

AUSTRALIAN HEALTH SERVICES RESEARCH
AND ITS CONTRIBUTION
TO THE INTERNATIONAL LITERATURE

by

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DISCUSSION PAPER 41

December 1999

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1 INTRODUCTION

The need to assess and monitor performance is evident in research, as in other areas of public expenditure. Computerised data bases of the published literature allow analyses of publications and citations. These counts can be used to identify outstanding individuals, and the bylines on journal articles are used as indicators of the performance of institutions and the success of funding agencies. Bibliometric analysis can also be used to assess the contribution of a country's research effort in international terms. Indeed, Australian biomedical researchers have long been proud of the comparative impact of their research, citing that 2.5% of the world literature is published from Australia, a country with 0.3% of the world's population (Wills, 1999).

In 1998, the National Health and Medical Research Council commissioned the Research Evaluation and Policy Project (REPP) of the Australian National University to undertake a bibliometric analysis of Australian health and medical research (Butler et al, 1998). Its primary purpose was to assess the performance of NHMRC funded research. However, the report also shows publication and citation rates for the Australian Standard Research Classification (ASRC) sub-fields of research. These sub-fields include physiology, medical microbiology, immunology, neurosciences and pharmacology, as well as public health and health services research.

The surprising finding from this research was the apparently outstanding performance of Australia's health services researchers. Their contribution to the world literature was assessed as 5.6%, while for all other sub-fields it ranged from 1.4% (medical biochemistry and clinical chemistry) to 3.4 % (physiology). This is against a background of the fall in real terms of funding for health services research from investigator initiated sources (including the demise of the Research and Development Grants Advisory Committee of the Commonwealth Department of Health), where peer reviewed publication is an important component of an investigator's track record.

Is this a valid performance indicator for Australian health services research? To answer that question we sought to critically appraise the methodology used by Butler et al. As we do not have access to the REPP data base, we could not repeat their analysis. However, we used two different search strategies to test whether these would yield comparative results.

2 BACKGROUND: CRITIQUE OF BUTLER ET AL.

The REPP data base, used by Butler et al, is constructed from the three main Institute for Scientific Information (ISI) indices: Science Citation Index, Social Sciences Index and Arts and Humanities index, capturing all publications with an Australian address (Butler et al, 1998). The ISI has a descriptive classification system of around 200 categories, based on the journal which carries the publication. The ISI categories do not identify health services research as a separate category. The ISI categories were translated into the Australian Standard Research Classification (ASRC) sub-fields by Butler et al. The publication rate by ASRC sub-field is reproduced from Butler et al in Table 1.

TABLE 1: AUSTRALIA'S SHARE OF INTERNATIONAL BIOMEDICAL PUBLICATIONS

ASRC sub-field	%
Health services research	5.6
Physiology	3.4
Interdisciplinary biomedical	3.3
Medical microbiology	3.1
Immunology	3.1
Genetics, molecular biology & biotechnology	2.9
Clinical sciences	2.6
Public health research	2.6
Biology	2.1
General medical & health sciences	2.1
Neurosciences	2.0
Pharmacology	1.8
Other medical & health sciences	1.8
Medical biochemistry & clinical chemistry	1.4

Source: Table 3 in Butler et al.

The first question to ask is to what extent do the ISI-indexed journals represent the entirety of the international literature in the field of health services research? The coverage of the ISI-indexed journals of the various sub-fields, based on a 1994 study, is reported by Butler et al. For the biomedical sub-fields, it ranges from 64% to 87%;

however for public health and health services research it is 24% and 0% respectively. Therefore, while the ISI analysis will give a reasonable picture of biomedical research publications, it will not reflect health services research publications.

The second question is what ISI categories were translated into health services research? This information is given in Appendix A of the report. The categories, 'medicine, legal' and 'medicine, miscellaneous' were taken as equivalent to health services research. These do not, on the face of it, accord with health services research. In comparison, for public health, the ISI categories comprised 'public health', 'nutrition and dietetics', and 'substance abuse'.

Perhaps the labelling of the categories, 'medicine, legal' and 'medicine, miscellaneous', is just a quirk of the ISI-indexing system, so the actual journals included in each category were identified (Appendix B in the report). These are given in table 2.

Most of these journals would be unfamiliar to those working in, or using the findings of, health services research, with perhaps the exception of Medical Decision Making. It is questionable how much, if any, health services research is contained in these journals.

TABLE 2: ISI JOURNALS IN THE CATEGORIES MEDICINE LEGAL AND MEDICINE MISCELLANEOUS

Academic Medicine
Acute Care
American Journal of Nursing
American Journal of Physical Medicine
Anaesthesia & Intensive Care (Australian Publication)
Archives of Physical Medicine & Rehabilitation
Aviation Space & Environmental Medicine
Critical Care Medicine
Exercise and Sports Sciences Reviews
Forensic Science International
Intensive Care Medicine
International Journal of Legal Medicine
International Journal of Sports Medicine
Journal of Audiovisual Media in Medicine
Journal of Forensic Sciences
Journal of Hospital Infection
Journal of Medical Education
Journal of Medical Ethics
Kosmicheskaia Biologiia Aviakosmicheskaia Meditsina (Russian)
Medical Decision Making
Medical Education
Medical Teacher
Medicine & Science in Sports & Exercise
Medicine Science & the Law
Methods of Information in Medicine
Nursing Research
Pharmacopeial Forum
Physical Therapy
Regulatory Toxicology & Pharmacology
Scandinavian Journal of Rehab. Medicine
Science & Justice
Undersea & Hyperbaric Medicine.
Undersea Biomedical Research
Zeitschrift fur Rechtsmedizin Journal of Legal Medicine (published in Germany, English Language)

3 METHODS

We decided to identify the extent to which HSR is published in these journals; and to assess the contribution of Australian health services research using an alternative search strategy. Further, we extended the second search strategy to cover a six year period (1993-8) to ensure that any results were not influenced by a particularly good or poor year.

I. The first search used journals classified as “medicine legal” and “medicine miscellaneous” as given in the Butler report. All articles published (or indexed) in 1993 and 1994 were taken as the total publications. This was then combined with the Medical Subject Heading (MeSH) of “Health Services Research” to identify the proportion of all articles which can be categorised as HSR. MeSH uses Last’s definition for the subject heading, “Health Services Research” which is:

“The integration of epidemiologic, sociological, economic, and other analytic sciences in the study of health services. Health services research is usually concerned with relationships between need, demand, supply, use, and outcome of health services. The aim of the research is evaluation, particularly in terms of structure, process, output, and outcome. (from Last, Dictionary of Epidemiology, 2d ed)” (medline, 1999)

This was then combined with the heading “Australia” to determine the share of Australian HSR publications.

II. For the second search, we identified a number of the leading HSR journals internationally. Whilst this may not be an exhaustive list, it contains the journals that many active health services researchers nominate as the key journals in their field. These are listed in Table 3. The databases used for these searches comprise Medline, Embase and Econlit via the Ovid interface. Different databases were employed for this search strategy as the selected journals are not all indexed in Medline. All articles published within these journals were considered to be HSR. We searched on the journal name for 1993 and 1994 to determine the total number of articles published during that

period. Letters to the editor and editorials were omitted from the results. This was then combined with the search term “Australia” to assess the proportion of Australian publications. In some cases, HSR is originated in Australia but the principal author has an address outside Australia. This could under-estimate the number of Australian articles. Therefore, we also reviewed all articles with ‘Australia’ in the title or abstract and included those articles with a known Australian researcher in the list of authors.

TABLE 3: HSR JOURNALS

Health Affairs
Health Economics
Health Policy
Health Services Research
International Journal of Technology Assessment in Health Care
Journal of Clinical Epidemiology
Journal of Health Economics
Journal of Medical Screening
Medical Care
Medical Decision Making
Pharmacoeconomics
Quality of Life Research
Social Science & Medicine

However, much HSR is published in journals for which the main focus is not HSR. This is because HSR findings need to be communicated not just to other researchers but to those who influence policy and practice. Thus HSR results can be reported in medical and management journals. Here we did not attempt to develop an exhaustive and comprehensive list of journals which contain HSR articles; rather we chose a sample of six prestigious journals, shown in Table 4, to review for Australian contributions.

TABLE 4: OTHER JOURNALS SEARCHED FOR HSR

American Journal of Public Health
BMJ
JAMA
Lancet
New England Journal of Medicine
Health Promotion International

The search strategy for these journals was the same as that used for the legal and miscellaneous journals, ie all articles published or indexed in 1993 and 1994 combined with “Health Services Research” identified the proportion HSR. This was then combined with the heading “Australia” to determine the share of Australian HSR publications; and further articles with known Australian authors were added.

4 RESULTS

The results for the first search are shown in Table 5 (the results by journal are in the appendix). Eight journals included in the ISI listings were not included in Medline for 1993 and 1994. The Australian proportion of the total articles is 8.7%, somewhat higher than the Butler et al estimate of 5.6%. However, most of these are accounted for by the inclusion of an Australian journal, *Anaesthesia and Intensive Care*. If this journal is removed then the proportion of Australian articles falls to 2%.

There were 21 articles published in these journals which were categorised as HSR, most of these (7) in *Critical Care Medicine*. The proportion of the total which is health services research is 0.31%. The Australian contribution to this is 4.7%, reasonably close to the Butler et al estimate of 5.6%. However, this is accounted for by one article published in *Critical Care Medicine*.

TABLE 5: HSR ARTICLES PUBLISHED IN “LEGAL” AND “MISCELLANEOUS”

Journal category	Total no of articles	No of HSR articles (% total articles)	No of Australian articles (% total articles)	No. Australian HSR (% HSR articles)
legal	1022	3 (0.29)	29 (2.83)	0
misc	5558	18 (0.32)	543 (9.76)	1 (5.55)
total	6570	21 (0.31)	572 (8.70)	1(4.76)
total excluding Aus journal	6122	21 (0.34)	124 (2.02)	1 (4.76)

The results for the search using HSR journals are shown in Tables 6 and 7; and for other journals publishing HSR in Tables 8 and 9.

For the specialist HSR journals, there were 60 articles with an Australian address, or 2.43% of published articles, and 63 with an Australian author or 2.55%.

When we repeated the same search strategy for a longer period, the contribution of Australian research remained the same (table 7).

TABLE 6: HSR JOURNALS 1993-4

Journal Name	No of articles indexed in 1993 & 1994 in databases	Total no (per cent) with Aust address	Total no (per cent) any Aust author
Health Affairs	285	(0)	(0)
Health Economics	77	(3.89)	(3.89)
Health Policy	126	(3.96)	(4.76)
Health Services Research	79	(0)	(0)
Int Jnl of Technology Assessment in Health Care	131	(0.76)	(2.29)
Jnl of Clinical Epidemiology	320	(3.43)	(3.43)
Journal of Health Economics	55	(0)	(0)
Journal of Medical Screening	54	(5.55)	(1.22)
Medical Care	243	(0)	(0)
Medical Decision Making	99	(0)	(0)
Pharmacoeconomics	204	(5.39)	(4.90)
Quality of Life Research	95	(0)	(0)
Social Science & Medicine	698	(3.86)	(3.86)
Total	2466	2.43	2.55

Table 7: HSR Journals 1993-1998

Journal Name	No of articles indexed 1993 - 1998 in databases	Total no (per cent) with Aust address	Total no (per cent) any Aust author
Health Affairs	864	(0)	(0)
Health Economics	287	(2.43)	(2.78)
Health Policy	384	(5.46)	(6.25)
Health Services Research	307	(0)	(0)
Int Jnl of Technology Assessment in Health Care	418	(1.43)	(2.63)
Jnl of Clinical Epidemiology	1050	(2.09)	(2.09)
Journal of Health Economics	199	(2.01)	(2.51)
Journal of Medical Screening	244	(5.32)	(5.32)
**Journal of Health Services Research & Policy	68	(0)	(0)
Medical Care	886	(0.45)	(0.56)
Medical Decision Making	341	(0.58)	(0.58)
Pharmacoeconomics	761	(3.28)	(3.28)
Quality of Life Research	319	(2.50)	(2.50)
Social Science & Medicine	2040	(4.80)	(4.90)
Total	8168	2.57	2.73

**The Journal of Health Services Research & Policy has been added to this list. It was not included in the 1993-1994 figures as it commenced publication in 1996.

TABLE 8: OTHER JOURNALS 1993-4

Journal Name	No of articles indexed in 1993 and 1994 in databases	Total No of HSR for 1993 & 1994	No. (per cent) HSR articles with Australian address
American Journal of Public Health	853	14	(0)
BMJ	4430	34	(2.94)
JAMA	2837	33	(0)
Lancet	5518	9	(11.11)
New England Journal of Medicine	2787	1	(0)
Health Promotion International	66	0	(0)
Total	16491	91	2.20

The sample of other journals shows 91 HSR articles published in 1993 and 1994, or 0.55% of their total content. These included 2 Australian articles, giving an Australian contribution of 2.2% to all Health Services Research. For the six year period, 1993-98, the number of HSR articles had trebled but no more Australian articles appeared, reducing the Australian contribution to the literature.

Table 9: Other Journals 1993-1998

Journal Name	No of articles indexed in 1993 -1998 in databases	Total No of HSR for 1993 - 1998	Number (per cent) Australian HSR
American Journal of Public Health	2353	45	0 (0)
BMJ	14079	97	1 (1.03)
JAMA	8266	99	0 (0)
Lancet	16047	17	1 (5.8)
New England Journal of Medicine	8001	12	0 (0)
Health Promotion International	207	1	0 (0)
Total	48953	271	0.73

5 SUMMARY AND CONCLUSION

This study was prompted by the findings of Butler et al that the Australian contribution to the international health services research literature accounted for 5.6% of the total, out performing all other sub-fields of medical research. The ISI categories, on which their analysis is based, do not include health services research. Two categories, 'medicine, legal' and 'medicine, miscellaneous' were taken as equivalent to health services research. This has little face validity; and an independent study, reported by Butler et al, estimated that these journals would not cover health services research. On this basis alone, the 5.6% should be dismissed as an invalid estimate.

The journals which are covered by the legal and miscellaneous categories, on our analysis, contained 8.7% of Australian articles. This is higher than the Butler et al estimate of 5.6%; but this may be accounted for by the omission of eight journals from the publicly accessible data bases. If these journals increased the denominator more than the numerator, the two estimates could be compatible. This is plausible, as the list of included journals contains one Australian journal, ie all articles published were listed as of Australian origin. However, once the specifically Australian journal is excluded, our estimate of the proportion of Australian articles falls to 2%. And therefore the Butler

estimate is an over-estimate of the Australian authored articles in these journals.

The major problem, though, is not the Australian content of the journals in the Butler et al review but that these should be considered as covering the field of health services research. The list of journals categorised as legal and miscellaneous excludes all but one of the journals we nominated as specialist health services research journals.

Nonetheless, health services research is often published in a range of journals so we assessed the proportion of the total articles in these journals that were classified as health services research. In 1993-4, twenty one of these articles, or 0.3% were so classified. The Australian contribution to this was 4.7% but this is accounted for by only one article. Whilst this is close to the Butler et al estimate of 5.6%, the fact that it is due to one article means that there can be little confidence attached to either Butler's estimate.

Our own search of the specialist HSR journals concluded that the Australian contribution to the world literature is much less substantial, at around 2% of the total. As this contribution represents 60 articles in over 2000 published papers, this result is not due to the effect of one or two articles in a small number of total publications. We also searched the non specialist health services research journals to determine the extent of health services research reported here and the contribution of Australian research. For 1993-4, the Australian contribution looks to be about the same, ie 2%, but it is accounted for by only two articles. No Australian articles were published in 1995-8, thereby reducing the relative Australian contribution. The Australian contribution via the non specialist health services research journals is, at best, modest.

We are left with the conclusion that Australian health services research is far from out-performing other medical research fields in international publication; rather it is comparable to the poorest performing fields.

6 DISCUSSION

This type of study demonstrates the difficulty in defining health services research and therefore appropriately classifying journals and pieces of research. It also demonstrates that the scope of health services research is poorly understood, even by specialists in other fields.

It also raises the issue of how the performance of health services research can and should be judged. By definition, HSR is relevant to policy and program issues in health service delivery, organisation and financing. Much of this is not readily transferable from country to country; while microbes and cells behave much the same no matter in which country they are located, health systems, patients and providers do not. Health systems are a result of country specific history and culture. This limits the appeal of many HSR results to international audiences.

At the same time, most active researchers in this field want to communicate their results directly to the policy makers and practitioners to whom they are most relevant and whose practice is the focus of change. This means they will sensibly direct their publications to the media most used by their target audience. This may mean publishing in Australian journals, or non-specialist journals. Consequently, the proportion of Australian contributions in the international literature may not be a valid means of assessing the performance of health services researchers.

Another approach to assessing the performance of health services research is to examine research reports and the extent to which their recommendations have been implemented; or major policy decisions and the extent to which they have been influenced by research findings (Hall, 1994; Selby Smith 1994). There are several problems with this approach due to the implicit assumption that there should be an exact relationship between research findings and policy implementation (Hall, 1992). Even when the research question is well matched to the policy needs, there are many other factors which influence policy development and implementation which may make the influence of research difficult to discern.

The specialised health services research journals seek publications that contribute to conceptual and theoretical issues, developments in methodology, and findings with widespread implications. Thus the contribution to these journals is likely to be a good reflection of the sophistication of health services research that is underway. The Australian contribution to these journals is slight. Should we therefore conclude that the quality of health services research in Australia is poor? This contribution represents not just the quality of what is being done but also the extent and breadth of work that is undertaken. This finding is consistent with a poorly developed research sector as indicated by the Wills Review (Wills, 1999).

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APPENDIX

HSR PUBLISHED IN LEGAL & MISC JOURNALS

Journal Name	Total No of articles indexed in 1993 & 1994	Total no of Aust articles	No of HSR indexed in 1993 & 1994	No. Australian HSR articles based on MeSH	Proportion Australian HSR
Forensic Science Int.	235	4	2	0	
Int Journal of Legal Medicine	133	1	0	0	
Journal of Forensic Sciences	275	8	0	0	
Journal of Medical Ethics	109	8	1	0	
Pharmacoepial Forum	Unable to locate				
Medicine Science & the Law	133	7	0	0	
Regulatory Toxicology & Pharmacology	137	1	0	0	
Science & Justice	0 (only 1998 onwards)				
Zeitschrift fur Rechtsmedizin Journal of Legal Medicine (published in Germany, English Language)	0 (up to 1990 only)				
Academic Medicine	663	3	4	0	
Acute Care	0 (1989 latest)				
American Journal of Nursing	418	0	0	0	
American Journal of Physical Med.	0 (1987 latest)				
Anaesthesia & Intensive Care (Australian Publication)	448	448	0	0	
Archives of Physical Medicine & Rehabilitation	498	10	2	0	
Aviation Space & Environmental Medicine	400	2	0	0	
Critical Care Medicine	850	11	7	1	
Exercise and Sports Sciences Reviews	28	0	0	0	
Int Journal of Sports Medicine	206	4	0	0	
Intensive Care Medicine	321	6	1	0	
Journal of Audiovisual Media in Medicine	49	3	0	0	
Journal of Hospital Infection	245	7	1	0	
Journal of Medical Education	0 (1988 latest)				
Kosmicheskaia Biologiia Aviakosmicheskaia Meditsina *(Russian)	0 (1991 latest)				
Medical Decision Making	99	0	2	0	
Medical Education	174	20	1	0	
Medicine & Science in Sports & Exercise	457	12	0	0	
Medical Teacher	38	4	0	0	
Methods of Information in Medicine	167	1	0	0	
Nursing Research	148	0	0	0	
Physical Therapy	208	8	0	0	
Scandinavian Journal of Rehab. Medicine	56	2	0	0	
Undersea & Hyperbaric Med.	75	2	0	0	
Undersea Biomedical Research	0 (1992 latest)				
Total	6570	572	21	1	4.76%

