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EDITORIAL

A guide to reporting studies in rural and remote health

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Introduction

Rural and remote health is an established area in medical and social science research. Several rural health journals are known internationally and indexed in major literature databases such as MEDLINE and the Web of Science. Populations in rural and remote areas are often disadvantaged in terms of available health resources, health literacy, access to health care, and health outcomes[1-3]. The development of rural health research is essential to redress the disadvantages of people in rural and remote settings. Although traditional biological determinism is still a dominant ideology in medicine, non-biological themes such as the social determinants of health and health equity are now receiving increasing attention from medical professionals, researchers, ethicists, and policy-makers[4-7]. Rural health research integrates differences, distances, and contexts in ways that illustrate these emerging non-biological themes.

Members of the *Rural and Remote Health* editorial team have prepared a brief guide. The guide addresses 10 key areas often encountered in rural and remote health research. The guide does not include instructions for general research methodologies such as observation, intervention and qualitative research. These are easily available in websites such as Equator Network[8]. The guide presented here focuses exclusively on 'rural' elements in the rural health studies of any methodology. A checklist for writing a rural health manuscript is included at the end of the guide (Fig1).

General criteria for quality

1. The research purpose must be directly linked to rural health

Rural health research of high quality is more than research that happens to be conducted in rural areas. Its purpose, methods and discussion should pertain specifically to rural issues. The focus of a good rural health paper is RURAL health, not rural HEALTH. The rural purpose and objective of the study should be clearly mentioned in the introduction of the manuscript. If both the purpose and objective are not specific to rural settings, the authors need to explain how they are related to rural health.

2. The hypothesis must be clear and relevant to rural and remote health

In a good rural health article, the research hypothesis is clear and it is situated neatly in the realm of rural health. Such a hypothesis is based on the cumulative findings of past rural health literature but is designed to find something that past literature could not reveal.

3. The topic has relevance for rural and remote health policy

Policies established by government, providers, those who train providers, professional associations, and insurance companies greatly influence rural and remote health outcomes. Rural health can be seen as the cumulative effect of past policies and practices[3,9]. Health resource distributions, education for health professionals, and the financing of health care are all core themes in rural and remote health and are directly influenced by local, national and global policies[10]. A good rural health article has implications for better policies. It explains what policies have been in existence, and by reference to the results of the study, what can be done to improve these policies.

4. The research acknowledges a local–global balance

Rural and remote health research depends on the context in which the study was conducted. The unique context created by historical, cultural, politico-economic, and health system factors shape the purpose, hypothesis, results and implications of the research. The interpretation of the results thus makes sense only when the context is taken into account.

The findings from rural and remote health research are, by nature, local knowledge. This 'localness' should be valued, and that is why *Rural and Remote Health* appoints local editors in each world region and attempts to exclude a bias in which the value system of a particular region is used to evaluate the importance of manuscripts submitted from other regions.

At the same time, however, rural health research is a part of the global scientific community. Even though it is rooted in a certain society and locality, the findings need to be understood and so they can be applied by other societies[11]. This is a dilemma facing all rural health researchers. This balance between local and global is very important. A study in which the results can only be applied to a small region of interest has little chance of publication as original research in an international journal like *Rural and Remote Health*. A well-balanced article contributes to the improvement of local health, and to some degree, shows how the evidence and conclusions could be used in other rural and remote regions of the world.

5. The topic is important in the rural and remote health discourse

Some topics are widely recognised as important for rural and remote health research[12-14]. Among these are the definition of rural areas, health services research, access to health care, workforce, professional education, primary care, non-communicable diseases, mental health, and maternal/children's health[12-15]. These are, in general, issues of high priority in rural and remote health in most countries. Other

topics are similarly important in some countries. Infectious diseases such as malaria and HIV/AIDS, for example, are critical issues in the rural areas of some developing countries[16-18]. The United Nations Millennium Development Goals provide a useful reference in this regard[19].

Rural health research is required along all aspects of the research translation pipeline[11]. For example, it is useful to study how national evidence-based practice guidelines and protocols apply in rural and remote regions. Similarly, it is important to have research that studies the application of international policy recommendations. An example of this is the policy recommendations for retaining rural health workforce by the World Health Organization[10].

Rural research studies can demonstrate the consequences of actions or inactions that can compromise health for rural populations[9]. Researchers or policy-makers who reside in locations with top concentrations of people, income, health professionals, and training sites may not have the perspective to understand such consequences, or may not understand that there *are* consequences.

Rural populations can offer researchers advantages such as smaller scale, homogeneous populations, or populations with a definite denominator – factors that can facilitate analysis and understanding when studies are complex and multifactorial. Rural interventions have also illustrated healthcare solutions for access, cost, and quality for other rural areas or for urban populations.

Some technical issues specific to rural and remote health research

6. Definition of rural

The rural definition influences the methodology and the results of rural health studies[20-22]. Authors of rural and remote health manuscripts should describe their definition in sufficient detail, they should be able to justify their choice of definition, and they should address bias that might result from their choice.

For those not familiar with rural health research, the task of definition seems quite simple. Of course there is no internationally valid definition for rural and remote areas[10]. Some countries such as the USA and Australia have created official urban–rural area classifications[20,23]. Many countries have not, and researchers in those countries need to make explicit their own definition of what is and is not rural. Variables that are often used in defining rural areas are population size, population density, distance factors specific to care access, concentrations of workforce relative to population or population need of care, and the administrative classification of a particular area. It is helpful if authors present data to support the validity of their chosen definition, and describe the implications of this definition for their country, for example, by describing the percentage of the entire population in their country that is included in the defined rural areas.

7. Which rural and remote area/s to study

In most countries, there is significant heterogeneity between different rural and remote regions. The ideal approach to overcome this is to include all rural and remote areas in the country. Practically, a limited number of areas is more common. In this case, the findings in the study may be biased according to the uniqueness of the study areas. The authors of the study must explain why and how they have chosen the areas, how they have accounted for selection bias, and to what degree their findings are applicable to rural and remote areas in general.

8. Should authors include an urban control in the research design?

A major challenge of rural research is the challenge of clarity. A common approach is to use an urban or national control while describing the differences in terms of rurality or remoteness. Authors may find it desirable to minimize the differences or distances between the rural areas and their

urban controls. This can minimize effects of natural environment, culture, ethnicity, politics, demography and socioeconomic status.

In manuscripts without urban control, authors could compare the results of their study with results from other studies that investigated the same topics in urban areas or nationwide. Of course in these cases, authors must reflect the difference in study methods and area characteristics between the two studies and discuss carefully the comparability of the results of the two studies.

Descriptive studies or qualitative studies may seek awareness or understanding with regard to an issue in a particular rural or remote context. These studies would benefit from a discussion of how to interpret the finding of the particular study in other contexts, such as urban or other rural and remote regions.

9. Statistical analysis in quantitative research

There is no unique statistical method in rural health research. Because rural studies often include both individual-level data (eg blood pressure) and community-level data (eg rural/urban category), authors have a choice of methodology. When analysing this type of data (hierarchical data) by multivariate models, multilevel analysis may be a better choice rather than the usual regression analysis[24].

10. Ethical considerations

As with other types of research, ethical approval is needed for rural health research. This may be complex if multiple communities and health services are involved. Rural and remote research may involve substantial community cooperation. Community expectations may be high regarding the research findings. Researchers must address matters of ethics, informed consent, participation, feedback, and expectations before, during, and after studies. Research focusing on Indigenous health requires especially careful ethical consideration[25].

Research 'with' rural and remote communities and health services may have advantages when compared to research 'on' the same participants, but researchers must also address problems that can arise, such as proper boundaries, sources of bias, and objective analysis.

Sufficient time must be allowed in research plans for consultation with the diversity of stakeholders that are often involved in rural and remote health research. It adds significant credibility to a publication if this process is clearly articulated in the methods section.

Conclusion

In summary, a good rural and remote health article includes all the standard hallmarks of rigorous research and effective academic writing, such as those identified in the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) and Consolidated Standards of Reporting Trials (CONSORT)[26,27].

However, it is not enough to just be a rurally located researcher and author. Rural and remote health research must be situated in the rural and remote health discourse, and able to contribute new knowledge that is relevant to rural and remote health care and policy.

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Introduction
- Is the research purpose clear and directly related to rural and remote health?
- Is the research hypothesis relevant to rural and remote health?
- Are the purpose and hypothesis based on past literature in rural health?
- Is the main topic recognized as important in the rural and remote health discourse?

Methods
- Is the rural definition explained and appropriate?
- Is the study appropriate in numbers and sampling?
- Does the study have an appropriate control (often urban individuals or areas)?
- Is the statistical analysis appropriate?
- Are rural and remote community ethical considerations addressed?

Results
- Is the relationship between the results and rurality clearly shown?

Discussion
- Is the discussion specific to rural health?
- Is there policy relevancy to rural and remote communities?
- Does the interpretation of results address the local context?
- Do the results hold global implications?
- Are the limitations, especially contextual limitations, of the study discussed?

Figure 1: Rural and remote checklist summary

References

1. Smith KB, Humphreys JS, Wilson MG. Addressing the health disadvantage of rural populations: how does epidemiological evidence inform rural health policies and research? *Australian Journal of Rural Health* 2008; **16:** 56-66.

2. Gamm L, Hutchison L, Dabney B, Dorsey A. *Rural healthy people 2010: a companion document to healthy people 2010. Volume 1-3.* College Station, Texas: School of Rural Public Health, Texas A&M University, 2003.

3. Ricketts TC. The changing nature of rural health care. *Annual Review of Public Health* 2000; **21:** 639-657.

4. Commission on Social Determinants of Health, World Health Organization. *Closing the gap in a generation: health equity through action on the social determinants of health*. (Online) 2008. Available: http://www.who.int/social_determinants/thecommission/finalreport/en/index.html (Accessed 14 December 2011).

5. Marmot M, Friel S, Bell R, Houweling TA, Taylor S. Closing the gap in a generation: health equity through action on the social determinants of health. *The Lancet* 2008; **372:** 1661-1669.

6. Sen A. Why health equity? *Health Economics* 2002; **11:** 659-666.

7. Ostlin P, Braveman P, Dachs N. Priorities for research to take forward the health equity policy agenda. *Bulletin of the World Health Organization* 2005; **83:** 948-953.

8. Equator Network. *Introduction to reporting guidelines*. (Online) 2011. Available: http://www.equator-network.org/index.aspx?o=1032 (Accessed 14 December 2011).

9. Humphreys JS, Gregory G. Celebrating another decade of progress in rural health: what is the current state of play? *Australian Journal of Rural Health* 2012; **20:** 156-163.

10. World Health Organization. *Increasing access to health workers in remote and rural areas through improved retention: global policy recommendations*. Geneva: WHO, 2010.

11. Farmer J, Clark A, Munoz SA. Is a global rural and remote health research agenda desirable or is context supreme? *Australian Journal of Rural Health* 2010; **18:** 96-101.

12. Patterson C. Systematic overview of rural health research in Australia published in the serial literature. *Australian Journal of Rural Health* 2000; **8:** 286-293.

13. McLean R, Mendis K, Harris B, Canalese J. Retrospective bibliometric review of rural health research: Australia's contribution and other trends. *Rural and Remote Health* **7:** 767. (Online) 2007. Available: www.rrh.org.au (Accessed 3 September 2012).

14. Anon. A rural health services research agenda. Summary of a conference. 13-15 December 1987; San Diego, CA. *Health Services Research* 1989; **23:** 725-1080.

15. Ricketts TC. *Rural Health in the United States*. New York: Oxford University Press, 1999.

16. Dawson AJ, Joof BM. Seeing, thinking and acting against Malaria: a new approach to health worker training for community empowerment in rural Gambia. *Rural and Remote Health* **5:** 353. (Online) 2005. Available: www.rrh.org.au (Accessed 3 September 2012).

17. Houeto D, D'Hoore W, Ouendo E, Charlier D, Deccache A. Malaria control among children under five in sub-Saharan Africa: the role of empowerment and parents' participation besides the clinical strategies. *Rural and Remote Health* **7:** 840. (Online) 2007. Available: www.rrh.org.au (Accessed 3 September 2012).

18. Couper ID. Reframing the HIV/AIDS debate in developing countries I: setting the scene. *Rural and Remote Health* **4:** 280. (Online) 2004. Available: www.rrh.org.au (Accessed 3 September 2012).

19. The United Nations. *Millennium Development Goals*. (Online) 2010. Available: http://www.un.org/millenniumgoals/ (Accessed 16 December 2011).

20. Hart LG, Larson EH, Lishner DM. Rural definitions for health policy and research. *American Journal of Public Health* 2005; **95:** 1149-1155.

21. Matsumoto M, Inoue K, Kajii E. Definition of "rural" determines the placement outcomes of a rural medical education program: analysis of Jichi Medical University graduates. *Journal of Rural Health* 2010; **26:** 234-239.

22. Lourenco AE. The meaning of 'rural' in rural health: a review and case study from Brazil. *Global Public Health* 2012; **7:** 1-13.

23. McGrail MR, Jones R, Robinson A, Rickard CM, Burley M, Drysdale M. The planning of rural health research: rurality and rural population issues. *Rural and Remote Health* **5:** 426. (Online) 2005. Available: www.rrh.org.au (Accessed 3 September 2012).

24. Diez-Roux AV. Multilevel analysis in public health research. *Annual Review of Public Health* 2000; **21:** 171-192.

25. Robinson A, Burley M, McGrail MR, Drysdale M, Jones R, Rickard CM. The conducting and reporting of rural health research: rurality and rural population issues. *Rural and Remote Health* **5:** 427. (Online) 2005. Available: www.rrh.org.au (Accessed 3 September 2012).

26. Strengthening the Reporting of Observational Studies in Epidemiology. *The STROBE Statement*. (Online) 2009. Available: http://www.strobe-statement.org/ (Accessed 14 August 2012).

27. Consolidated Standards of Reporting Trials. *The CONSORT Statement*. (Online) 2010. Available: http://www.consort-statement.org/ (Accessed 14 August 2012).

