy for the complication of hemorrhage, including mechanical methods of uterine compression, Bakri balloon tamponade, use of misoprostil, and consideration of hysterectomy

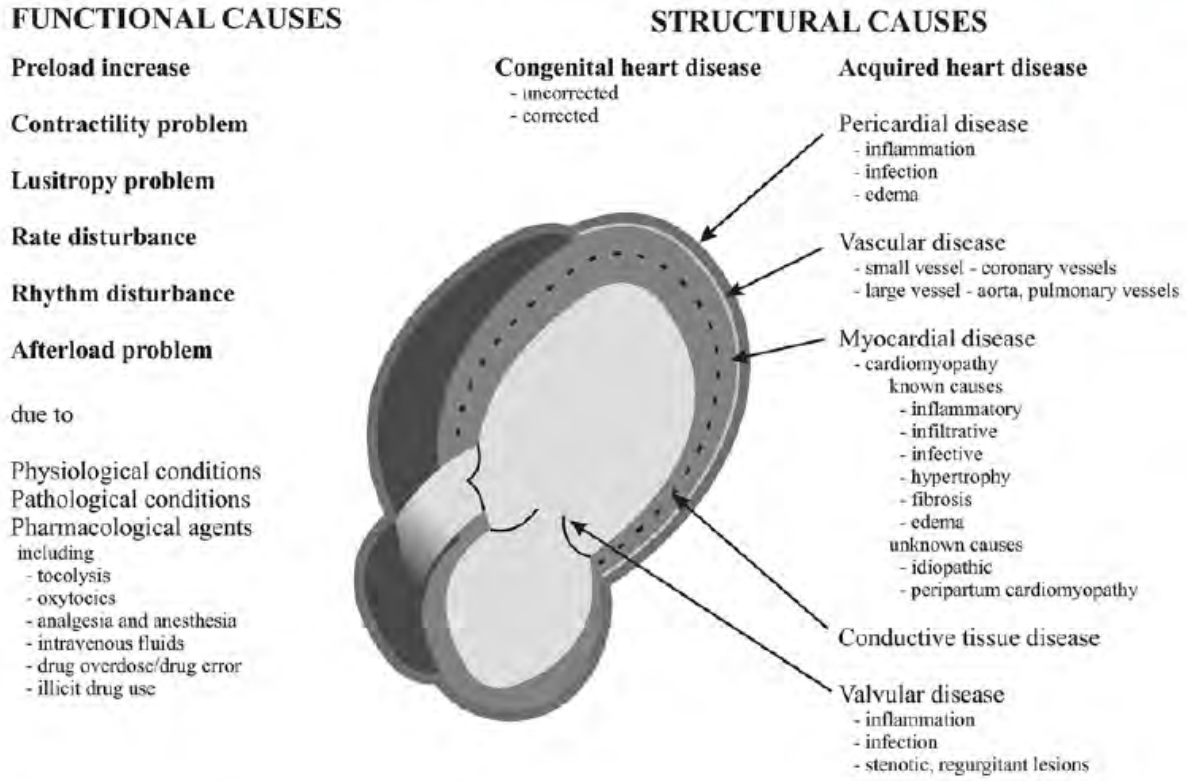


Figure 1. Causes of heart failure in pregnant or recently pregnant women. The causes of heart failure are divided into functional and structural causes. Abnormalities of function can be divided into the six categories of physiologic cardiac function, and the structural abnormalities can be divided into the major cardiac structural categories. Abnormalities of function may independently be a reason for the development of heart failure in pregnant women or may be combined with structural problems to cause heart failure. The diagnosis of peripartum cardiomyopathy is made after the exclusion of all known causes of heart failure.

International Journal of Obstetric Anesthesia (2016) 25, 4–8
0959-289X/$ - see front matter
http://dx.doi.org/10.1016/j.ijoa.2015.09.001

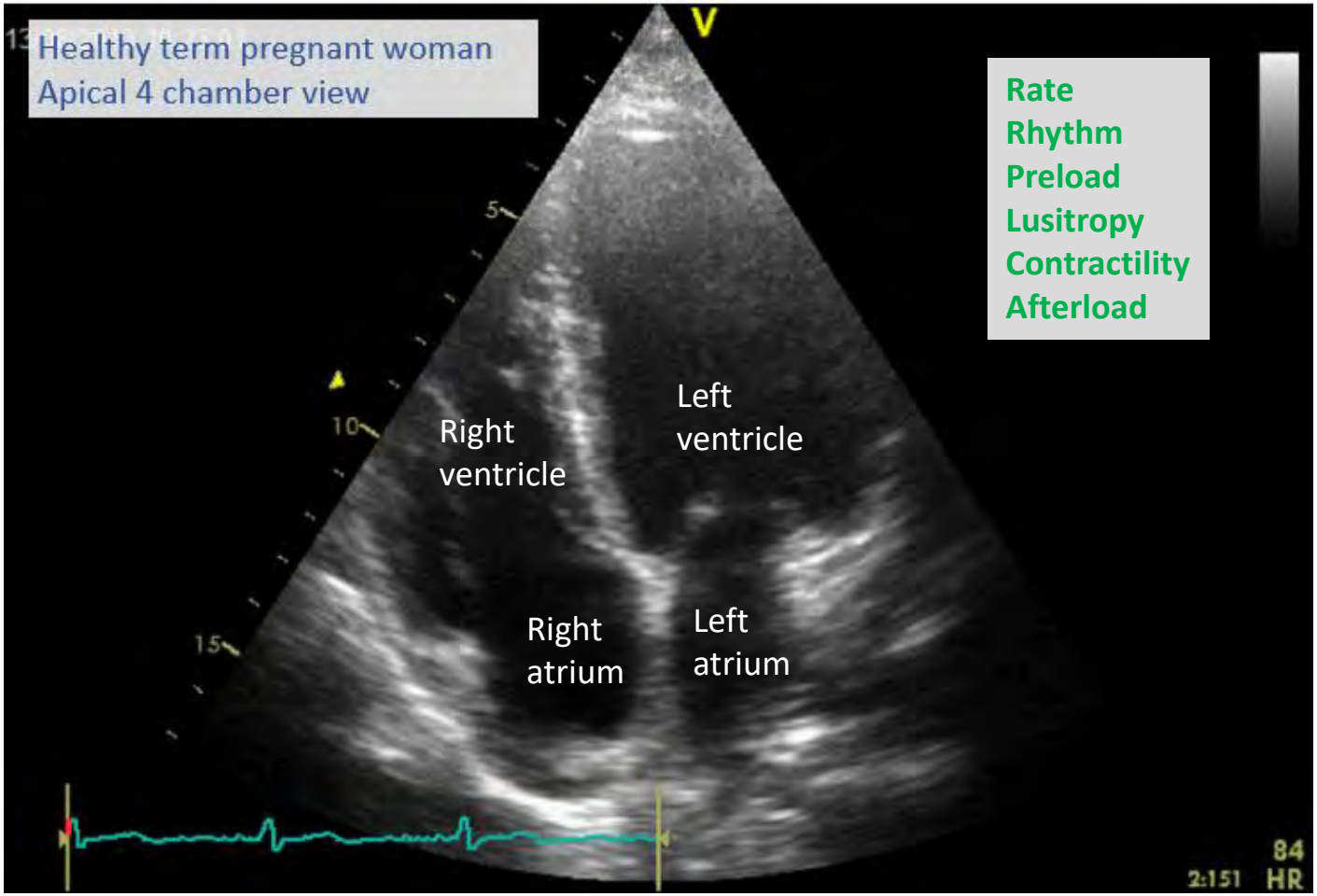
EDITORIAL

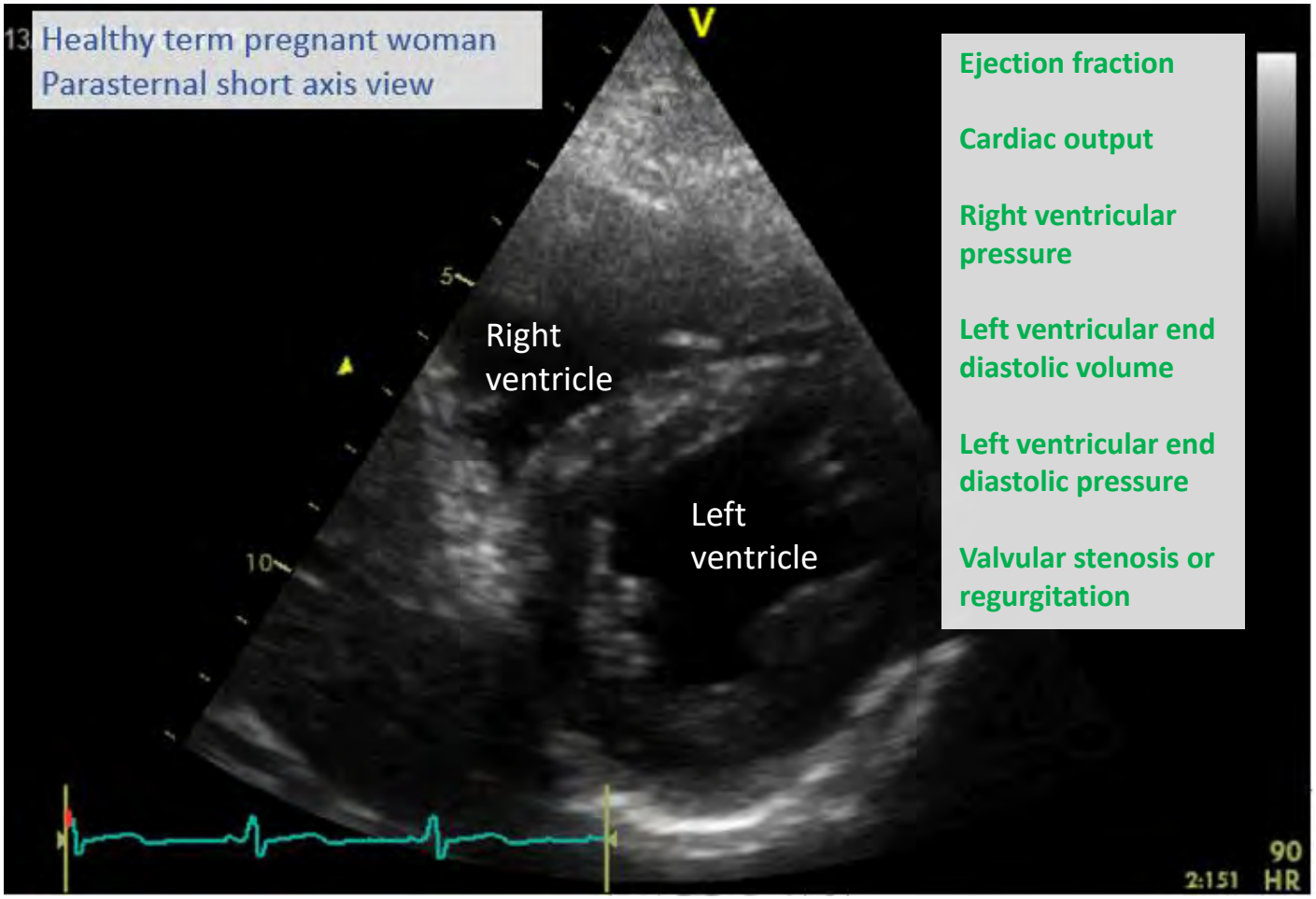
Valvular heart disease in pregnancy

10 questions to answer

1. What is the lesion and its underlying cause?
2. How severe is the lesion?
3. What are the likely complications of the lesion and what is the plan if these occur?
4. What are the treatment options for this lesion?
5. Does the lesion affect the mode of birth?
6. What is the effect of neuraxial analgesia and anaesthesia on the cardiovascular system?
7. What third stage management can the woman receive?
8. Is endocarditis prophylaxis needed?
9. What postnatal management is required?
10. What is the plan regarding future pregnancies?

*BEWARE MECHANICAL VALVE THROMBOSIS


Healthy term pregnant woman
Apical 4 chamber view
Rate
Rhythm
Preload
Lusitropy
Contractility
Afterload
Right ventricle
Left ventricle
Right atrium
Left atrium
84
HR


Healthy term pregnant woman
Parasternal short axis view
Right ventricle
Left ventricle
Ejection fraction
Cardiac output
Right ventricular pressure
Left ventricular end diastolic volume
Left ventricular end diastolic pressure
Valvular stenosis or regurgitation
90
HR

Dealing with diagnostic uncertainty - echocardiography

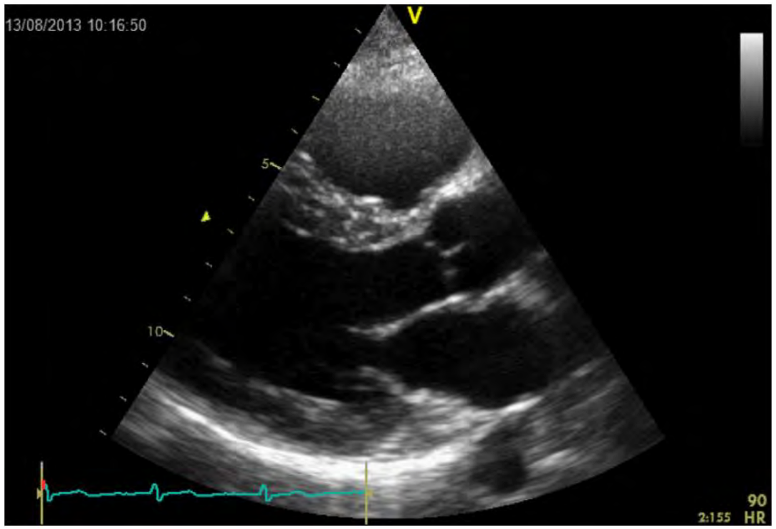
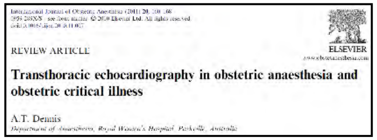


Table 2 Clinical scenarios in obstetric critical illness

	Clinical scenarios
Obstetric critical illness	Major obstetric haemorrhage Myocardial ischaemia Cardiac failure Sepsis Embolism – pulmonary, amniotic fluid, air Preeclampsia Coagulopathy Aortic dissection Respiratory emergencies (asthma) Endocrine emergencies Extreme obesity Trauma
Clinical symptoms and signs	Bleeding Unexplained tachycardia Hypotension Chest pain Shortness of breath Severe hypertension Fever Reduced conscious state Collapse
Clinical questions addressed with the use of TTE	What is the intravenous volume status? Are there regional wall motion abnormalities? What is the left ventricular contractility? Is there right ventricular outflow tract obstruction? What is the right ventricular size and contractility? Is there pericardial tamponade? Is there pulseless electrical activity? What is the fetal heart rate?


REVIEW ARTICLE

Transthoracic echocardiography in obstetric anaesthesia and obstetric critical illness

A.T. Dennis


EACVI appropriateness criteria for the use of transthoracic echocardiography in adults: a report of literature and current practice review


APPROPRIATE USE CRITERIA

ACC/AATS/AHA/ASE/ASNC/HRS/SCAI/SCCT/SCMR/STS 2019 Appropriate Use Criteria for Multimodality Imaging in the Assessment of Cardiac Structure and Function in Nonvalvular Heart Disease

Dealing with diagnostic uncertainty – echocardiography

HYPERTENSION AND BREATHLESSNESS

Category of heart failure

Is it HFpEF or HFrEF?

HYPOTENSION

Is it HFrEF or Hypovolaemia?

World Hypertension Day

World Hypertension Day will be held this year on May 17, 2023.

In 2023, the theme is **Measure Your Blood Pressure Accurately, Control It, Live Longer**, focusing on combatting low awareness rates worldwide, especially in low to middle income areas, and accurate blood pressure measurement methods.

Pregnant people with cardiovascular disease

New recommendations

Wheeze can be due to pulmonary oedema. Consider wheeze which does not respond to standard asthma management and exertional syncope as red flag symptoms of cardiovascular disease in addition to orthopnoea and chest pain **[ACTION: All health professionals, Professional education programmes]**.

Be aware of the common risk factors for heart disease and venous thromboembolism, such as extreme obesity, and consider on an individual basis whether women should be made aware of the symptoms and signs of heart disease as well as those of venous thromboembolism **[ACTION: All health professionals, Professional education programmes]**.

Ensure maternal medicine networks and their equivalents in the devolved nations and Republic of Ireland can provide appropriate expertise and supervision for all women, including those in rural/remote areas. **[ACTION: Service Planners/Commissioners, Hospitals/Trusts/Health Boards]**.

Develop guidance for the use of Brain Natriuretic Peptide measurement in pregnancy **[ACTION: Royal Colleges of Obstetricians and Gynaecologists and Physicians]**.

Be aware that women using oral anticoagulation with warfarin may be more safely managed without transition to low molecular weight heparin treatment when having an early termination of pregnancy **[ACTION: All health professionals, Professional education programmes]**.

Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022

Early pregnancy disorders

- Ectopic pregnancy
- Miscarriage

Early pregnancy disorders

Managing pregnancy of unknown location

A vulnerable woman presented to the emergency department with a suspected miscarriage. She had taken photographs of the expelled products. She had an ultrasound scan, which showed an empty uterus, and no adnexal masses. Speculum examination confirmed a closed cervical os. Based on these findings and the photographs she was told she had a complete miscarriage and discharged home with the advice to repeat a pregnancy test in two weeks. She was not given any written information and did not have a current GP. She was found dead three weeks later. Post-mortem confirmed intra-abdominal haemorrhage secondary to ruptured ectopic pregnancy.

FAST scanning

An ethnic minority woman who was known to be pregnant collapsed in the community with abdominal pain. She was brought to the emergency department where she had a cardiac arrest. She was noted to have a very low haemoglobin but was thrombolysed for presumed pulmonary embolism. A FAST scan was not carried out. Her ectopic pregnancy was diagnosed at a subsequent laparotomy undertaken when signs of bleeding became more evident, but she continued to deteriorate and died.

Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022

Early pregnancy disorders

New recommendations for care

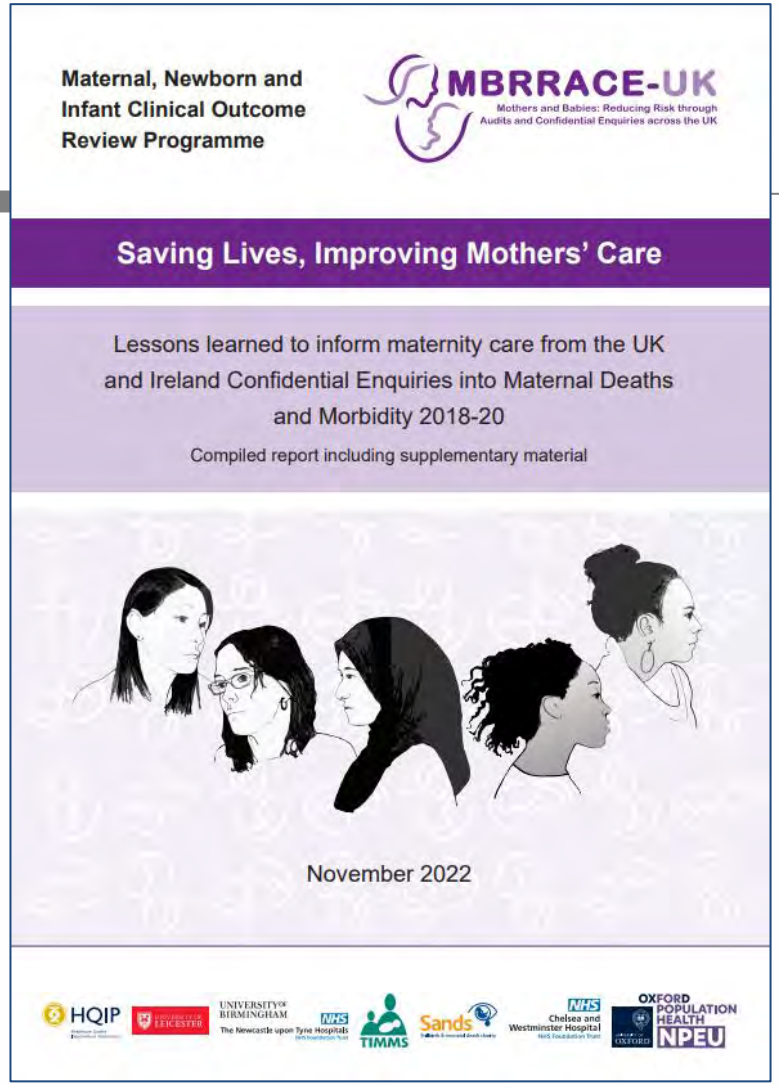
Vulnerable and young women remain disproportionately represented amongst those who have died from ectopic pregnancy. Ensure care is personalised to provide appropriate additional safety measures **[ACTION: Service Planners/Commissioners, Hospitals/Trusts/Health Boards]**.

Knight M, Bunch K, Patel R, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care Core Report - Lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2018-20. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2022

Critical Care

Key new recommendation:

"Involve the critical care team in antenatal multidisciplinary team planning for women with serious morbidity who are anticipated to require admission to intensive care after giving birth"



Critical Care

Postoperative care

Location of postoperative care

Anaesthesia 2023, 78, 758-769 doi:10.1111/anae.15948

Review Article

Current perspectives on maternity critical care

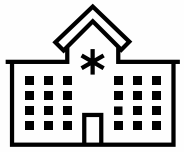
K. Cranfield,[1] **D. Horner,**[2] **M. Vasco,**[3,4] **G. Victory**[5] and **D. N. Lucas**[6]

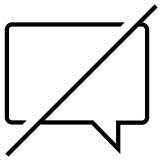
1 Consultant, Department of Critical Care, Royal Victoria Infirmary, Newcastle-upon-Tyne, UK
2 Consultant, Department of Anaesthesia and Critical Care, Bradford Teaching Hospitals Foundation Trust, Bradford, UK
3 Chairman, Constitution Committee and WFSA, Medellin, Colombia
4 Consultant, Department of Anesthesia, Universidad CES, Medellin, Colombia
5 Patient, London, UK
6 Consultant, Department of Anaesthesia, London North-West University Healthcare NHS Trust, London, UK

Delivery Suite	Critical Care	Medical Ward
Pros	**Pros**	**Pros**
∧ Familiar with pregnant patients	∧ Confident management of unwell patients	∧ Confident management of multiple medical conditions
∧ Confident prescribing in pregnancy	∧ Invasive monitoring	∧ Partner/baby may be welcome/co-located
∧ Staff nearby if woman goes into labour	∧ Additional organ support	∧ Nursing/medical staff familiar with wide range medical conditions
∧ Parents + baby co-located	∧ 1:1 nursing support	
∧ Confident management of pregnancy related-syndromes e.g. PET	∧ High consultant presence	**Cons**
∧ High consultant presence	**Cons**	∨ Not all staff comfortable with pregnant patients
Cons	∨ Not all staff comfortable with pregnant patients	∨ Lack confidence prescribing pregnancy
∨ May not be confident with unwell patients	∨ Lack confidence prescribing pregnancy	∨ Lack awareness MEOWs parameters
∨ Possibly no nursing staff	∨ Lack awareness MEOWs parameters	∨ Partner/baby often not co-located
∨ May not be co-located with ICU	∨ Partner/baby often not co-located	∨ Support if in labour
∨ Lack of access to physicians	∨ Support if in labour	

The future – improving care through collaborations

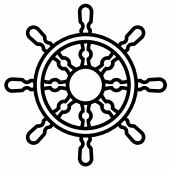
10-point plan

1. 
Integrate pregnant people into mainstream medicine

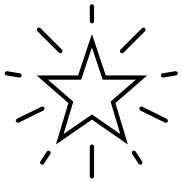
2. 
Eradicate historical pregnancy language

3. 
Achieve universal truthful pregnancy education

4. 
Ensure individualised person centred care

5. 
Implement what we know

6. 
Combat inequity

7. 
Promote science

8. 
Advocate for excellence

9. 
Develop collaborations

10. 
Create safe workplaces

Infirmary at The Royal Women's Hospital Melbourne 1912

Sex and suffering : women's health and a women's hospital : the Royal Women's Hospital, Melbourne, 1856 - 1996 / Janet McCalman Carlton, Vic.: Melbourne University Press, 1999 420 p., ill., ports. ; 25 cm. ISBN 0522849024 (paperback)

Acknowledgments and funding

Australian and New Zealand College of Anaesthetists

Faculty of Pain Medicine

Academic Enhancement Grant

ANZCA 2019 The Elaine Lillian Kluver Research Award

Australian Government National Health and Medical Research Council NHMRC

Edwards

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MOWBRAY maternity | kraam | sobelekiso
To be the BEST in what we do

Pregnant people

Peter Mac
Peter MacCallum Cancer Centre
Victoria Australia

ST VINCENT'S HOSPITAL MELBOURNE

ASA
Australian Society of Anaesthetists

Western Health

the women's
the royal women's hospital
victoria australia

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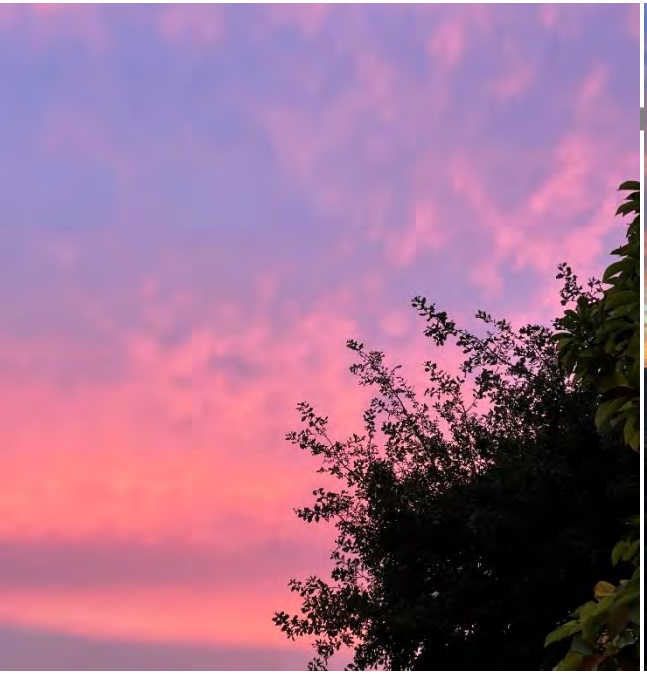


Thank you

THE UNIVERSITY OF MELBOURNE

Critical Care Connections

Department of Critical Care

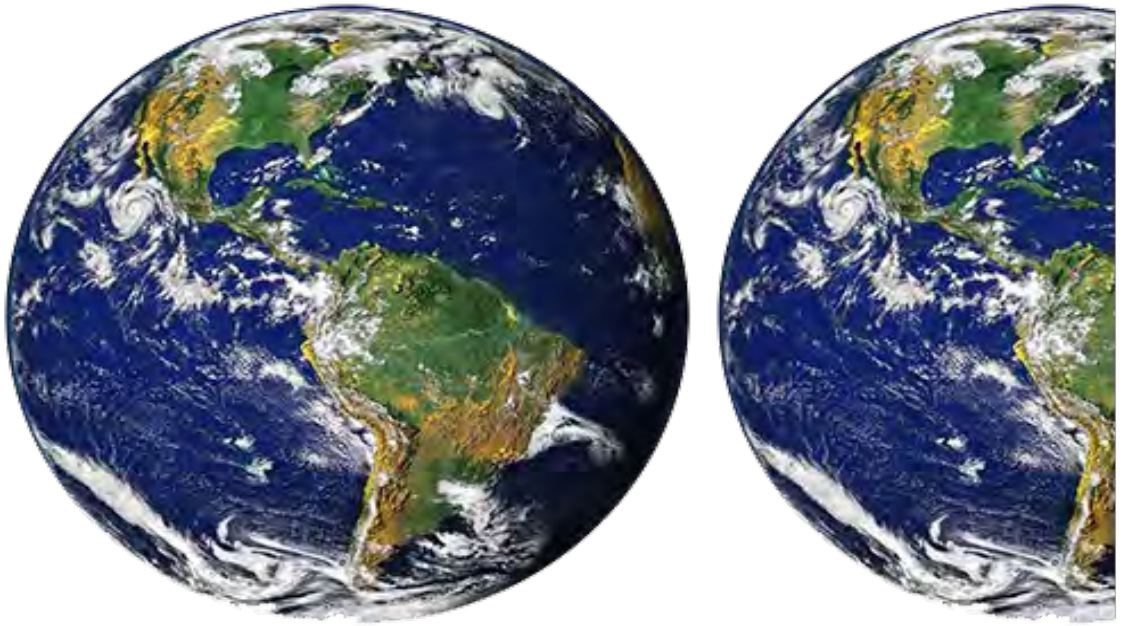
Wednesday 7th June 2023

Critical Care + Carbon Care: Challenges + Opportunities

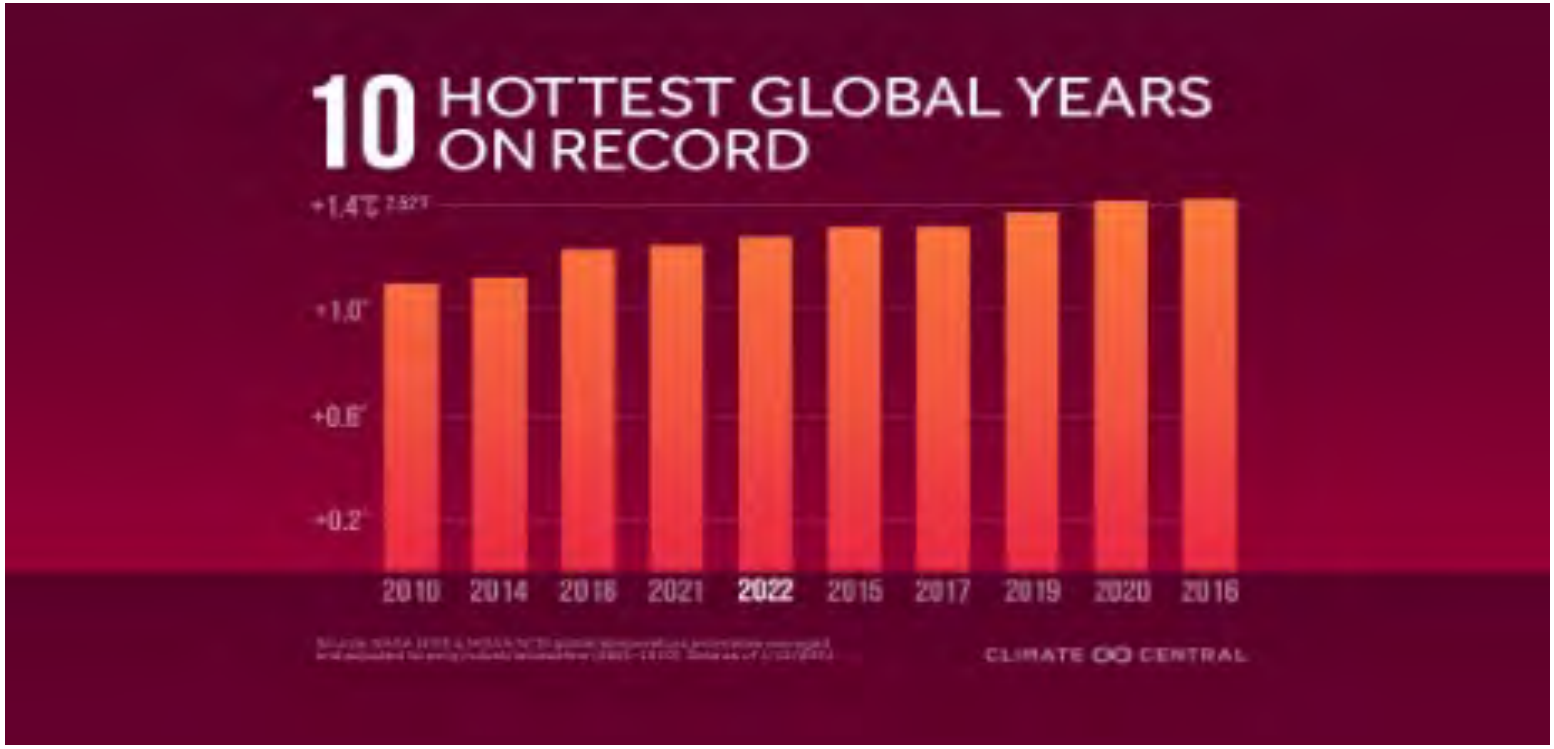
Eugenie Kayak
FANZCA, MBBS, MPH, MSc.

Enterprise Professor, Sustainable Healthcare,
Department of Critical Care,
The University of Melbourne.

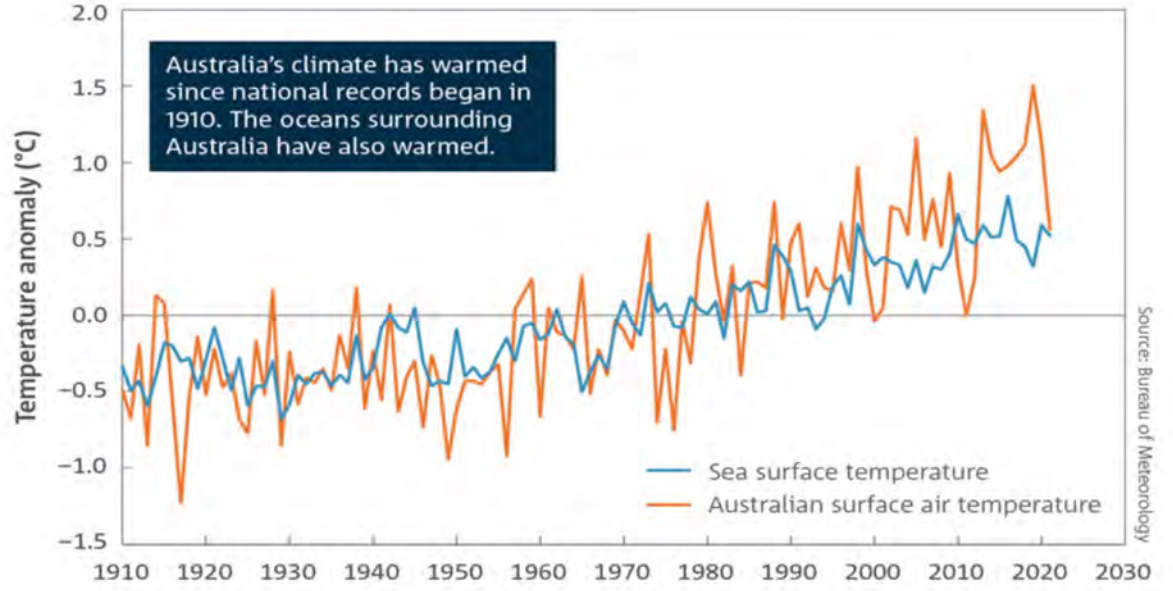
Co-convenor, Sustainable Healthcare,
Doctors for the Environment Australia (DEA).



Healthy Planet, Health People



2016 hottest on record….2020 second…2019 third hottest



Climate Crisis = Health Crisis....Critical

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Climate change the greatest threat the world has ever faced, UN expert warns

21 October 2022

"the biggest health threat facing humanity"

World Health Organization

ipcc
INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2022

"it is a file of shame, cataloguing the empty pledges that put us firmly on track towards an unliveable world."

"fast track to climate disaster"

UN Secretary-General Antonio Guterres 2022

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Home / Media / Climate change is a health emergency

MEDIA RELEASE

Climate change is a health emergency

Published 3 September 2019

The AMA has joined other health or
British Medical Association, and Do
emergen

Climate Health Emergency

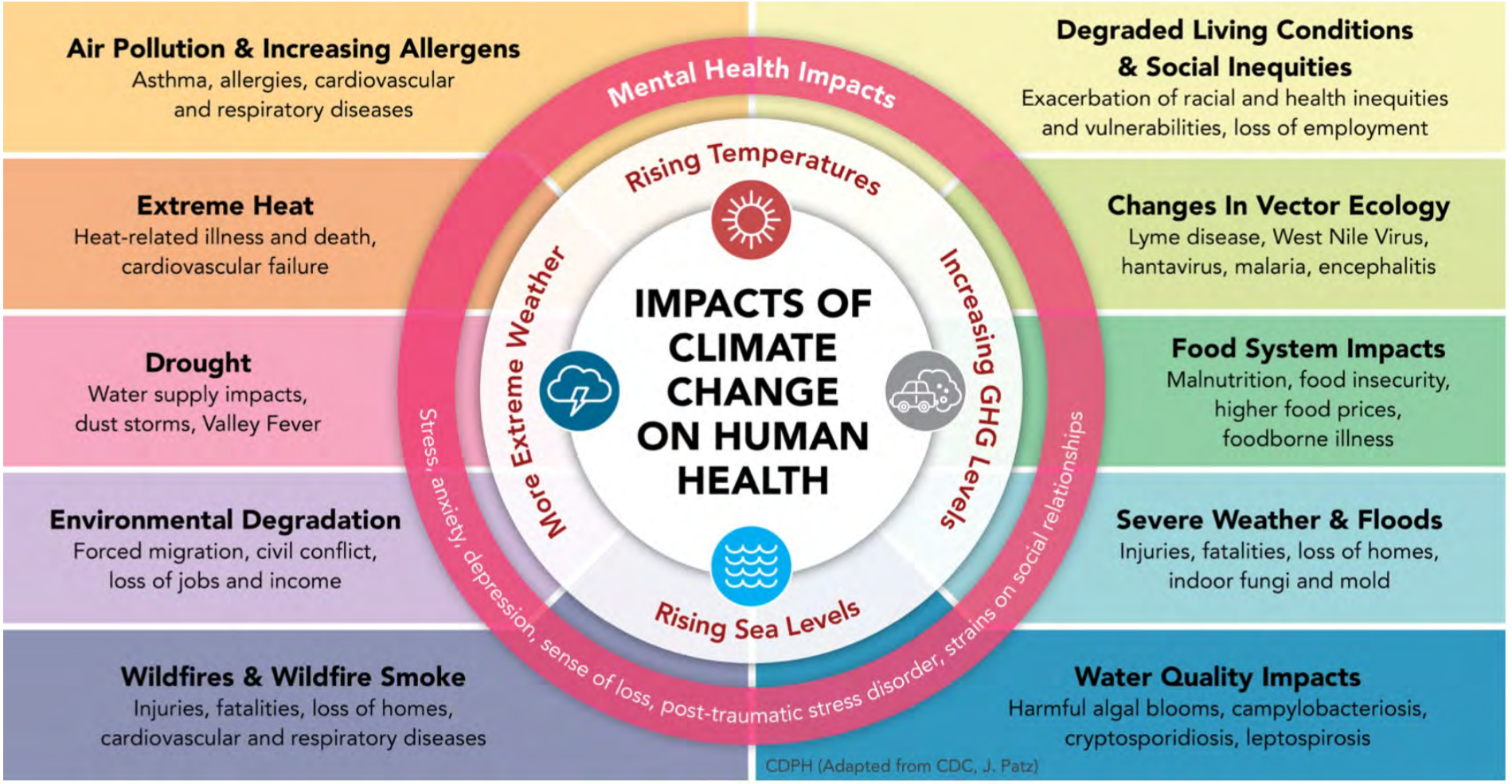
AUSTRALASIAN COLLEGE FOR EMERGENCY MEDICINE
ACEM

COLLEGE OF INTENSIVE CARE MEDICINE OF AUSTRALIA AND NEW ZEALAND

ANZCA FPM

Impacts human health - fundamental determinants:

freedom from disease + trauma,
air, water, food and shelter.



The challenge…

Healthcare sector carbon footprint

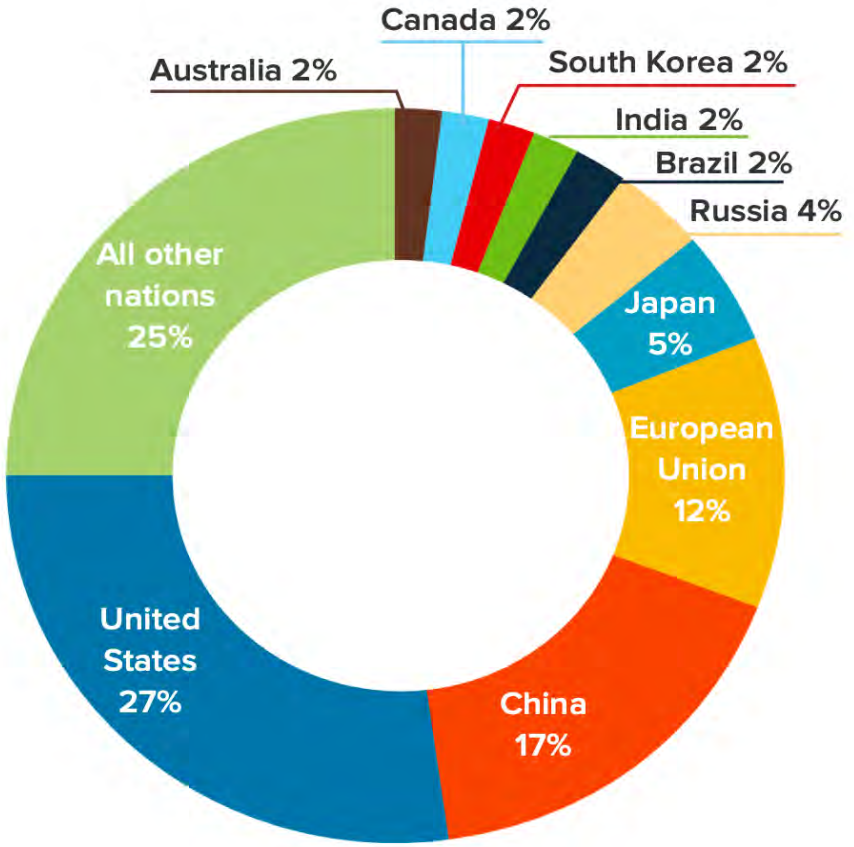
A problem

Globally

4-6% GHG emissions (4.4%)

if a nation 5th largest national emitter

Lancet Planet Health 2020; 4e:271-79
Health Care's Climate Footprint. 2019 HCWH/ ARUP report.



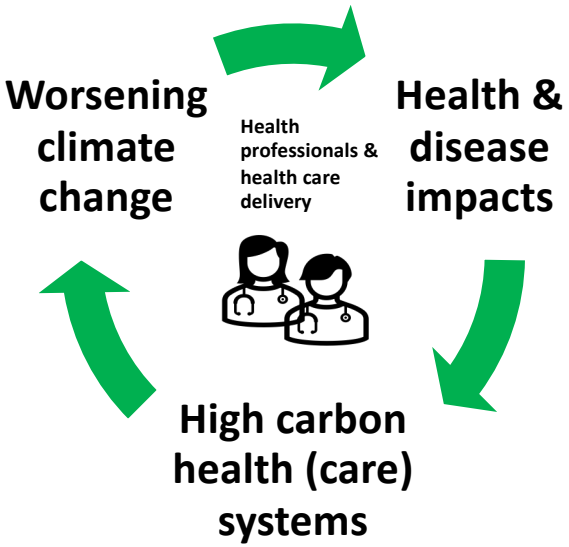
10 top emitters as percentage of global health care footprint (HCWH, ARUP 2019)

Australia

>7% of **Australia's** total CO_2e emissions

35.8 Mt CO_2e emissions (2014/15)
(Malik et al. 2018)

Health Care + Carbon Care:
the ethical paradox (part of the problem)



AMA Journal of Ethics®
October 2022, Volume 24, Number 10: E1004-1012

*Healing mission, **'do no harm,'** yet contribute to pollution and exacerbate environmental disease burden.* *(A Collins, S Demorest)*

Responsibility and opportunity - transform health systems to net zero (urgently)

Decouple health development (quality healthcare) from carbon emission increases

The challenge…

Healthcare sector goals

- **Net zero emissions by 2040**
- **80% reduction by 2030**

- **Minimise carbon health risk (resilience)** support (future) healthy populations.

Joint statement - Medical Professionals call for emissions reduction in health care

18 Mar 2021

AMA and Doctors for the Environment

The Australian Medical Association (AMA) and Doctors for the Environment Australia (DEA) are today calling on the Australian healthcare sector to reduce its carbon emissions to net zero by 2040, with an interim emission reduction target of 80 per cent by 2030.

Greener NHS

AMA

Doctors for the Environment Australia

ANMF Australian Nursing & Midwifery Federation VICTORIAN BRANCH

Royal Australasian College of Surgeons

RANZCO The Royal Australian

GENERAL SURGEONS AUSTRALIA

ANZSVS Australian and New Zealand Society for Vascular Surgery

RMSANZ Rehabilitation Medicine Society of Australia and New Zealand

Australian Society of Plastic Surgeons

AUSTRALIAN AND NEW ZEALAND HEAD & NECK CANCER SOCIETY

Health system + staff – *part of the solution*…

Opportunities: be part of the solution - acting + leading - **influence**

…. underutilized (essential) resource in race TO NET ZERO

Health sector
Shear size and reach – GDP (10% global), purchasing (food), employment, buildings, energy, transport and operations.

Health professionals
Agency - health emergency.
Trusted, respected voice and communicators.

Advocate - history of influencing policy/standards to improve + protect health - **prevention.**

Educate - climate health risk, sustainable healthcare practices, health co-benefits of mitigation.

Research/innovate - climate health risk, sustainable healthcare practices, carbon foot printing (LCAs).

Advance healthcare – addressing clinical practices (sustainable models of care/evidence-based care) + supply chain footprint – **implementation/innovation – clinical choices matters**.

Influence - healthcare facilities/operations and emission reduction targets (ERTs) **- work matters.**

Translate into action … BAU is not an option

Advocate

Communique

Australian doctors call for more leadership from governments and the healthcare sector for urgent action on climate change to protect health *August 2022*

1. A net zero Australian healthcare system by 2040 with majority of emission cuts by 2030.

2. The development of a national climate change and health strategy to facilitate planning for climate health impacts, which the federal government has committed to.

3. Establishing a National Sustainable Healthcare Unit to support environmentally sustainable practice in healthcare and reduce the sector's own emissions.

4. Education of current and future doctors to:
   a. be well equipped to care for patients and populations impacted by the adverse health effects of climate change, and
   b. provide sustainable health care to support sector-wide emissions reduction.

5. Collaboration on climate change mitigation strategies with populations most at risk of climate-related adverse health impacts, such as **Aboriginal and Torres Strait Islander peoples.**

Source: AMA/DEA Communique climate change and sustainability. August 2022.
https://www.ama.com.au/media/governments-and-healthcare-sector-must-lead-climate-change-ama-and-dea-say

Educate

World Health Organization

THE GLOBAL CLIMATE & HEALTH ALLIANCE

WHO-CS Working Group to advance action on Health and Climate Change

A call for strengthening climate change education for all health professionals

An open letter to universities and all education stakeholders

Australian Medical Council Limited

Medical Schools 2024 ✔

Teaching Hospitals 2024 ✔

Speciality Colleges 2025 ●

THE MEDICAL JOURNAL OF AUSTRALIA

MJA

A planetary health–organ system map to integrate climate change and health content into medical curricula

Health professionals must be prepared to address the health risks and impacts of climate change

Educate

Climate change can be seen through a disaster medicine lens

George Braitberg

Med J Aust 2022; 217 (9): 464-465. || doi: 10.5694/mja2.51730
Published online: 10 October 2022

THE MEDICAL JOURNAL OF AUSTRALIA
MJA

Healthcare Carbon Literacy Workshop & Life Cycle Analysis (LCA) Masterclass

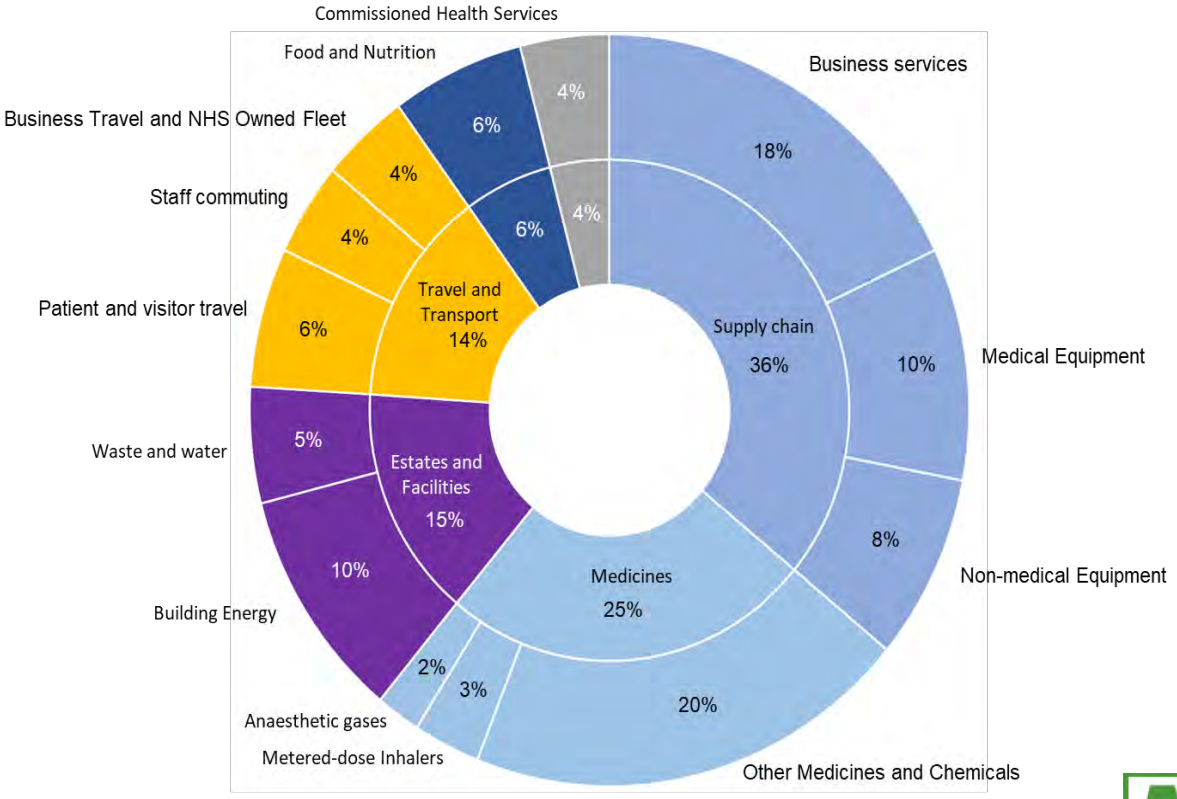
Monday
3rd April
2023

Presented by: Dr Scott McAlister, A/Prof Forbes McGain & Prof Eugenie Kayak
Department of Critical Care www.medicine.unimelb.edu.au/critcare @CritCareUnimelb

Educate + Research

Healthcare sector decarbonisation – hot spots

Sources of carbon emissions by proportion of NHS Carbon Footprint plus.
NHS: Delivering a 'Net Zero' National Health Service (2020).



NHS CO_2 emission sources:

- **>65 % procurement of goods and services**
  - 25 % medicines
  - 10 % medical equipment
  - 8 % non-medical equipment (eg. paper)
- 10 % powering of buildings
- 14 % travel
- 5 % water + waste

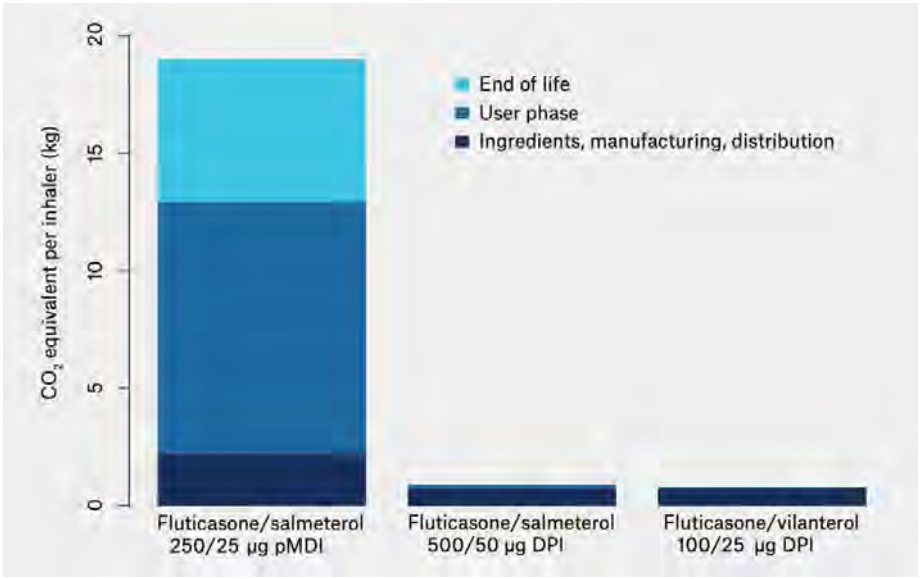
"Suppliers (80,000) to meet net zero commitment by end of decade"

Net zero: 2045
80% reduction before 2040

Research + Clinical Practice Changes

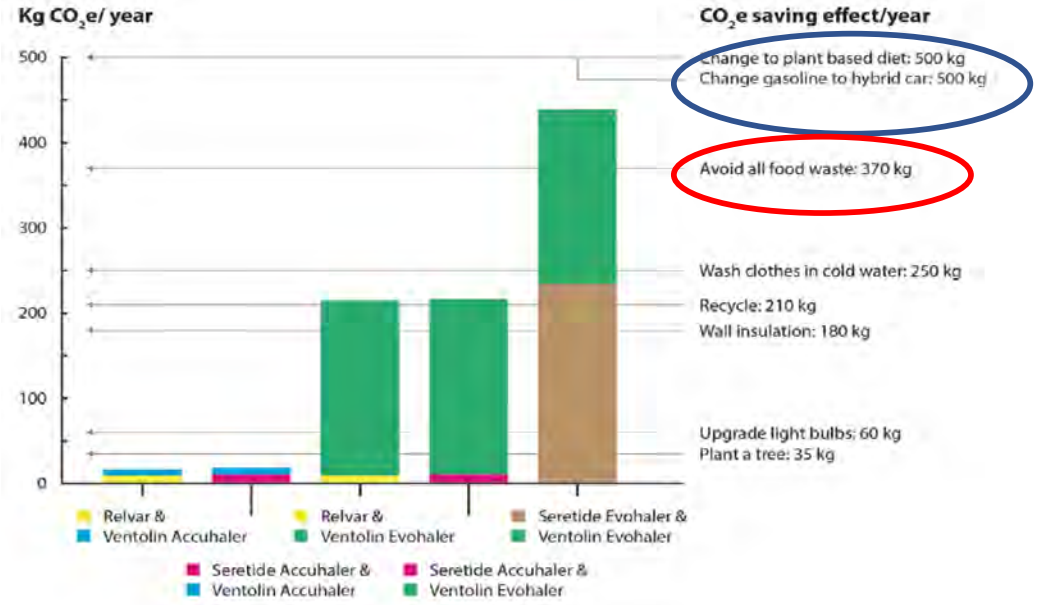
Metred Dose Inhalers – carbon footprint

Relative equivalent CO_2 per 30 day treatment with an inhaler



Montgomery and Blakey, AJGP Vol 51(12) Dec 12.2022

CO_2e relative to other activities



Janson C, et al. Carbon footprint impact of the choice of inhalers for asthma and COPD. *Thorax* 2020;**75:**82-84

Dry powder options – **chart as 'DPI'** if clinically applicable.
(exclude children <6 and low inspiratory flow).

Sweden <13% of asthmatics get MDIs, the rest prescribed dry powder inhalers

Graphic 2: thank-you Hayden Burch

Research + Clinical Practice Changes

Anaesthetic gases – carbon footprint

5% - anaesthetic gases (NHS acute care hospitals)

Shelton et al., BJA 2020. Desflurane in modern anaesthetic practice: walking on thin ice(caps)?

Removed Desflurane (Australia)

Association of Anaesthetists

NHS England

NHS SCOTLAND

Joint statement on NHSE's plan to decommission desflurane by early 2024

RCoA Royal College of Anaesthetists

Research + Influence

Nitrous oxide project

Association of Anaesthetists

- 2 NHS hospitals (Scotland) – 1.5 mill litres N_20 per annum
- 16 sites – waste / leakage **13.7 mill litres per annum**
- **95% of total collective annual volume of volume**

CENTRE for SUSTAINABLE HEALTHCARE
inspire • empower • transform

Western Australia

Green Theatres Network

KN$_2$OW NiTROUS

Discrepancy between procurement and clinical use of nitrous oxide: waste not, want not

BJA. 26 Nov 2021.

Richard Seglenieks[1,2,*], Angela Wong[1], Fiona Pearson[3] and Forbes McGain[1,2,4]

Footscray Hospital

- 77% discrepancy between procurement and clinical use of N_2O (160,000 litres)
- ≈ >75,000kg $C0_2e$
- ≈ 600,000 km average car
- ≈ Sevoflurane 10hr/d, 6 ORs, 2.5yrs.

Research + Clinical Practice Changes?

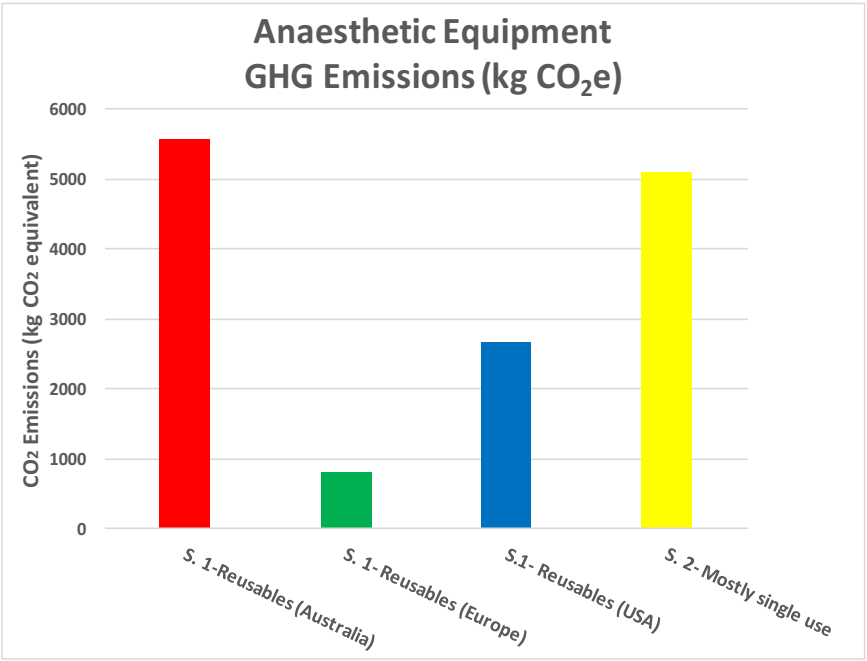
Financial and environmental costs of reusable and single-use anaesthetic equipment

F. McGain[1,2,*], D. Story[3], T. Lim[1] and S. McAlister[4]

British Journal of Anaesthesia, 118 (6): 862–9 (2017)
doi: 10.1093/bja/aex098
Advance Access Publication Date: 15 May 2017
Clinical Practice

Western Health

- changed from single use to **reusable operating room** circuits, face masks, plastic trays and other anaesthetic equipment
- **>$6000 per OR per annum**.
- saving $100,000 per annum
- BUT no environmental advantage

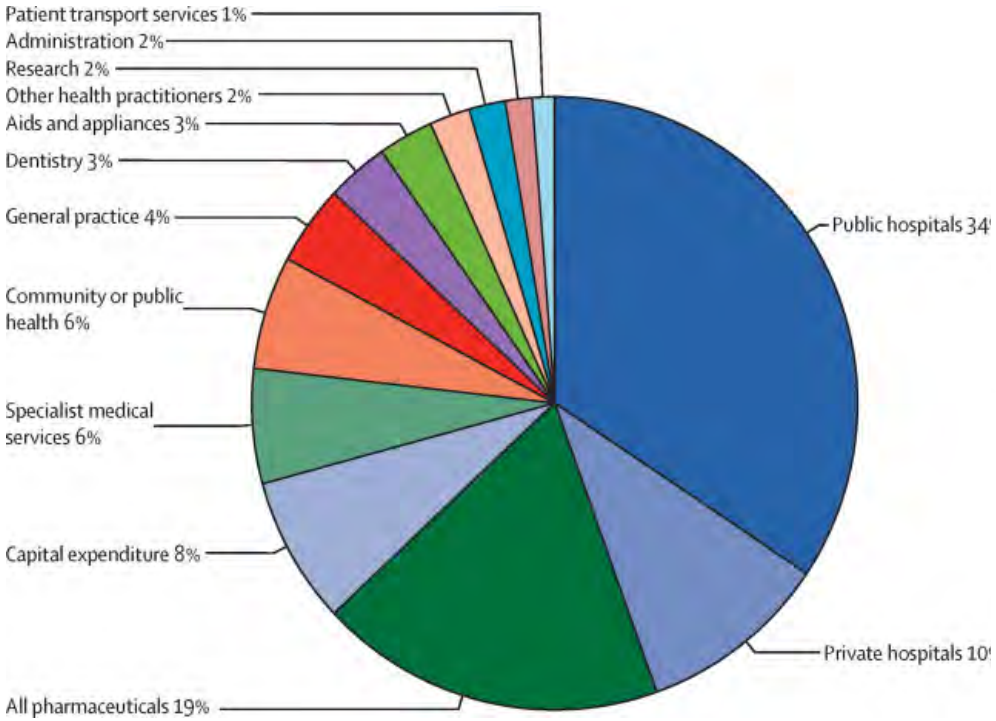


Studies of reusable vs single use, reusable products consistently save $$

RENEWABLE energy makes REUSABLE better.

Research *The challenge…*where do emissions come from??

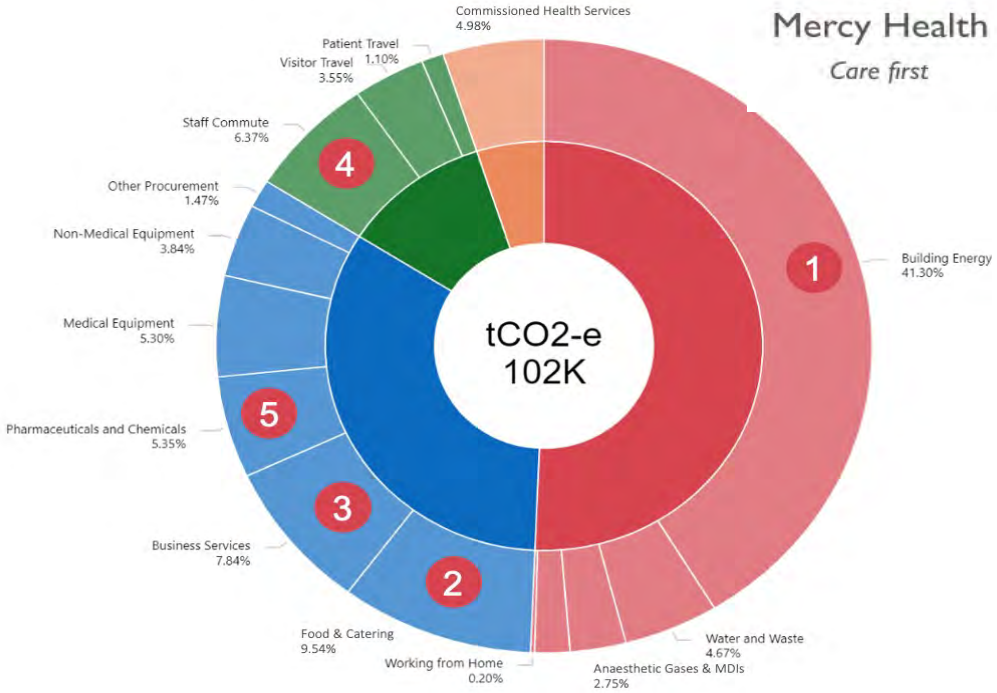
Carbon footprint of Australian healthcare



(Malik et al. 2018)

+ direct impact of anaesthetic gases
+ staff travel

Mercy Health
Care first

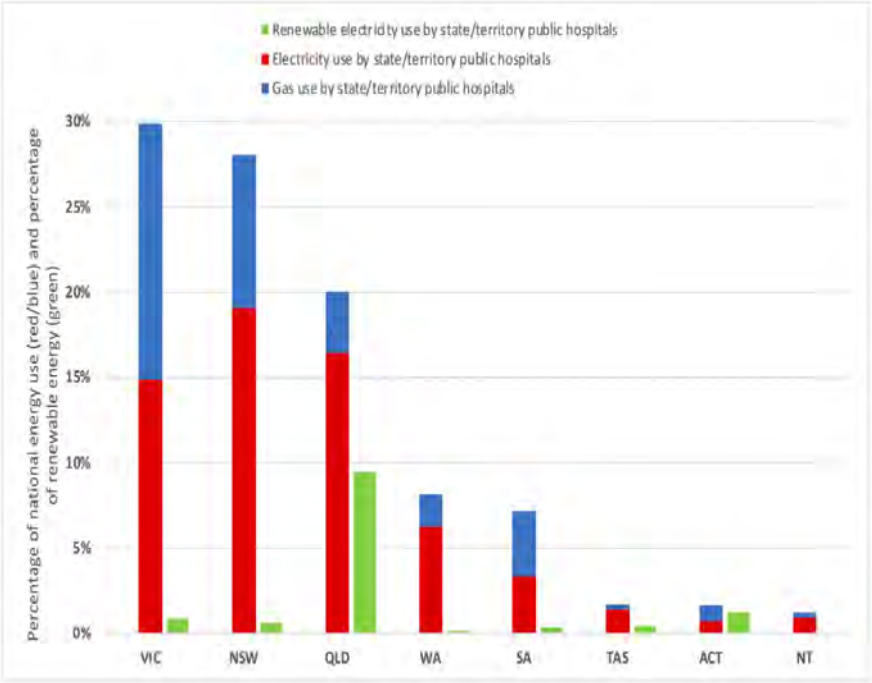


Top 5 carbon hot spots	% MH FY 21
Building energy (Elect/Gas/Refrig)	41%
Food & Catering	10%
Business services	8%
Staff commute	6%
Pharmaceuticals & chemicals	5%

Acknowledge Mercy Health (Jenny Smith/Sharon Desmond)

Research + Influence

Energy source for Australian public hospitals 2018/19



Burch H, Anstey M, McGain F. "Renewable energy use in Australian public hospitals." MJA (2021).

Decarbonise healthcare delivery, facilities and operations

GreenPower®

All electric hospitals…
no gas

Canberra

Adelaide

Melton (Vic)

Research + Innovation

NSW GOVERNMENT | Health

Climate Risk & Net Zero Unit

"Kick start" high impact innovative projects to improve patient care and reduce environmental footprint.

- **Clinical care transformation**: including but not limited to carbon hotspot areas of anaesthetics, metered dose inhalers and critical care emissions.
- **Travel and transport:** including but not limited to staff, patient and business transport emissions reductions and innovations to reduce care-related travel.
- **Energy and Assets**: including but not limited to energy efficiency, energy consumption reduction, resource (including gas use) emissions reduction, water consumption reduction.
- **Procurement and Waste:** improve processes, reduce waste and/or emissions related to procurement practices.
- **Pharmaceuticals and Medicines:** improve quality, safety and reduce emissions in prescribing; reduce waste and/or emissions in medications management.

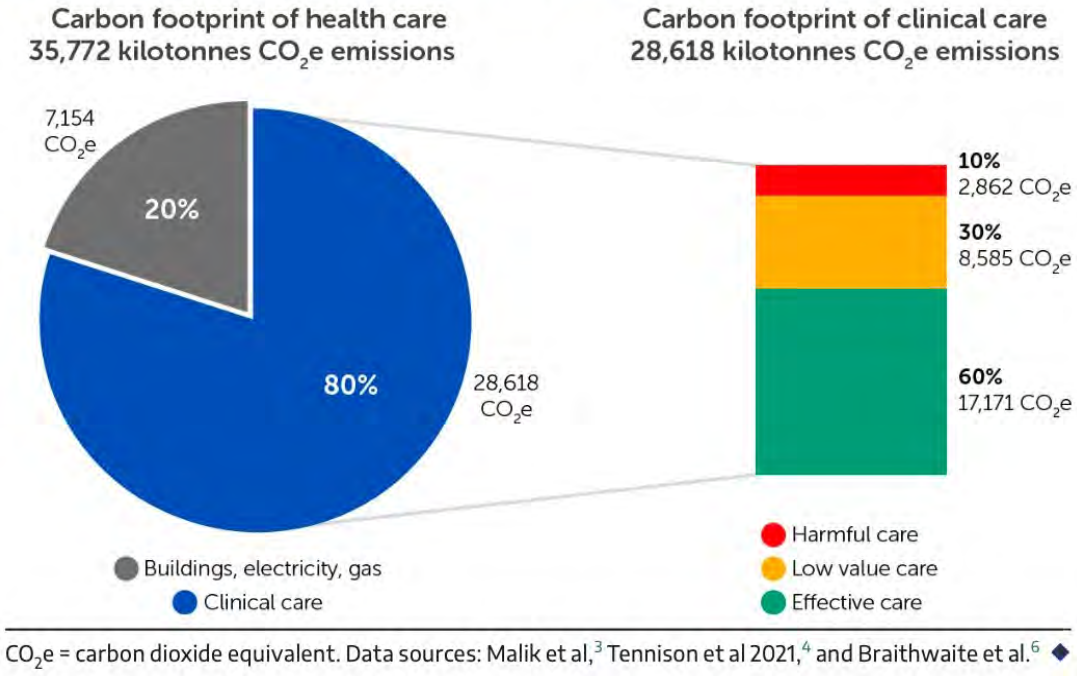
Advance healthcare/innovation

Reduce healthcare demand + shift to sustainable clinical care

Effective care /pathways (evidence-based medicine)
right care, right time, right place… minimizing harmful + low-value care…

"High value care is low carbon health care" Barratt *et al*. MJA 216(2) 7 Feb 2022.

The carbon footprint of Australian health care and the share of its carbon emissions attributable to harmful, low value and effective care



CO_2e = carbon dioxide equivalent. Data sources: Malik et al,[3] Tennison et al 2021,[4] and Braithwaite et al.[6]

Decarbonise high-value care

Example: Low Value Care

Reducing inappropriate arterial blood gas testing. Walsh O, et al. Critical Care and Resuscitation, Vol. 22, No. 4, Dec 2020: 370-377

Observational study. Audit. Educated staff. Implemented guideline. Re-audit.

Outcomes:
Reduced inappropriate ABGs by 31%
No change in patient outcomes
Annual saving of 100L blood, $770,000, 1038kg CO_2e

Australian Government

Department of Health and Aged Care

NATIONAL HEALTH AND CLIMATE STRATEGY

Consultation Paper

Objectives

It is proposed the Strategy includes the following objectives in support of this vision:

1. **Measurement:** Measure and report on health system greenhouse gas emissions, so progress in reducing emissions can be tracked and quantified.[8]
2. **Mitigation:** Accelerate the reduction of greenhouse gas emissions from the health system
3. **Adaptation:** Strengthen the resilience of the health system and communities to anticipate and respond to the health impacts of climate change.

Enablers

We propose to develop actions around the following enablers to support realisation of the Strategy's objectives.

1. **Workforce, leadership and training**
2. **Research**
3. **Communication and engagement**
4. **Collaboration**
5. **Monitoring and reporting**

AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Home | Standards | Our work | COVID-19 | Publications and resources

Home > Standards > National Safety and Quality Health Service (NSQHS) Standards

Sustainable Healthcare Module

Opportunities

Advocate, educate, **research (grants)**, advance healthcare/innovate, influence

BAU … is NOT an option

Sustainability and Planetary Health Action Network (SPHAN)

Get involved!

Department of Critical Care www.medicine.unimelb.edu.au/critcare @CritCareUnimelb

'Tackling climate change could be the *greatest global health opportunity* of the 21st century'

Lancet 2015

THE UNIVERSITY OF MELBOURNE

Critical Care Connections

Department of Critical Care

Wednesday 7th June 2023

THE UNIVERSITY OF MELBOURNE

Critical Care Connections

FMDHS Research Support

Navigating the grants landscape

7 June

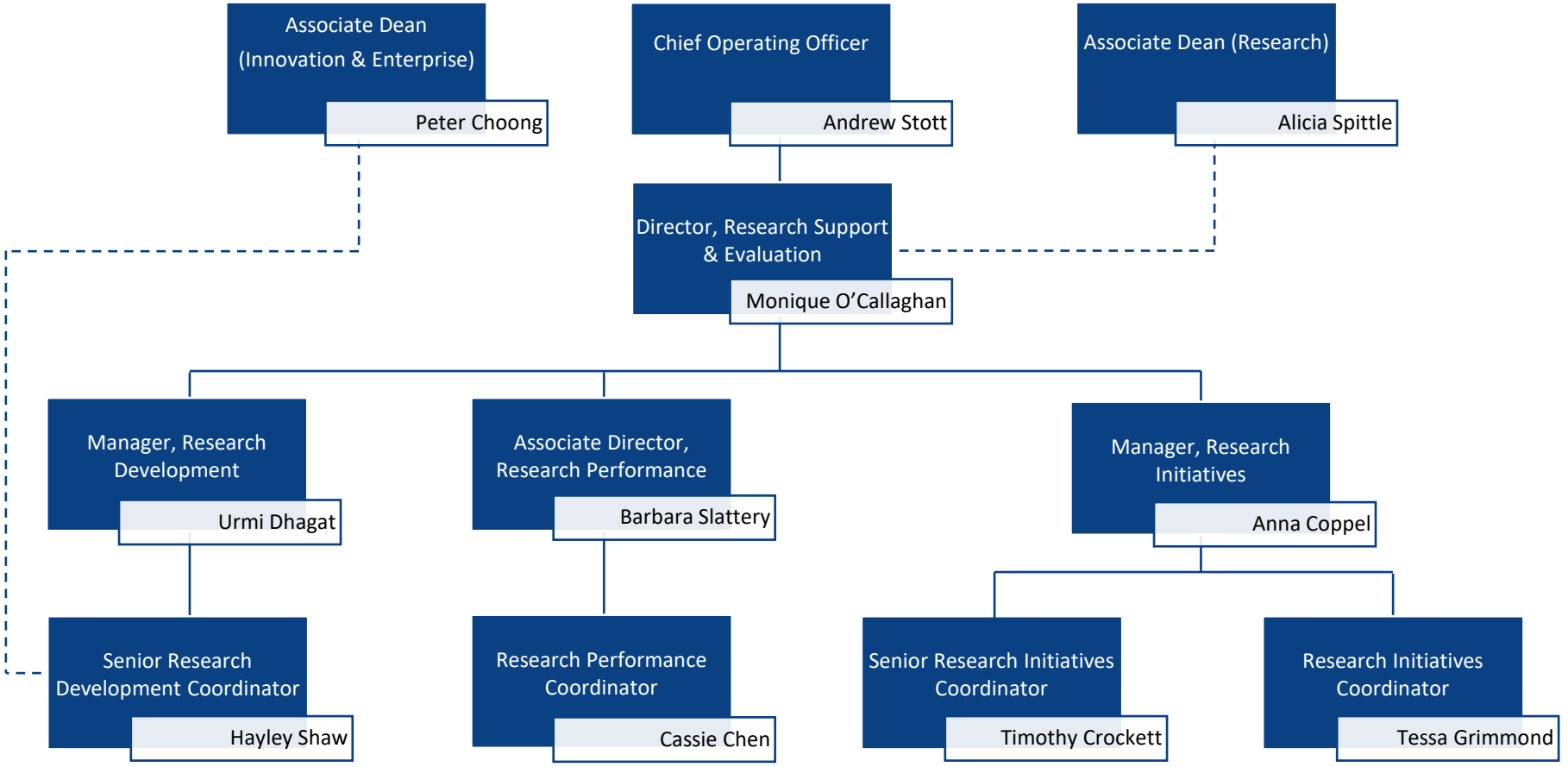
COLLABORATE + INNOVATE + NURTURE = IMPACT

Dr Urmi Dhagat
Manager, Research Development
mdhs-grants@unimelb.edu.au

Presentation Outline

- Faculty Research Support team
- Faculty support principles
- RISe Seminars (and resources)
- Research Support Programs 2022 -23
- Other Research Support activities in partnership with RIC & Chancellery

Research Support & Evaluation Team Organisational structure



Faculty support principles

- Provide support at scale (RISe seminars, workshops, guide documents and templates)

- Engage and benefit the greatest number of MDHS researchers

- Focus on people support schemes, project-based schemes are better supported at School / Department level

Research Information Seminar Series (RISe) 2022

Date	Funder/Scheme	Seminar Title / Topic
2 Feb	NHMRC	Finalising your NHMRC Investigator Grant
28 Feb	ARC	How to pitch your ARC grant for MDHS Researchers
9 March	DKCF	Applying for DKCF
30 March	n/a	Unconscious Bias and relative to opportunity in Grant Review
27 April	MRFF	Preparing for team-based proposals including MRFF EMCR scheme
18 May	MRFF/EMCR	Preparing a proposal budget (inc for MRFF EMCR scheme)
20 June	MRFF	MRFF EMCR scheme – tips and tricks for crafting a successful MRFF application
27 June	Deans Innovation Grant	Dean's Innovation Grants Online Information Session
13 July	NHMRC	Recipe for success: Clinical Trials and Cohort Studies Grant Applications
17 August	n/a	MDHS Town Hall on Animal Ethics
22 - 26 August	NHMRC/ARC /MRFF	Using metrics in grant applications

Research Information Seminar Series (RISe) 2023

Date	Funder/Scheme	Seminar Title / Topic
30 Jan	NHMRC	NHMRC Investigator grants: Final Tips and Key Changes
8 March	n/a	Safety in Research Data Management
3 April	NHMRC	NHMRC Ideas Town Hall
17 May	NIH/DoD etc	Shining a light on International Funding Opportunities.
19 June	n/a	Understanding research costing and pricing tools and their relevance to the MDHS Innovation Fund
July (TBC)	n/a	Human Ethics

MDHS Seminar Series for Professional Staff

Date	Seminar Title / Topic
5 June	MDHS information session on Research Costing and Pricing for Professional Staff

MDHS RS&E webpage: Research Development

Research Information Seminar Series (RISe)

Watch recordings and access presentation slides of recent MDHS support sessions in the RISe series

View →

Fellowship mentoring

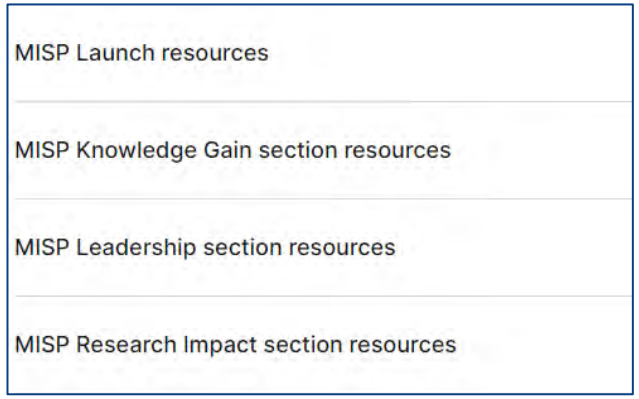
Receive support and mentoring before submitting research fellowship funding applications

View →

Project-based schemes

The faculty provides a suite of resources to assist researchers be better prepared when applying for project-based research funding opportunities.

View →



MDHS RSE Resource Hub: View recordings of past seminars and access guide documents

https://staff.unimelb.edu.au/mdhs/research-support-and-evaluation/development-and-capabilities-support

Overview of FMDHS Research Support Programs (2022 – 23)

- NHMRC Investigator Grant Support
- Synergy Grants support
- Ideas Grants support
- Clinical Trials and Cohort Studies

Melbourne Investigator Support Program (MISP)

Pilot program designed support application development for the NHMRC Investigator Grant scheme.

- Delivered via Zoom and recorded for on demand viewing
- EOI for Buddy support (matched by application level & broad research area)
- Guide documents provided to buddies to support application development especially designed to support EMCAs
- Opt-in internal peer review (prospective applicants matched with successful applicants or assessors)

10 seminars delivered between September 2022 and January 2023

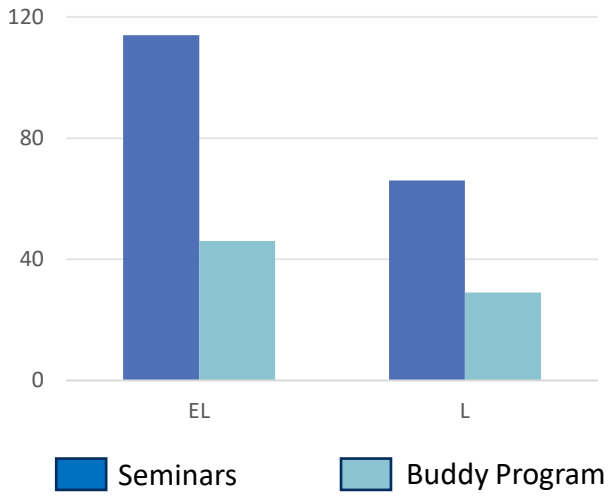
Date	Funder/Scheme	Seminar Title / Topic	Target Audience
5 Sept	NHMRC Investigator Grant Scheme	MISP Launch, MDHS advice on selecting level and level justification (assessors' perspective)	Prospective applicants for NHMRC Investigator grant scheme
3 October	NHMRC Investigator grant / Synergy grant applicants	Crafting the **Leadership** section of your Investigator Grant Application	Emerging Leadership
5 October	NHMRC Investigator grant / Synergy grant applicants	Crafting the **Leadership** section of your Investigator Grant Application	Leadership
24 October	NHMRC Investigator grant / Synergy grant applicants	Strategies and tips for selecting and justifying your **Top 10 publications**	Emerging Leadership
26 October	NHMRC Investigator grant / Synergy grant applicants	Strategies and tips for selecting and justifying your **Top 10 publications**	Leadership
14 November	NHMRC Investigator grant / Synergy grant applicants	Crafting the **Research Impact** sections of your Investigator Grant Application	Emerging Leadership
16 November	NHMRC Investigator grant / Synergy grant applicants	Crafting the **Research Impact** sections of your Investigator Grant Application	Leadership
5 December	NHMRC Investigator grant / Synergy grant applicants	Approaching and writing the **Knowledge Gain** section of your Investigator Grant application	Emerging Leadership
7 December	NHMRC Investigator grant / Synergy grant applicants	Approaching and writing the **Knowledge Gain** section of your Investigator Grant application	Leadership

MISP participation

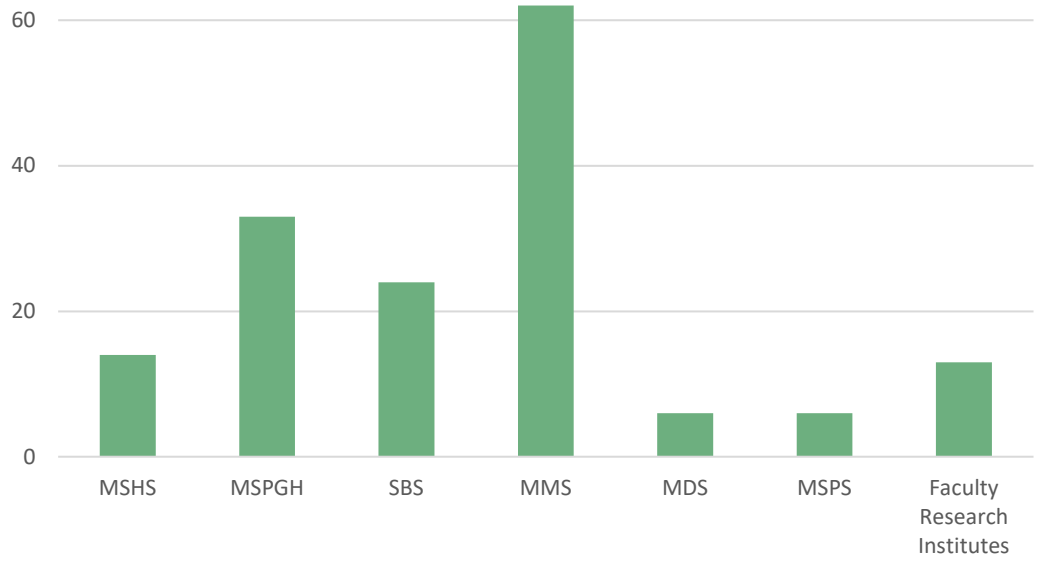
48 Contributors including successful applicants, near miss applicants & assessors

160 EOIs for the program
96 Participants in buddy program
36 Full application peer reviews
>170 Views of seminar recordings

Participation by applicant level



Participation by School



MDHS Submissions

The University submitted 198 Investigator Grant proposals (38 more than last year). Total funding request of $321,745,838.

The Faculty submitted a total of 184 applications, for a total requested amount of $295,630,831.

Submission numbers by application level

	2024	2023	2022	2021	2020
EL1	79	44	61	72	61
EL2	37	32	43	46	52
L1	28	32	47	58	54
L2	27	25	22	24	31
L3	13	15	9	10	10
Total Submitted	184	148	182	210	208

Application numbers by school over last 5 years

	2024	2023	2022	2021	2020
MDS	3	2	3	2	3
MMS	59	43	57	64	67
MSHS	8	6	7	11	12
MSPGH	27	20	25	26	25
MSPS	1	1	4	10	6
SBS	39	36	35	37	34
Faculty Institutes, Departments, Centres	47	40	51	60	61
Total applications	184	148	182	210	208

NHMRC Synergy Grant Scheme

Synergy Grants supports multidisciplinary teams of investigators to work together to address major problems in human health, that cannot be answered by a single investigator/ discipline.

Duration of funding 5 years Level of funding $5,000,000 10 grants awarded nationally each year

	Funding Commencement Year								
	2023			2022*			2020		
	# Submitted	# Awarded	Success Rate	# Submitted	# Awarded	Success Rate	# Submitted	# Awarded	Success Rate
Faculty Institutes, Departments, Centres	2	0	0.00%	3	1	33.33%	2	0	0.00%
Melbourne Medical School	3	0	0.00%	5	1	20.00%	1	1	100.00%
Melbourne School of Population and Global Health	3	0	0.00%	5	2	40.00%			
School of Biomedical Sciences	2	0	0.00%	1	0	0.00%	3	0	0.00%
Grand Total	10	0	0.00%	14	4	28.57%	6	1	16.67%

*Funding pool increased in 2022 round due to round cancellation in 2021

NHMRC Synergy Grants Scheme support (2023 round)

Application development program: designed to provide feedback on the Synergy and Knowledge Gain sections of the proposal early in the application development process.

- Facilitated application pitch development and peer review (Feb 2023).
- Access to resources (seminar recordings and guide documents) for team track record development
- Organised roundtable discussion with panel of successful applicants and assessors.
- Facilitated full application peer review for near miss applicants

9 Prospective teams participated in the program
6 Applications submitted from MDHS
50 Applications submitted nationally
Expecting 20% success rate (national) for the 2023 round

NHMRC Ideas scheme support (2023 round)

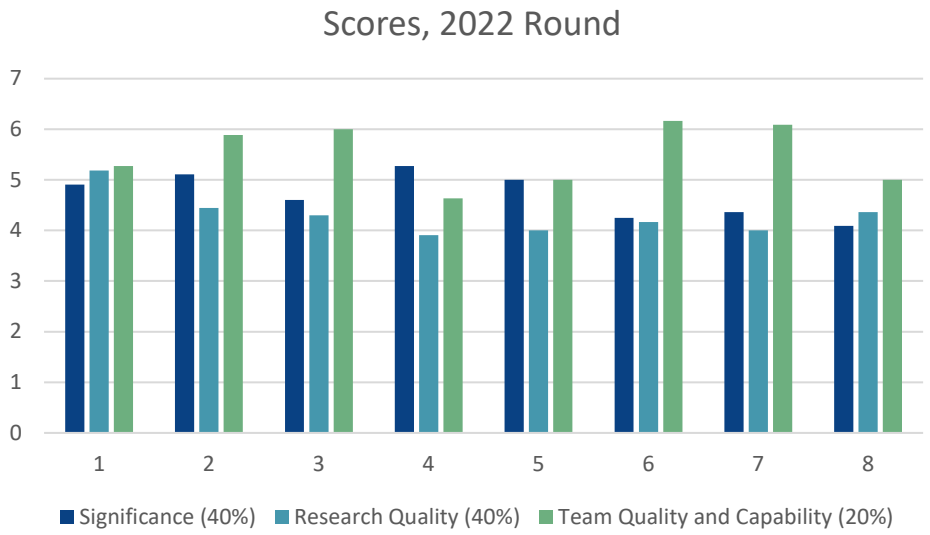
Application development program: designed to leverage expertise from across the Faculty and support applicants through benchmarking data and MDHS Town Hall

- Benchmarking data made available to help assess competitiveness / readiness for the scheme.
- MDHS Town Hall with a panel of Ideas grants recipients and assessors covering each assessment criteria, including top tips for crafting compelling narratives.
- Facilitated participation in Uplift program (coordinated by RIC; new initiative). Applicants receive two rounds of full application review by an external consultant. One applicant selected from each School.
- Facilitated small scale cross School peer review (candidates nominated by Schools)

11 EMCAs participated in GrantEd workshop (3 hrs)
6 CIs participated in the Uplift program
18 CIs participated in cross School peer review
242 Applications submitted from MDHS

NHMRC Clinical Trials and Cohort Studies

Year	# Submitted	# Successful	% Success Rate
2019	82	4	4.88%
2020	50	3	6.00%
2021	28	5	17.86%
2022	26	1	3.85%
Grand Total	**186**	**13**	**6.99%**



Year	Support
2019 - 2021	MMS coordinated pitch sessions; open to applicants from all Schools
2019 - 2022	Faculty wide seminars (successful applicants and assessors)
2023	MISCH Hub is coordinating a series of workshops covering trial design, biostatistics and health economics, budgeting and tips from assessors and successful applicants (12 July 2023)

Research development activities (planned for the next 6 – 12 months)

- NHMRC Partnership Projects (alignment and scope)
- NHMRC Development Grants (positioning for success)
- NHMRC Clinical Trials and Cohort Studies (supporting development of high-quality applications)
- Budgeting for NHMRC Ideas and ARC Discovery Projects (improving research budgeting practices)

Other Research Support activities delivered in partnership with RIC & Chancellery

- Uplift program for Investigator Grants, Discovery Projects and Ideas Grants schemes
- NHMRC Centres of Research Excellence (CRE) scheme
- Pivoting applications to other schemes (International / MRFF/ NHMRC/Philanthropic)

MRFF support programs

Accessing MRFF Funding: Workshop Series

Monday **13 February**	12:00pm-1:00pm 1. Intro to MRFF: Knowing your Audience
Monday **20 February**	12:00pm-1:00pm 2. Partnering for Impact: Organisational Partners
Monday **27 February**	12:00pm - 1:00pm 3. Partnering for Impact: Consumer Engagement
Monday **6 March 2023**	12:00pm-1:00pm 4. Pathways to Translation
Tuesday **14 March 2023**	12.00pm-1.00pm 5. The 2023 Early to Mid-Career Researchers Grant Opportunity
Monday **1 May 2023**	12.00pm-1.00pm 6. Managing Compliance Obligations and Budget
Monday **15 May**	12.00om-1.00pm 7. Pivoting Previous Applications

Co-delivered by MRFF team (RIC) and GrantEd

Guest speakers included successful applicants, assessment panel members and specialist advisors from the University of Melbourne

Upcoming capability building initiatives:

- MRFF Frontiers Pitch Panel session : 19 July 2023
- Innovation by Design Program

The MRFF team provide guidance and template documents, application development support and eligibility/ compliance checks.
Contact: enquiries-mrff@unimelb.edu.au

https://sites.research.unimelb.edu.au/research-funding/mrff

FMDHS Communication channels

Research Resource Report

Research Resource Report

In case you missed it - Several online session recordings are now available from MACH, MSEI and RS&E.

Internal funding

- **Dean's Innovation Grants:** Applications close Monday 1 August.
- **Mid Career Seeding Ideas Grants:** Applications open today.

NHMRC

2022 Clinical Trial and Cohort Studies scheme: Minimum data due on Wednesday 27 July. Applicants, submit a NOI.

ADR Newsletter

MDHS Associate Dean (Research) Update

Dear colleagues,

In this month's newsletter I'd like to highlight several opportunities for our early career academics (ECA) to enhance their research capabilities, profile, collaborative networks, leadership and build their track record.

The University's Early Career Researcher Grant Scheme is now open for researchers to undertake high quality projects or pilot studies. MDHS has high success rates in this scheme (55% in 2021; 47% in 2022 and 84% in 2023).

Professor Alicia Spittle
Associate Dean (Research), MDHS

ADVANCING HEALTH 2030
COLLABORATE + INNOVATE + NURTURE = IMPACT

Thank you

THE UNIVERSITY OF MELBOURNE

Critical Care Connections

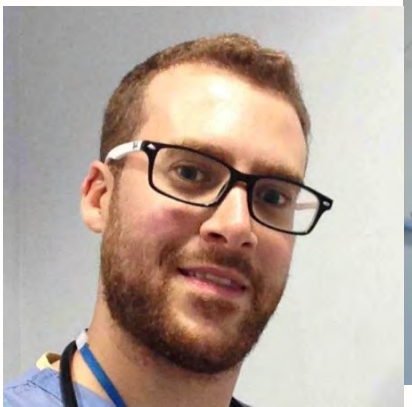
Department of Critical Care

Wednesday 7th June 2023

The Stars Are Rising:
Meet Our Grad Researchers

Associate Professor Adam Deane

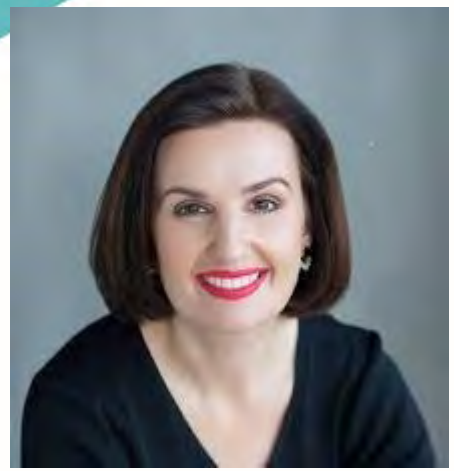
Twenty of 23 HDR students are part-time

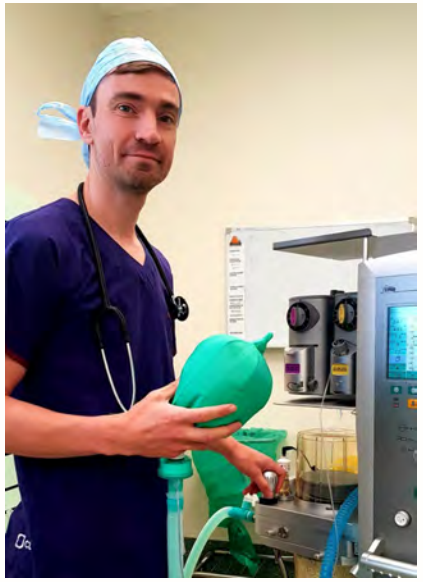


Non-MBBS pathways (5)

MBBS pathways (18) includes 4 specialists-in-training

Anaesthesia, emergency and intensive care (8, 1 & 14)





Unique opportunities - funding

Unique opportunities - impact

Point of View

Anaesthesia and Intensive Care

The goals of care framework and the perioperative period: A practical approach

Chuan-Whei Lee[1] and Michael A Ashby[2,3]

Anaesthesia and Intensive Care
2023, Vol. 51(3) 170–177

DOI: 10.1177/0310057X221150270
journals.sagepub.com/home/aic
Sage

ORIGINAL ARTICLE

A Phase II Cluster-Crossover Randomized Trial of Fentanyl versus Morphine for Analgosedation in Mechanically Ventilated Patients

Andrew J. Casamento[1,2,3], Ary Serpa Neto[1,3,4,5,6], Marcus Young[3,5], Mervin Lawrence[2], Christina Taplin[2], Glenn M. Eastwood[1,3], Angajendra Ghosh[2,7], and Rinaldo Bellomo[1,3,4,5]; for the Assessment of Opioid Administration to Lead to Analgesic Effects and Sedation in Intensive Care (ANALGESIC) trial centers

Unique challenges

"Worse than a headache—I have three kids and a full-time job."

Sustainability and Planetary Health Action Network (SPHAN)

Get involved!

Department of Critical Care

www.medicine.unimelb.edu.au/critcare

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More info:

Enrol in a single subject in 2023

A great way to develop in-demand skills in your own time, studying the same course material from the Disaster and Terror Medicine degrees. Subjects taken in assessed mode will give you credit towards the degree courses.

- **Clinical Leadership During Crises (starts July)**
- **Advanced Toxicology and Terror (starts July)**
- **Managing Complex Disasters (starts October)**

Learn more about the subjects:

Delivered mostly online over 8 weeks, with a face-to-face workshop
Cost: $3,784 (assessed) and $3,028 (non-assessed)
Gain credit towards Disaster and Terror Medicine degrees (assessed mode)

Learn more about applying:

Entry requirements

To be considered for entry, applicants must have completed:

a) A medical degree or,
b) An undergraduate degree in any discipline and at least three years of documented relevant work experience in a health management, paramedicine, nursing or equivalent role.

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