

In praise of critical appraisal

Judith Lumley and Jeanne Daly

Co-editors, *Australian and New Zealand Journal of Public Health*

One of the advantages of a multidisciplinary field like public health is that the good practices developed by one discipline can be shared with other disciplines. Critical appraisal of the medical literature is a basic procedure in evidence-based medicine. We think it has benefit for other researchers, practitioners and policy makers.

The idea of critique is familiar to social scientists, especially those interested in critical social theory. Sometimes critical theorists are, in turn, criticised for always trying to swim against the tide, but their aim is to raise questions about taken-for-granted realities in order to gain a different, better understanding of social life. Clinicians are used to 'grand rounds' or case conferences in which colleagues from various sub-specialties gather to hear details of a specific patient's illness. The case presenter takes the lead, but the aim is to have different views of the illness presented and discussed, with differences being resolved in the most positive way possible.

With the growth in the medical literature since World War II, clinicians had to engage with the medical literature in a new way. If it is not to overwhelm, the literature has to be brought under control. Not only must the literature be read, but it must be critically assessed to determine its relevance for practice. There are now excellent users' guides to the medical literature, published as a series in the *Journal of the American Medical Association* (JAMA) and collected in book form.¹ Australian researchers have made substantial contributions to the work of critical appraisal.

In public health we can draw on these (and other) traditions in setting in place journal clubs of people who gather with the purpose of critically appraising selected articles from the literature. The rules for critical appraisal of the clinical medical literature are explicit and readily accessible but are not necessarily applicable to other disciplines, using other, different research methods. We suggest that the following questions are worth asking of any article presented for discussion in a journal club.

1. Is this a significant research problem?

There are clearly some research questions that are trivial and not worth pursuing or publishing. A thorough review of the literature, both local and international, serves to establish the importance of the research problem and shows that the answers have not yet been generated by other researchers.

2. Has the appropriate research design been used?

Different research designs are suitable for different problems and an appropriate research design is the one that is best adapted to answering the research problem. Specific research methods from randomised controlled trials to qualitative research methods are better suited for addressing specific kinds of problems and it is the problem rather than the disciplinary preferences of the research team that should determine the method used.

3. Has the method been used correctly?

We need a clear description of the methods that have been used

and how they were applied to the research problem. There is clear guidance for what is to count as a methodologically refined study in most disciplines, for most methods, and this allows us to assess the methodological basis of the study.

4. How does context affect the research design?

As any researcher knows, there are research contexts in which the perfect research design is neither practical nor even desirable. Among these are vulnerable populations that may be especially difficult to enrol in potentially intrusive studies. The research design may need to be adapted to one that is perhaps less than ideal from a methodological perspective alone. The test is whether the design has been implemented as well as possible, given the contextual constraints that should be outlined in the article. The UK 'Sure Start' program – an intervention in disadvantaged areas – explicitly excluded randomisation of communities. The outcome was that the interpretation of the findings, showing no benefit and some evidence of harm, was questionable.²

5. Are the results trustworthy?

A good article with results that can readily be implemented in practice or in policy making is one where the method is used to produce data that are analysed to produce a set of defensible conclusions, and where each of these steps is clearly described and justified. In many research studies there are limitations to the study – which can still make an important contribution to a field of knowledge – but these limitations have to be identified and the possible implications for the conclusions should be addressed.

The point of the critical appraisal exercise is to assess research studies in the public health literature for their potential contribution to practice or policy. In public health, critical appraisal exercises provide a good setting for different disciplines to learn about the quality criteria and methodological niceties of their colleagues trained in other disciplines. In time we can develop a better, shared, overall understanding of public health research method.

This is, however, not just an exercise designed for assessing the literature. Researchers learn new skills from critical appraisal exercises. In disciplines where there are not as yet clear criteria for assessing the quality of a research report, it helps to focus the debate on how we are to judge research quality. We learn skills in communicating the details of research design in articles submitted for publication. We may even learn to design our research studies more carefully so that we are able to reach the most defensible and valuable conclusions, within the constraints that all researchers experience ranging from inaccessibility of research participants to lack of funding for a full-scale study.

References

1. The Evidence-Based Medicine Working Group. Users' guides to the medical literature. A Manual for Evidence-Based Clinical Practice. Editors: Gordon Guyatt and Drummond Rennie, JAMA & Archives Journals. AMA Press, 2002.
2. Belsky J, Melhuish E, Barnes J, Leyland AH, Romaniuk H. Effects of Sure Start local programmes on children and families: early findings from a quasi-experimental cross sectional study. *BMJ* 2006; 332: 1476-8.

In this issue

It would be great to have an issue of *ANZJPH* in which all the papers were happy ones: gains in years of healthy life, effective and simple disease prevention, even some 'breakthroughs'. Alas, we start this issue with five papers about **Hazards**.

Marian Shanahan and colleagues report the patterns and costs of treatment for heroin dependency in a cohort from Sydney, Melbourne and Adelaide followed for 12 months. Participants spent, on average, 188 days in treatment during the study, demonstrating the high severity of this particular hazard and giving a detailed costing. The second is a case report – or rather the report of a family – from Arthur Musk and colleagues, demonstrating lung damage originating in childhood, probably due asbestos exposure from recycled hessian superphosphate bags, that were used from the 1940s to the mid-'60s in rural Western Australia.

As you would expect in a public health journal, cigarette smoking and alcohol consumption are still to the fore. Richard Townsend and colleagues report the health of petroleum industry workers over two decades: those who smoked >30 cigarettes a day had a three-fold higher all-cause mortality, a 60% increase in cancer with a 43-fold increase in lung cancer, and more than fourfold increase in mortality during the follow-up to 2001. Moderate, though not high, alcohol consumption had provided some protection from death in the same follow-up time. Caroline Miller and Jacqueline Hickling report strong support for smoke-free bar laws and higher patronage by 18 to 24 year olds, in South Australia. We await evidence on the long-term net effects. Samantha Diplock and Konrad Jamrozik take up the issue of alcohol consumption's contribution to drowning, estimated as 30% of drowning fatalities and 35% of drownings associated with boating. They call for national legislation on maximal blood alcohol concentrations for recreational boat operators, including occasions when boats are at anchor.

Health Systems can help or hinder health. Carolyn Nickson and colleagues interviewed women using eight privately funded services for pregnancy termination to describe the travel involved, costs in time and money, and the reasons for selecting the chosen services. More than 9% travelled >100 km and 18% of women under 20 did so. The problems identified ranged from substantial and immediate costs, poor continuity of care and significant time away from home. Chris Bullen and Mark Lyne report their survey of New Zealand's Territorial Local Authorities to see what their policies and plans were in 2004/05 for promoting physical activity in their locality. 'To him that hath shall be given' remains true, alas. Hazel Clothier and colleagues in Victoria describe current sentinel influenza surveillance, demonstrating the need for an updated and evidence-based strategy, based on geographic representativeness and the number of GP consultations. They also describe the need for planning with respect to phases of pandemics.

No public health paper can avoid attention to **Methods**. In this issue, Martin Tobias and Li-Chia Yeh use Life Tables for 1999-2003 to compare mortality gradients by socio-economic status for four groups of New Zealanders: Asian, Pacific, Maori and European. Although all groups show a socio-economic gradient the differences between the four groups are striking, drawing attention to the inappropriateness of applying these gradients as a single proxy measure, especially among Asian and Pacific peoples. Fiona Clay and colleagues' paper describes a new barrier to longitudinal study methods due to increased changes to privacy legislation in Australia, in this instance a follow-up of patients admitted to

hospital after an injury and followed-up for six months. To protect confidentiality, a patient-derived code that is a combination of letters from the patient's mother's maiden name and their father's first name is used. In theory, this process always gives exactly the same code and the code is a reliable identifier of a single patient as exactly the same question is used on each occasion. In reality, 44% of patients had at least one error in the follow-up period and the proportion of questionnaires with errors was 29%. Failure to match at all time points threatens the power of the study, may preclude linkage of crucial medical information, and risks the possibility of attributing health information – including health status – to the wrong person.

Anne Young and colleagues contribute information from the Australian longitudinal study of women's health (ALSWH) to describe the loss of participants in their three different age cohorts. The youngest group, recruited at age 18-23, were estimated as 41 to 42% of those approached, losing 32% of participants at the first follow-up, mainly because they could not be contacted. Among women aged 45-50 at recruitment, the participation rate was 53 to 56% with a loss of 16% at the first follow-up. In the oldest cohort, aged 70-75, the participation at recruitment was 37 to 40%, with a loss at the second survey of only 10%. There was, however, a number of risk factors for attrition which were consistent across all groups: less education, being born in a non-English-speaking country and being a current smoker. Poorer health was a common factor associated with attrition in the two older cohorts as was having difficulty in managing their income in the two younger cohorts.

Risk and prevention includes two papers on the contentious question of folate fortification of food. Mark Lawrence draws attention to the limited extent of use of the folate-neural tube defect health claim for informing women of child-bearing age about their need for peri-conceptual folate and to the finding that the increased use of folate-fortified products has occurred independently of the health claim. Carol Bower and colleagues provide estimates of the number of neural tube defects that could be prevented each year in Australia and New Zealand by increasing the levels of folic acid intake by 0.2 mg/day: 49 in Australia, and 11 in New Zealand. Among Indigenous Australians, the number would be seven in a year. The final paper, by Tracey DiSipio and colleagues, draws attention to the findings from the Queensland Cancer Risk Study that the majority of Queensland adults 'exhibit known, modifiable cancer risk behaviours'. They conclude that significant gains could be made with a focus on changing behaviour in people under 40, men and those living in remote and very remote areas of the State.

Don't miss the Letters, where there is good news and bad, and the Book Reviews.

Journal contact details

Mail: *Australian and New Zealand Journal of Public Health*, PO Box 351, North Melbourne, Victoria 3051.

Street deliveries: c/- SUBStitution Pty Ltd, 1st Floor, 484 William Street, Melbourne, Victoria 3003.

Phone: (03) 9329 3535 **Fax:** (03) 9329 3550

E-mail: anzjph@substitution.com.au