

Approaching biomedical research

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Summary Writer: Jane McDonnell

Script Writer: Sam Orton

Editor: John Myburgh

Interviewee: John Myburgh

James chats to John Myburgh about biomedical research and how to approach reading, interpreting and conducting research as a junior doctor. With the increasing influence of social media and rise of predatory journals, John Myburgh advises how to navigate online journals to focus on good quality evidence to guide clinical practice.

Professor John Myburgh is Professor of Critical Care at the Faculty of Medicine, University of New South Wales; Director of the Division of Critical Care and Trauma at the George Institute for International Health and senior intensive care physician at the St George Hospital, Sydney.

He also holds honorary professorial appointments at University of Sydney and Monash University School of Public Health.

Professor Myburgh was a foundation member and past Chairman of the Australian and New Zealand Intensive Care Society (ANZICS) Clinical Trials Group. He has an extensive research record of accomplishment over 25 years and is regarded as a national and international expert in catecholamines, traumatic brain injury, fluid resuscitation, endocrine dysfunction in critical illness and in the development and co-ordination of over 40 studies in Intensive Care Medicine. He has been awarded over \$75M in cumulative research funding from national and international research funding agencies.

His list of publications include over 230 refereed research publications and 45 book chapters, with an h-index of 41. He has delivered over 400 presentations, including over 50 plenary presentations at major international and national scientific congresses.

He has a long-established profile in education in Intensive Care Medicine, both at undergraduate and postgraduate levels. He was instrumental in establishing the College of Intensive Care Medicine of Australia and New Zealand, serving as President from 2010-2012. For services to medicine, he was made an Officer of the Order of Australia in 2014. Professor Myburgh was elected to the WFSICCM Council in 2013 and as Secretary-General in November 2017 and will hold this office until 2019.

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With Professor John Myburgh, Intensivist at St George Hospital and Professor of Intensive Care Medicine at The University of New South Wales, Australia

3. How do you know if a piece of research will change your practice?

- Read the study closely
 - Was the question accurate and was the trial design adequate?
 - Was bias mitigated?
 - Are results generalizable to the group of patients you are treating?
 - Were relevant outcomes measured?
- Clinicians often apply results incorrectly to populations who were not under investigation in the study
- Less credentialed journals will allow the investigators to editorialise the results
 - In such cases, all the bias mitigation strategies implemented in the study design are obviated by an over-interpretation of results and speculation of what it means
- One of the key components of understanding research is plausibility
 - If an effect seems biologically implausible or too good to be true, it almost certainly is
 - E.g. if research is claiming a drug reduces mortality by 15%, it is almost certainly a type 1 error (false positive)
 - Was it randomized? Blinded? Was there a small sample size? Was this a subgroup analysis?

4. How should junior doctors become involved in research?

- There are many ways of getting involved in research
- Research is comprised of things beyond publishing an article in NEJM
- Research should complement medicine rather than being a burden
- Learning the basic principles of good research, including an understanding of trial design, will aid in interpreting the literature
- Consider factors related to trial design when designing audits
- One of the main obstacles to doing research is that doctors aren't trained in it
 - Courses with a focus on research methods such as a Masters in Epidemiology are run by many universities in Australia and can be done by correspondence or part-time

Take home messages

- Avoid predatory and tabloid journals
- Take the time to read the study question, assess the design and the results before reading the discussion
- Don't be afraid to challenge the results of the studies you don't agree with


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