



# Australian Biomedical Research

Funding acknowledgments and performance

Supported by the NHMRC Research Committee

**NHMRC**

National Health and Medical Research Council

**Australian Biomedical Research:**  
Funding acknowledgments and performance

Linda Butler, Beverley Biglia and Paul Bourke

Research Evaluation and Policy Project  
Research School of Social Sciences  
Australian National University

December 1998

# Contents

---

Executive Summary	i
1 INTRODUCTION	1
2 METHODOLOGY	3
2.1 Data Sources	3
2.1.1 The REPP database	3
2.1.2 PRISM's ROD database	3
2.1.3 Matching the REPP and ROD databases	4
2.2 Under-acknowledgment of funding sources	4
2.3 Classification to fields of research — Journal set analysis	5
2.4 Bibliometric measures	6
2.4.1 Most highly cited publications	6
2.4.2 Actual and expected citation rates	6
2.4.3 Level of collaboration	7
2.4.4 Research Level	7
2.4.5 Relative citation impact	8
2.5 Coverage issues	8
3 OVERVIEW OF AUSTRALIAN BIOMEDICAL RESEARCH	9
3.1 Share and distribution by ISI subject category	9
3.2 Share and distribution by ASRC sub-field	10
3.3 Distribution by research level	12
3.4 Distribution by level of collaboration	12
3.5 Impact of Australian research – ASRC sub-fields	13
3.6 Impact of Australian research – ISI subject categories	15
3.7 Section summary	18
4 THE FUNDING OF AUSTRALIAN BIOMEDICAL RESEARCH	19
4.1 The size of the analysis	19
4.2 Number of funding acknowledgments	20
4.3 Type of funding	21
4.4 Funding sectors	22
4.5 Funding countries	23
4.6 Funding bodies	26
4.7 Level of research	29
4.8 Publishing sectors	30
4.9 ASRC sub-fields	30
4.10 ISI subject category	31
4.11 Highly cited publications	32
4.12 Section summary	34
5 NHMRC-FUNDED RESEARCH	36
5.1 Number of funding acknowledgments	36
5.2 Type of funding	37
5.3 Type of research	37
5.4 Collaboration	38
5.5 ASRC sub-fields	38
5.6 ISI subject categories funded	40
5.7 Highly cited publications	43
5.8 Funded Institutions	44
5.9 Section summary	47
6 CONCLUSION	49
Appendix A Translation of ISI subject categories to ASRC sub-fields	50
Appendix B Journals in each ISI subject category	52
Appendix C Detailed statistical tables	63
Appendix D Details of the most highly cited publications in each ISI subject category	87
Appendix E Explanatory charts and tables	91

## Foreward:

The Research Committee of the National Health & Medical Research Council is pleased to present this analysis of Australia's health and medical research publications. The NHMRC supported this research and analysis, by Mrs. Butler, Mrs. Biglia and Dr. Bourke, in order to better evaluate the publication output of Australia's health sector, particularly the papers supported by the NHMRC. This research group from the Research Evaluation and Policy Project, Research School of Social Sciences at the Australian National University has a distinguished record of analysis of Australian research output.

There are many important messages in the analysis, for the NHMRC and for the wider community of health research funding organisations, research scientists, their institutions and policy makers. For the NHMRC, we need to consider the relative performance of different fields of research, performance of the different research sectors (universities, institutions, hospitals), international collaboration, the applicability of the data to a more applied health system and public health research, and many other matters.

We are pleased to note that NHMRC publications appear at approximately twice the expected rate in the top 1% of most highly cited papers Australia-wide, and the top 5% in many fields. On the other hand, we need to consider why NHMRC supported publications appear to be under-represented in international collaborations.

It is important to emphasise that bibliometric analysis of health research is only one measure of the impact and significance of the public investment in research. A strong health research effort must also result in better health – better prevention, better treatments, better delivery of health and better health policy formulation. It should improve the health of individuals and the whole society, contribute to a more effective health care system through the translation of evidence into clinical practice, and, increasingly, contribute to national wealth through the growth of knowledge based industries. The lure of bibliometrics is the lure of numerical descriptions – but these are effective only when applied properly to large data sets, such as this analysis. When judging individual research, traditional peer review mechanisms remain the best way in which to judge value and merit.

In the broad, these results point to a healthy, internationally competitive research sector. But health research is rapidly changing internationally and this is no time for Australian health research to rest on its laurels. Furthermore, there are many specific issues that need consideration and further analysis. NHMRC's Research Committee invites your comments on "Australian Biomedical Research: funding acknowledgments and performance".

*Warwick Anderson,  
Chairman,  
Research Committee.  
National Health and Medical Research Council.*

## Executive Summary

The analyses contained in this report make use of two sources of data:

1. The Research Evaluation and Policy Project (REPP) database containing all Australian publications indexed in Institute for Scientific Information's (ISI) three main indices: Science Citation Index (SCI), Social Sciences Citation Index (SSCI) and Arts and Humanities Citation Index (A&HCI) for the period 1981-1995.
2. The Research Outputs Database (ROD) maintained by Policy Research in Science and Medicine (PRISM) unit at the Wellcome Trust containing the funding acknowledgments listed on all UK biomedical publications published since 1988. For 1993 and 1994, PRISM also collected data for Australian publications.

The coverage of the data in this report is limited to:

- ✦ articles published in 1993 and 1994;
- ✦ citations received between 1993 and 1995;
- ✦ 14 biomedical sub-fields of the Australian Standard Research Classification (ASRC).

Sections one and two of the report contain introductory remarks and a detailed description of the measures used in the analyses. In section three of this report we analyse data for all Australian biomedical publications. The most important findings from this section are:

- ✦ **Australia's share of the world biomedical publications is 2.5%.**  
This is at the same level as Australia's share of all SCI publications.
- ✦ **Australia's shares of publications classified to ASRC sub-fields range from 1.4% (Medical biochemistry) to 5.6% (Health services research).**
- ✦ **Australia's relative citation impact (RCI) for the ASRC sub-fields range from 0.69 (Medical microbiology) to 1.27% (Health services research).**  
Relative citation impact is a measure comparing a country's share of citations with its share of publications. An RCI greater than 1 indicates a higher than expected share of citations for the number of publications produced.
- ✦ **60% of Australia's biomedical publications involve group collaboration, while 20% incorporate international collaboration.**  
The level of collaboration is high compared to the level for all Australian science publications, but the level of international collaboration is less than that found in most other fields of science.

In section four of this report we analyse the funding acknowledgments listed on Australian biomedical publications that are also contained in the ROD database. The most important findings from this section are:

- ✦ **Over 60% of Australian biomedical publications acknowledge external funding sources and, of these 60%, acknowledge more than one source.**
- ✦ **56% of publications listed only Australian funding bodies. 17% listed only international bodies, while the remainder (27%) listed a combination of Australian and international funding bodies.**
- ✦ **The major Australian funding bodies were NHMRC and ARC, followed by the National Heart Foundation.**  
NHMRC accounted for 25% of the funding acknowledgments. The two largest international funding bodies were the World Health Organisation and the Wellcome Trust.
- ✦ **NHMRC-funded publications achieve above the expected citation level for their journal mix.**  
The 3134 publications acknowledging NHMRC funding averaged 5.32 citations per publication (cpp). This was above the average cpp of 5.00 for all articles in the journals in which these publications appeared.
- ✦ **There is a strong positive relationship between success in attracting external funding sources and success in achieving very high citation impact.**  
In 27 of the 41 ISI subject categories studied, **all** the most highly cited publications attracted external funding.

In section five of this report we analyse the publications containing acknowledgment of NHMRC funding and contrast their citation performance to that of publications funded by other bodies. The most important findings from this section are:

- ✦ **25% of publications acknowledge funding from NHMRC.**
- ✦ **77% of NHMRC-funded publications were classified to the two basic levels of research.**  
This compares with only 51% of other funded publications.
- ✦ **Collaborative effort in NHMRC-funded publications is more heavily invested in group collaboration and less heavily in international collaboration than other Australian biomedical publications.**  
73% of NHMRC-funded publications involve group collaboration, compared to 56% of other funded publications; 18% of NHMRC-funded publications involve international collaboration, compared to 32% of other funded publications.

✦ **ASRC sub-fields:**

**NHMRC funding is acknowledged on more than 40% of all publications in Neuroscience, Immunology and Physiology.**

**Less than 20% of publications in Medical biochemistry, Other medical & health sciences, and Health services research acknowledge NHMRC funding.**

**Using the measure of actual and expected citations, Genetics and Interdisciplinary biomedicine are the strongest performers, while Medical microbiology is the weakest.**

✦ **NHMRC funding was acknowledged in 40% of publications in the top 5% most highly cited band, and 47% in the top 1% band.**

The proportion of NHMRC-funded publications in the high impact bands is significantly larger than their overall presence of 25%.

The analyses contained in this report have rested primarily on the funding acknowledgments given in biomedical publications. We could not apportion the amount of funding from the different sources relevant to each publication, or indeed to the total basket of biomedical publications. However, it is interesting to note that the proportion of publications reporting NMHRC funding is very close to their share of total biomedical funding i.e. 25%.

The single most outstanding feature of the analyses is the presence of NHMRC funding in a very high proportion of publications achieving high rates of impact.

## **Acknowledgments**

The authors of this report would like to acknowledge the assistance and support given to them by PRISM. The project was initially conceived in discussions between the heads of PRISM and REPP, Dr Joe Anderson and Professor Paul Bourke. Detailed discussions were then commenced between Dagmar Jeschin of PRISM and Linda Butler of REPP. On Ms Jeschin's transferral to other duties in the Wellcome Trust, close collaboration continued with Dr Grant Lewison. More recently, Mr Graham Dawson has provided valuable additional data and analysis on comparative UK data. For all this support, we express our appreciation.

# 1 INTRODUCTION

In 1996 the Research Evaluation and Policy Project (REPP) undertook a consultancy for the National Health and Medical Research Council (NHMRC) which provided a comprehensive bibliometric analysis of institutions, centres and units funded by NHMRC at the level of block grants. In this study, we seek to complement that investigation by extending the analysis to include individual research projects funded under the project grants scheme, training awards, and similar schemes.

This has been made possible through a collaborative project with the Policy Research in Science and Medicine (PRISM) unit of the Wellcome Trust in London. We have sought to match our database with PRISM's research outputs database (ROD) which contains details of all the funding acknowledgments carried by biomedical research articles. For 1993 and 1994 their database was extended to cover Australian articles. We are now able to undertake a bibliometric analysis based on these acknowledged sources of funding. This enables us to identify publications that result from research funded by the NHMRC (among many funding bodies) across all granting schemes.

When researchers make acknowledgments to funding agencies, they may be indicating some of the following:

- that the research would not have been possible without the grant;
- that the research was assisted at the margin by the grant;
- that the grant was one of several supporting the project;
- that they are complying with a grant protocol requiring acknowledgment even where the actual contribution of the grant was minor.

Without knowing the scale of a particular grant in relation to the actual costs of the project, it is difficult for funding agencies or students of acknowledgments' data to derive strong conclusions from the practice of acknowledgment. In these respects, acknowledgments, as we later note, are an imperfect guide to the relationship between funding and outcomes. The final reports of grants, which list particular publications arising from a specific funding source, may prove to be a more reliable guide.

It is also important to distinguish between two types of research funding, which we will designate as internal and external. Internal funding sources, derived principally from the general recurrent budget of the institution to which a researcher is affiliated, are rarely acknowledged explicitly; at most, this support is acknowledged implicitly through the address byline given in an article. The acknowledgments that we are analysing in this report are primarily external in origin and are in addition to the implicit internal funding received.

Nevertheless, patterns of acknowledgment, when they are carefully studied and classified, provide an important general map of the nexus between the evaluation processes of grant agencies and the outcomes of those decisions. It is important to anticipate one analytical problem arising in this regard. Granting agencies have a stake of their own in aligning themselves with 'winners'. All granting agencies have Boards, Ministries and other superior bodies scrutinising how well they spend their funds and there are strong imperatives for granting bodies to wish not only to create 'winners' but also to get with existing 'winners'. Accordingly, while we later refer to the good relationship between the success of researchers in securing external grants and their visibility in the international journal literature as showing the success of peer

selection processes, we are aware that this relationship may also be evidence of shrewd investment by granting bodies.

It is also important to note that not all sources of external funds are acknowledged in publications. PRISM undertook a detailed study of the extent to which UK authors acknowledged their funding sources, and the reasons why some sources were not mentioned<sup>1</sup>. The extent to which the NHMRC will be an acknowledged source of funds for any article will depend in part on the perceived normal practice for acknowledgments in Australia and the degree to which the NHMRC requires this recognition. This question will be discussed more fully later in the report and we will examine the under-estimation this may cause of the volume of research supported by the NHMRC.

This report is presented in sections. First, we describe in detail the methodology used in the analysis (section 2). Next, in section 3, we place Australia's biomedical research in context, using comparative world and/or UK data. Section 4 analyses the funding acknowledgments given by Australia's biomedical research, while section 5 analyses NHMRC-funded research.

---

<sup>1</sup> G. Lewison, G. Dawson and J. Anderson, 'The behaviour of biomedical scientific authors in acknowledging their funding sources' in M. Koenig and A. Bookstein (eds), *Fifth International Conference of the International Society for Scientometrics and Informetrics*, Learned Information Inc, New Jersey, 1995.

## 2 METHODOLOGY

### 2.1 Data sources

#### 2.1.1 *The REPP database*

The REPP database was created from data files purchased from the Institute for Scientific Information (ISI) for the period 1981-95. It captures all publications with an Australian address in the three major ISI Indices: Science Citation Index (SCI), Social Sciences Citation Index (SSCI) and Arts & Humanities Citation Index (A&HCI). The database also contains the yearly counts of citations in ISI indexed journals to each of these Australian publications. The REPP database as it now stands contains over a quarter of a million records of Australian publications.

#### 2.1.2 *PRISM's ROD database*

In 1993 PRISM commenced the construction of a database containing the bibliographic details of all UK biomedical research articles. All articles were inspected in London libraries and the funding acknowledgments these contained were noted<sup>2</sup>. ROD contains articles published from 1988 onwards and is updated annually. For the 1993 and 1994 updates, the coverage of the database was extended to include publications from Australia, New Zealand and South Africa.

Each funding acknowledgment is allocated five codes:

- i. Type of funding
  - Intramural support, implied by an address on the publication (e.g. it includes the name of the collecting charity)
  - Extramural grants and contracts
  - Travel funding
  - Personal support such as fellowships, studentships or career development awards
  - In-kind support
  - Non-specified financial support
- ii. Organisational type, or sector (of the funding body)<sup>3</sup>
  - Charity (collecting)
  - Foundation (endowment or single source)
  - Government agency
  - Government department
  - Hospital trustees (charities associated with hospitals, including endowments)
  - Industry, non-pharmaceutical

---

<sup>2</sup> D. Jeschin, G. Lewison and J. Anderson, 'A bibliometric database for tracking acknowledgements of research funding' in M. Koenig and A. Bookstein (eds), *Fifth International Conference of the International Society for Scientometrics and Informetrics*, Learned Information Inc, New Jersey, 1995.

<sup>3</sup> In some analyses the sectors are combined into 3 groups — Government (Government agency, Government department, Local or regional authority), Non-profit (Charities, Foundations, Hospital Trustees, Not-for-profit, Mixed collecting) and Industry (Pharmaceutical and Non-pharmaceutical industry and subsidiaries, Veterinary practice).

- Subsidiary of industrial organisation, non-pharmaceutical
- Industry, pharmaceutical
- Subsidiary of industrial organisation, pharmaceutical
- Local or regional authority
- Not-for-profit
- Mixed collecting, charity and endowment
- Veterinary practice
- Unidentified

iii. Funding body code

iv. Parent body code, for subsidiaries of industrial organisations and units within organisations

v. Country in which the funding body is located

### 2.1.3 *Matching the REPP and ROD databases*

REPP supplied PRISM with bibliographic details of 13,620 Australian publications from 1993 and 1994 that appeared in the list of biomedical journals PRISM had supplied and some additional items that were considered relevant. ROD was then interrogated on the basis of this information, 12,429 of the Australian publications (91%) were identified. Of those not found in ROD, 743 publications were in journals not covered by the database, and for 448 bibliographic details were insufficient to be confident of the matching process.

Analysis was made of the impact of the unmatched items to determine if their exclusion from the main body of the analysis was significant (see section 4.2).

## 2.2 **Under-acknowledgment of funding sources**

As mentioned in the introduction, PRISM conducted two surveys to gain insight into the behaviour of UK researchers in relation to the way they acknowledged funding. These surveys found that, in 90% of cases where publications carried no acknowledgment of funding, this was an accurate reflection of the funding situation for the research they represented. These publications were the result of research primarily funded from internal institutional sources for which no acknowledgment (other than in the address by-line) would be expected.

Where the assistance received from a funding body accounted for more than 40% of the total support for the project, researchers consistently acknowledged that support. Where the assistance accounted for between 20% and 40% of total support, the rate of acknowledgment fell to around half, while if the assistance accounted for less than 20% it was seldom reported. Where the assistance was a major source (>40% of total funding), omissions of acknowledgment were found to be inadvertent. For less major sources of funds, researchers made deliberate decisions to omit mentioning the support.

The level of acknowledgment in Australian biomedical publications is very similar to that for the UK (see Chart 8), so it is unlikely that Australian practice will differ

significantly from that for the UK. We hope to test this more rigorously in a proposed project we have before the NHMRC, described briefly in the conclusion (section 6).

One aspect of under-acknowledgment we did investigate further related to NHMRC block-funded grants to institutes. We tabulated how often these institutions explicitly acknowledged NHMRC support in their publications. The results are shown in table 1.

*Table 1: Funding acknowledgments by selected medical research institutes*

<b>Institution</b>	<b>NHMRC acknowl.</b>	<b>NHMRC not acknowl.</b>	
		<b>Others acknowl.</b>	<b>No acknowl.</b>
Walter and Eliza Hall Institute	190	65	60
Howard Florey Institute	57	5	8
Murdoch Institute	27	10	25
Baker Medical Research Institute	74	40	50
Garvan Institute	62	13	14
<b>Total</b>	<b>410</b>	<b>130</b>	<b>157</b>

Fifty-nine percent of all biomedical publications from these institutions acknowledge funding from NHMRC. Nineteen percent acknowledge funding from other sources, but not the NHMRC. As the institutions do receive significant funding from other sources this figure may be accurate. Of more concern are the publications acknowledging no funding sources at all. Is it safe to assume that all these result from the core NHMRC block funding? The small number involved, however, means that the analysis of NHMRC-funded research will not be affected.

### **2.3 Classification to fields of research - journal set analysis**

The ideal (though impossible) scenario for field of research analysis would be to classify each publication separately. Standard practice is to classify the journal which carries the publication<sup>4</sup>. ISI has its own descriptive classification system involving around 200 subject categories and we have, for a number of previous exercises, translated these as closely as possible into the fields and sub-fields of the Australian Standard Research Classification (ASRC). The ASRC was prepared by the Australian Bureau of Statistics for use in the measurement and analysis of research and experimental development undertaken in Australia. Most ISI subject categories do slot neatly into one of the ASRC sub-fields, but some problems were encountered and these are noted in Appendix A where we detail subject categories ascribed to each biomedical ASRC sub-field.

In this study we have included analyses using both ASRC sub-field journal sets and also the individual ISI subject category journal sets (where numbers are sufficiently robust). Although ASRC is the standard classification used in the analysis of R&D indicators in Australia, it obscures some detail requiring use of the finer-grained analysis in the ISI sets. In particular, the ASRC sub-field of Clinical Sciences, which

<sup>4</sup> See F. Narin, *Evaluative Bibliometrics: The Use of Publication and Citation Analysis in the Evaluation of Scientific Activity*, Computer Horizons Inc., New Jersey, 1976.

is created by the amalgamation of 20 ISI categories, accounts for over 50% of research in biomedicine. This one sub-field drives much of the analysis of biomedicine as a whole.

It should be noted that ISI allocates some journals to more than one subject category with the effect of some double counting between fields and/or sub-fields.

## 2.4 Bibliometric measures

The results of our analyses are primarily presented in the form of charts or tables showing percentage distributions. The data underlying these tables and charts are given in Appendix C.

### 2.4.1 *Most highly cited publications*

For all relevant ASRC biomedical sub-fields and ISI subject categories, we calculated the number of citations required to rank a 1993 or 1994 publication in the top 1% and 5% of most highly cited publications in Australia. By extracting publications that fell within these bands, we were then able to identify the funding acknowledgments given for these high impact articles. In addition, we have included in Appendix C details of the most highly cited Australian publication in each of the biomedical ISI subject categories.

### 2.4.2 *Actual and expected citation rates*

In this measure, the term *Actual Citation Rate* refers to the average number of citations actually achieved by the publications of the unit under study. The term *Expected Citation Rate* refers to the average number of citations achieved by *all* publications in the journals publishing the articles of the unit under study. The ISI has supplied REPP with average citation rates for all publications in its journals for each year of publication. The calculations are weighted by the year of publication and the frequency of publication in particular journals.

The graph essentially, therefore, allows a comparison of *Actual* and *Expected* citation rates. The diagonal on the graph indicates the point at which actual and expected citation rates converge so that, where the unit under study appears above this diagonal line, it is achieving a rate of citation higher than the 'world' average for the journals in which it publishes; where it appears below the line, it is achieving a rate of citation lower than the 'world' average for its publications in those journals. Where a vertical line is drawn on a graph, it indicates the citation per publication figure for all publications in all journals in the field under study, that is, the SCI average.

In these graphs, the relationship to the diagonal line is the salient point to observe. A point above the line and at the right-hand end of the x-axis indicates above world

performance in high impact journals; a point below the line and to the left indicates below world performance in low impact journals. Between these extremes, there are many possibilities, such as appearing in high impact journals below the world expected rate or appearing in low impact journals but performing at a higher rate of citation than the expected world rate. Judgments about these relationships should be made carefully.

It is important to note here that the position of the diagonal line is driven largely by publications from the major research centres of America and Europe. For Australian publications to attract citations at or near this level is a strong performance, to achieve citations at a greater rate is an exceptionally strong performance.

### 2.4.3 *Level of collaboration*

The REPP database enables us to distinguish between publications with different types of authorship, viz.:

<i>Single author</i>	one author only (i.e. no collaboration);
<i>Group</i>	more than one author from the same AOUs <sup>5</sup> within an institution;
<i>Institutional</i>	more than one author from different AOUs within an institution;
<i>National</i>	more than one author from different institutions in Australia;
<i>International</i>	more than one country listed in the author addresses.

The classification is not hierarchical and all collaborations present in a publication will be ascribed to it. For instance, if a publication involves collaboration between a number of Australian institutions as well as an overseas institution, it will be classified as both *International* and *National*.

### 2.4.4 *Research level*

Computer Horizons Inc. (CHI) has developed a journal classification scheme that categorises most SCI journals to one of four research levels based on the research orientation of the journals. In biomedicine, the four levels of research are:

- Level 1    Clinical Observation;
- Level 2    Clinical Mix;
- Level 3    Clinical Investigation;
- Level 4    Basic Scientific Research.

An indicator of the research level of a field or set of journals is an important characteristic in bibliometric analysis. Studies indicate that the level of citation increases with the level of research, that is, basic scientific research is more highly cited than more applied research. As we shall see in the following analysis, different levels of research also appear to have the characteristic of attracting funding at differential rates.

---

<sup>5</sup> Academic Organisational Unit or CSIRO division.

#### 2.4.5 *Relative citation impact*

The relative citation impact (RCI) compares Australia's share of publications with the share of citations these publications achieve. If the field or category has equivalent shares of publications and citations, it will have an RCI of 1.00. If it achieves a greater share of citations than publications, its RCI would be greater than 1.00. Conversely, if its share of citations falls below its share of publications, then its RCI would be less than 1.00. RCIs measure the relative impact of Australia's research in a field of research as a whole, in contrast to the measure of actual and expected citations which is concerned with performance only in the sub-set of journals in which Australia actively publishes.

### 2.5 Coverage issues

Before any discussion of publications and citations occurs, it is important to be clear about the proportion of research output from the areas under study covered by bibliometric measures. ISI, on which this bibliometric analysis relies, only indexes journal articles. Published biomedical research does appear predominantly in journal articles. However, the extent to which the journals carrying the articles are indexed by ISI varies considerably across the different sub-fields of research. A study undertaken in 1994<sup>6</sup> analysing, among other aspects, the proportion of journal articles appearing in ISI-indexed journals, reports the following coverage rates for a number of the biomedical sub-fields:

Immunology	87%
Medical microbiology	85%
Genetics, molecular biology and biotechnology	81%
Clinical sciences	81%
Pharmacology	77%
Physiology	64%
Public health research	24%
Health services research	0%

ISI databases provide a comprehensive coverage of journal articles in most biomedical sub-fields, but caution must be used in the case of Public health research and Health services research. Only a limited proportion of the journal articles from these sub-fields is captured by ISI, so any bibliometric analysis undertaken can only be regarded as indicative and based on a very small sample.

---

<sup>6</sup> National Board of Employment, Education and Training, *Quantitative Indicators of Australian Academic Research*, Commissioned Report No.27, AGPS, Canberra, 1994.

### 3 OVERVIEW OF AUSTRALIAN BIOMEDICAL RESEARCH

In this section we seek to establish the context for our subsequent analysis of NHMRC-funded research. We present here an analysis of Australia's strengths and weaknesses in the biomedical sciences. We relate Australia's performance to world averages and, where comparable data is available from PRISM, to United Kingdom averages<sup>7</sup>.

The coverage of the analyses in this section is:

- ⊕ articles published in 1993 and 1994
- ⊕ citations received between 1993 and 1995
- ⊕ 14 biomedical sub-fields of the ASRC
- ⊕ 58 biomedical ISI subject categories
- ⊕ all Australian biomedical publications (whether matched to ROD database or not)

#### 3.1 Share and distribution by ISI subject category

We have tabulated Australia's share of publications in each of ISI's subject categories that constitute the medical and health sciences. In Table 2 below we list the ten categories for which Australia's share is highest, and the ten for which it is lowest.

Australia's share of biomedical publications in total is 2.5%

Table 2: Australia's share of biomedical publications in selected ISI subject categories

Highest ISI categories	%	Lowest ISI categories	%
Critical care	9.3	Urology & nephrology	1.9
Parasitology	8.3	Oncology	1.6
Reproductive systems	6.9	Toxicology	1.6
Medicine, miscellaneous	6.0	Orthopedics	1.6
Anesthesiology	5.8	Cardiovascular system	1.5
Substance abuse	4.9	Allergy	1.5
Medicine, general & internal	3.8	Otorhinolaryngology	1.5
Psychiatry	3.8	Chemistry, clinical & medicinal	1.4
Biology	3.6	Radiology & nuclear medicine	1.4
Genetics & heredity	3.5	Dermatology & venereal diseases	0.9

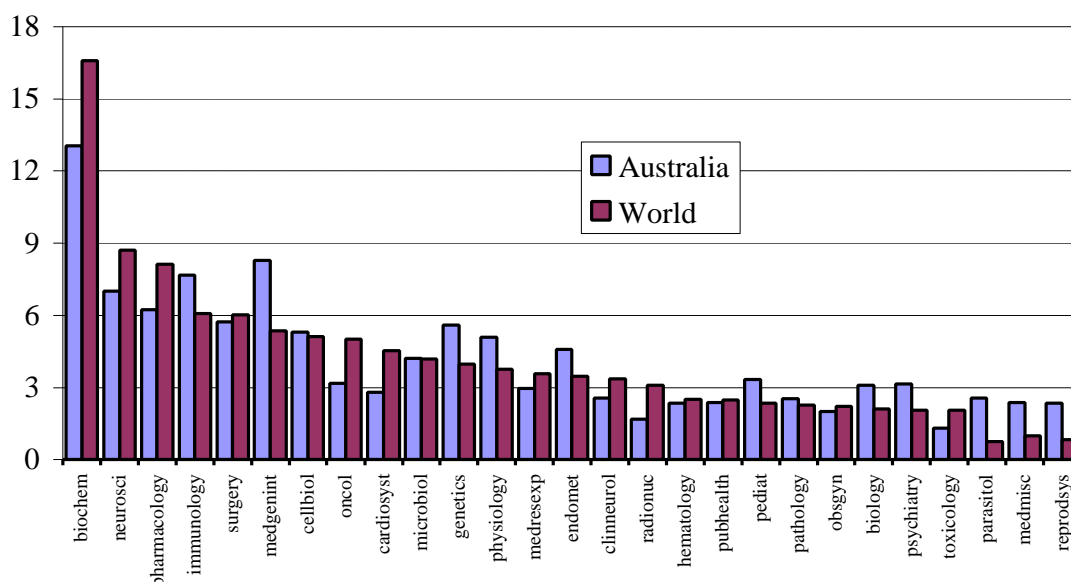
The underlying data for this table is given in Appendix C, Table C1.

Table 2 shows those categories in which Australia has either a very high or a very low representation relative to its share of biomedical publications in general. However, as some of these categories are quite small, the over- or under- representation may relate to small numbers of publications. A clearer picture of the focus of Australia's research effort can be gained by distributing total publications across ISI subject categories, as shown in Chart 1. The categories shown in Chart 1 are limited to those

<sup>7</sup> G. Dawson, B. Lucocq, R. Cottrell and G. Lewison, *Mapping the Landscape: National Biomedical Research Outputs 1988-95*, Policy Report No. 9, Wellcome Trust, UK, 1998.

which account for more than 2% of the world's or Australia's biomedical publications, so some of the smaller categories listed in Table 2 do not appear (eg. Critical care and Dermatology & venereal diseases).

*Chart 1: Distribution of Australian biomedical publications by ISI subject category*



The underlying data for this chart is given in Appendix C, Table C2.

As is the case for the total ISI database, the greatest concentration of effort is in the Biochemistry & molecular biology category, though the proportion of Australian publications in this category is smaller than it is worldwide. The larger categories in which Australia has a high representation are Immunology, General & internal medicine, Genetics & heredity, Physiology, Endocrinology & metabolism, Pediatrics, Biology, Psychiatry, Parasitology, Miscellaneous medicine and Reproductive systems. Those larger categories in which Australia has a low representation are Biochemistry, Neurosciences, Pharmacology & pharmacy, Oncology, Cardiovascular system and Radiology & nuclear medicine.

### 3.2 Share and distribution by ASRC sub-field

When we translate the ISI categories into the ASRC sub-fields of medical and health sciences (and three other medically oriented sub-fields), Australia's relative presence in each is shown in Table 3.

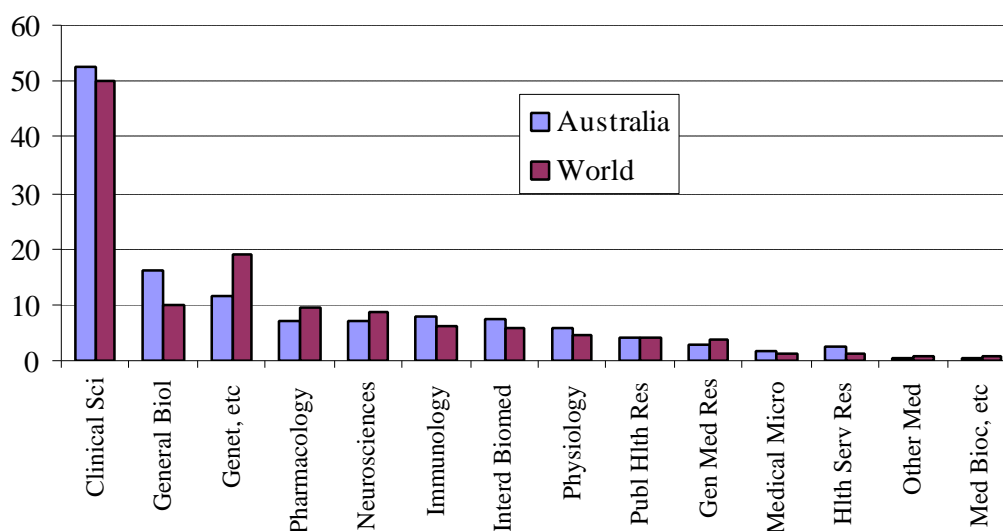
Table 3: Australia's share of biomedical publications in ASRC sub-fields

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 and health sciences	1.8
Medical biochemistry and clinical chemistry	1.4

The underlying data for this table is given in Appendix C, Table C3.

The sub-fields in Table 3 are ranked by Australia's share of world publications. Australia's presence in the sub-fields of Clinical sciences and Public health research is at the average level for its biomedical publications in general. Those sub-fields in which Australia has a strong or weak presence are readily apparent from this table and from the graphical representation of the data in Chart 2 where we distribute total publications across the sub-fields.

Chart 2: Distribution of Australian biomedical publications by ASRC sub-field



The underlying data for this chart is given in Appendix C, Table C4.

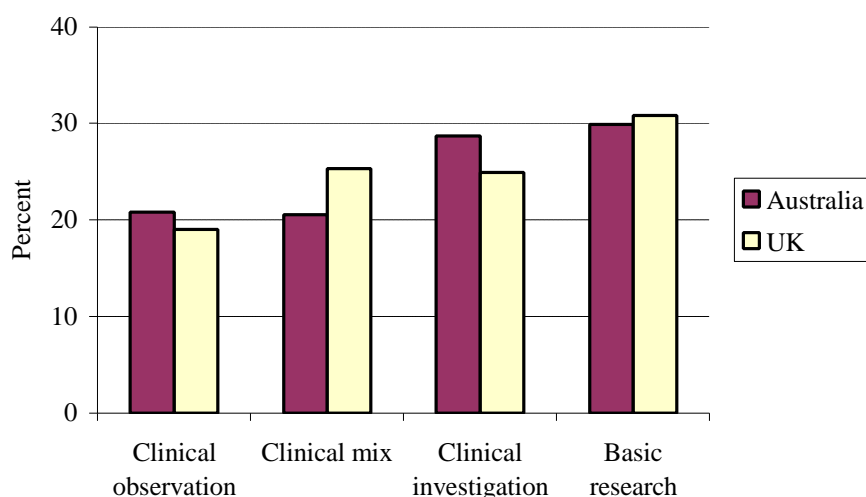
The sub-field of Clinical sciences, both in Australia and worldwide, accounts for 50% of all biomedical research. The implication of this is apparent: when using the ASRC classification scheme, this sub-field drives the data in many analyses in biomedicine. It can also be seen that while Australia's presence in Health services research is very significant within that area of research, as seen in Table 3, the sub-field constitutes a very small proportion of total biomedical research.

The next two largest categories are the General biology (the sub-field we created), and Genetics & molecular biology, though Australia’s focus on these two areas is at opposite ends of the spectrum — we focus more on General biology than we do on Genetics & molecular biology, relative to the rest of the world.

### 3.3 Distribution by research level

We used CHI’s classification scheme for journals to determine the type of research covered by our analysis of Australia’s biomedical research. Although not every journal carrying an Australian based article was covered by the CHI scheme, missing journals constituted an insignificant proportion of the total. We were able to draw on identical data from PRISM for a comparison between Australia and the UK, and the results of the analysis are shown in Chart 3.

*Chart 3: Distribution of Australian biomedical publications by level of research*



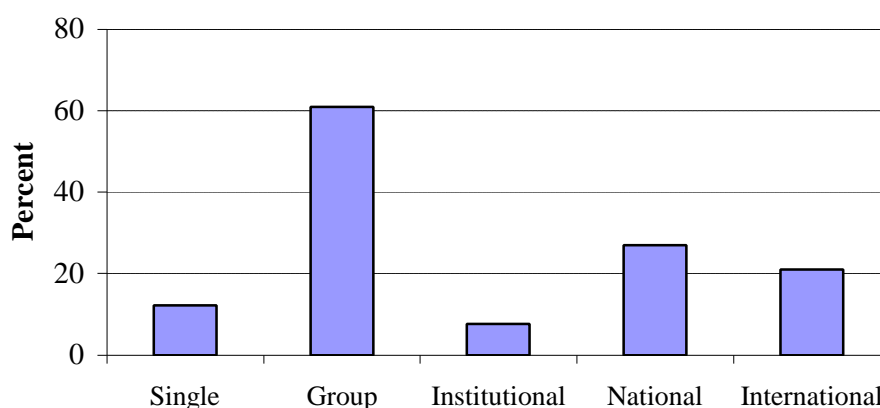
The underlying data for this chart is given in Appendix C, Table C5.

The distributions exhibited by the publications of the two countries are broadly similar. Both countries show a relatively even mix across the four categories, with proportions between 20% and 30%, and both show the higher proportions in the more basic journals. However, Australia’s publications at the more applied end of the scale are divided more evenly between clinical observation and clinical mix.

### 3.4 Distribution by level of collaboration

The level of collaboration involved in the publication of biomedical research articles, as determined by the addresses listed on these articles, is shown in Chart 4.

Chart 4: Distribution of Australian biomedical publications by level of collaboration



The underlying data for this chart is given in Appendix C, Table C6.

Single authorship plays only a small part in Australian biomedical publications. In contrast, 60% of all the publications involve group collaboration — they list more Australian authors than they do Australian addresses. There is very little collaboration between different organisational units within the same institution<sup>8</sup>, but there are significant amounts of national (inter-institutional collaboration within Australia). The level of international collaboration is somewhat lower than the 25% undertaken by Australian science in general.

### 3.5 Impact of Australian research – ASRC sub-fields

Sections 3.1 to 3.4 have looked at the distribution of Australia’s research effort in biomedicine using a variety of characteristics. In this section of our analysis we will introduce measures aimed at quantifying the impact of the research, in addition to measures that are of a more descriptive nature. Specifically, we will include in this and the next section analyses based on relative citation impact and actual and expected citation rates.

The RCI measure compares the impact of Australia’s publications (measured by its share of citations) with the size of the research effort (measured by its share of publications). Data for each ASRC biomedical sub-field is shown in Table 4.

---

<sup>8</sup> We are able to calculate this for universities, government departments and CSIRO where we have ‘cleaned’ addresses to a level lower than the whole institution. We cannot, however, calculate this for hospitals as their addresses are ‘clean’ only to the level of institution. The true figure for this level of collaboration, particularly as we are referring here to the biomedical sciences, would in reality have been significantly higher if we had been able to determine the amount of intra-institutional hospital collaboration.

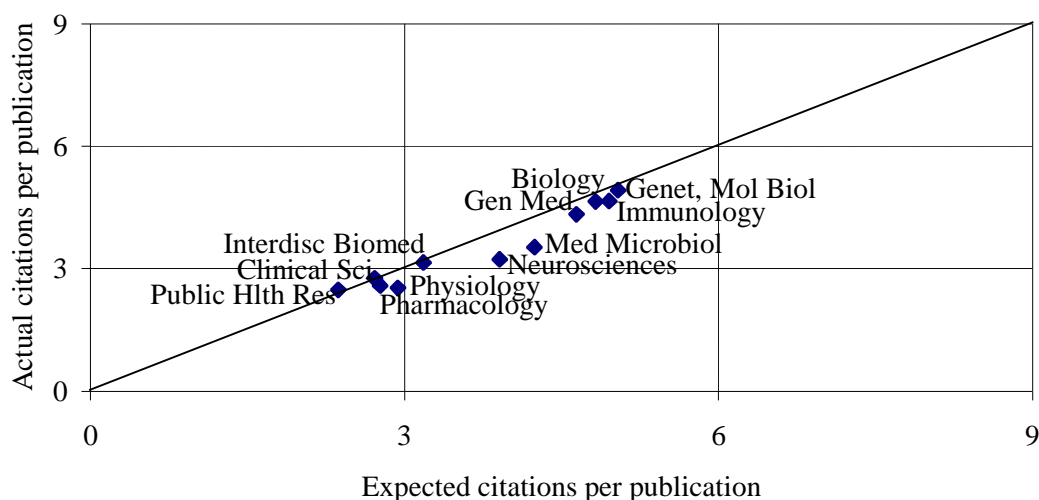
Table 4: Relative citation impact of Australian biomedical publications in ASRC biomedical sub-fields

	Share pubs	Share cites	RCI
Health services research	5.6	7.1	1.27
Public health	2.6	3.0	1.16
General medical & health sci	2.1	2.3	1.13
Interdisciplinary biomedicine	3.3	3.4	1.03
Pharmacology	1.8	1.9	1.02
Clinical sciences	2.6	2.6	1.00
Immunology	3.1	3.0	0.99
Neurosciences	2.0	1.6	0.81
General biology	2.1	1.7	0.80
Genetics & molecular biology	2.9	2.1	0.74
Physiology	3.4	2.5	0.74
Medical microbiology	3.1	2.2	0.69

The underlying data for this table is given in Appendix C, Table C7.

Table 4 shows the ASRC sub-fields split evenly between those achieving parity or better, and those with an RCI below 1. However, when the size of the sub-fields is taken into consideration (specifically, the fact that Clinical sciences accounts for over half of all biomedical pubs), we find that nearly 70% of Australia's biomedical publications fall in the seven sub-fields achieving an RCI of 0.99 or better.

Chart 5: Actual and expected citation rates — ASRC biomedical sub-fields



The underlying data for this chart is given in Appendix C, Table C8.

Chart 5 shows most sub-fields converging on the diagonal line, where actual citation rates equal expected citation rates. At first sight this appears to contradict the results shown in Table 4, where a number of sub-fields have quite low RCIs and some have RCIs well above 1. The explanation for this lies in the type of journals in which Australia's publications appear.

For most sub-fields where Australia has a low RCI, the result is due to its publications appearing in journals of lower than average impact. A good example of this is the Genetics sub-field where the average expected impact of Australia's publications is

5.04. Australia does achieve citations at a rate very close to this (4.92), but the average impact for all Genetics publications worldwide is 6.61, and Australia falls well short of this level.

Conversely, in sub-fields where Australia has a high RCI, this result is due mainly to its publications appearing in journals of high average impact. In Public health research, the average expected citation rate for Australia's publications is 2.37 and, while it does achieve better than this level at 2.49, the worldwide average is only 2.15.

We have calculated the world average citation impact in each sub-field and charted the results using the same scale as in Chart 5. This chart can be found in Appendix E, Chart E1. By comparing the two sets of charts, it can be seen that for the sub-fields with a high RCI, Australian publications appear in journals of high average impact, and for most sub-fields exhibiting a low RCI, Australian publications appear in journals of low average impact.

The exceptions to the foregoing analysis are Neurosciences and Medical microbiology, where Australia's publications are appearing in journals of around average impact, but the level of citations they receive fall short of the expected level.

### 3.6 Impact of Australian research – ISI subject categories

To gain a deeper understanding of the performance in each sub-field, we turn next to an analysis of the ISI categories that constitute the ASRC sub-fields. Table 5 details the relative citation impact for those ISI categories significantly above or below 1.00. Details for all categories are given in Appendix C. The analysis is limited to those categories in which Australia has more than 50 publications.

*Table 5: Relative citation impact of Australian biomedical publications in selected ISI categories.*

	Share Pubs	Share Cites	RCI
<i>Highest ISI categories:</i>			
Transplantation	3.0	4.7	1.58
Tropical medicine	3.4	5.4	1.57
Nutrition & dietetics	2.3	3.6	1.55
Obstetrics & gynecology	2.3	3.4	1.49
Orthopedics	1.6	2.1	1.32
Vascular diseases	1.9	2.5	1.31
Cardiovascular system	1.5	2.0	1.28
Medicine, miscellaneous	6.0	7.5	1.26
Reproductive systems	6.9	8.7	1.25
Respiratory system	2.4	2.8	1.20

*Lowest ISI categories:*

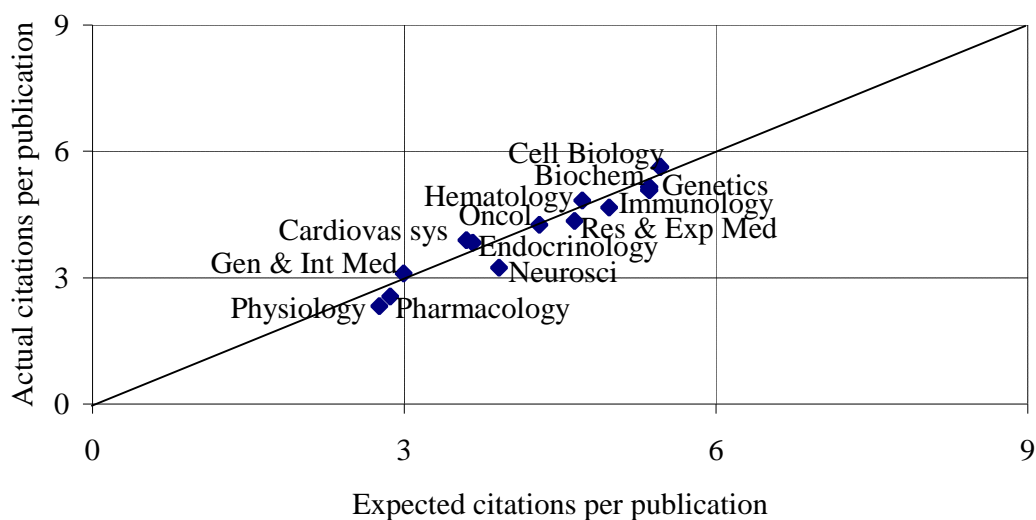
Neurosciences	2.0	1.6	0.81
Geriatrics & gerontology	2.7	2.1	0.79
Anatomy & morphology	3.3	2.5	0.74
Physiology	3.4	2.5	0.74
Biology, miscellaneous	2.8	2.0	0.70
Virology	3.1	2.2	0.69
Cell biology	2.6	1.8	0.68
Dentistry / oral surgery & medicine	3.1	2.1	0.68
Biometrics	2.0	1.3	0.67
Pathology	2.8	1.6	0.59

The underlying data for this table is given in Appendix C, Table C9.

There is no direct relationship between the size of Australia's share of research in a category and the impact of that research. Categories in which Australia's RCI are high are spread across categories in which Australia has high, low and average representation in terms of absolute publication numbers.

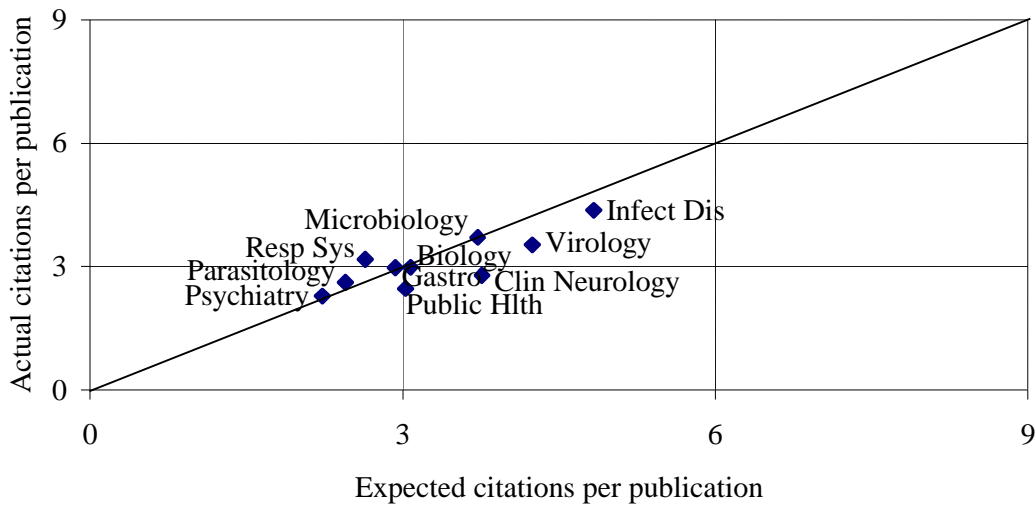
In the following two charts, Charts 6 and 7, we present an analysis of actual and expected citation rates for selected ISI categories. The groupings of categories and the selection of axis scales were chosen to replicate those used in section 5.5 of the analysis of NHMRC funded research (Charts 19 and 20). This was to simplify the direct comparison of all Australian research in a field with that acknowledging NHMRC funding.

*Chart 6: Actual and expected citation rates — selected ISI categories*



The underlying data for this chart is given in Appendix C, Table C10.

Chart 7: Actual and expected citation rates — selected ISI categories



The underlying data for this chart is given in Appendix C, Table C10.

As with the analysis of ASRC sub-fields, the analysis of ISI categories shows most converging on the diagonal line. Again there appears to be a contradiction between what we see in these charts and the data contained in Table 5 (and in the expanded table showing all categories in Appendix C, Table C10). The tables detail wide variations in RCI scores for a number of categories represented in these charts. The explanation is the same as for the ASRC sub-fields in section 3.5 — it is always important to examine the individual components of data that comprise the two measures.

We have calculated the world average citation impact in each category and charted the results using the same scale and same groupings of categories as in Chart 6 and 7. These charts can be found in Appendix E, Charts E2 and E3. By comparing the two sets of charts, it can be seen that, in general, for the categories with a high RCI, Australian publications appear in journals of high average impact, and for most categories exhibiting a low RCI, Australian publications appear in journals of low average impact.

Cell biology is a good example of a category with a low RCI (0.68) that appears to be ‘doing well’ on Chart 6, as Australia’s publications in this category do achieve a higher average citation rate than expected for the journals in which the articles appear (an actual citation rate of 5.63 compared to an expected citation rate of 5.46). But the SCI average for all articles in journals classified as Cell biology is 8.26 — 50% higher than the average for the journals in which Australian publications occur. This data is reflected in Australia’s low RCI while achieving above the expected level of citation for the journals in which it publishes. These are on average quite low impact journals for the category.

Cardiovascular systems is a good example of the reverse situation. Australia has a high RCI of 1.28 and while it does perform better than expected in the journals in which it publishes (3.90 actual cpp, 3.60 expected cpp), the difference is not as large as the RCI would indicate. The explanation can be seen in the much lower figure for the SCI average for all publications in journals classified as Cardiovascular systems — 3.05.

While Australia's RCI rates can generally be explained by the impact of the journals in which it is publishing, this does not apply to all categories and care needs to be taken when examining individual categories. A case in point is Public health research. Australia's RCI in this category is a 'healthy' 1.06, however in Chart 7 we see that its actual citation rate falls below the expected level for the journals in which it publishes. These two results are explained by the fact that while Australia's actual citation rate of 2.47 is below the expected citation rate of 2.69, it is still higher than the world average for the category of 2.33.

### 3.7 Section summary

The main findings of the bibliometric analyses of all Australian biomedical publications are:

- ✦ Australia's share of the world biomedical publications is 2.5%.
- ✦ Australia's shares of ASRC sub-fields range from 1.4% (Medical biochemistry) to 5.6% (Health services research).
- ✦ Australia's shares of ISI subject categories range from 0.9% (Dermatology & venereal diseases) to 9.3% (Critical care).
- ✦ Approximately 60% of Australia's biomedical publications appear in journals classified to the two most basic research levels; 40% appear in more applied journals.
- ✦ 60% of Australia's publications involve group collaboration, while 20% incorporate international collaboration.
- ✦ Australia's relative citation impacts for the ASRC sub-fields range from 0.69 (Medical microbiology) to 1.27% (Health services research).
- ✦ Most sub-fields achieved close to the expected level of citations for the journals in which they published, with only Medical microbiology and Neurosciences falling short of this level.
- ✦ Australia's relative citation impacts for ISI subject categories range from 0.59 (Pathology) to 1.58 (Transplantation).
- ✦ Most subject categories achieved close to the expected level of citations for the journals in which they published. Public health research, Clinical neurology, Virology and Neurosciences were significantly below the expected level, while Respiratory systems was significantly above.
- ✦ A number of sub-fields and categories exhibited low RCIs but expected levels of citations for the journals in which they published. In such cases, the average impact of these journals was relatively low, hence explaining the apparent contradiction between the two measures.

## 4 THE FUNDING OF AUSTRALIAN BIOMEDICAL RESEARCH

Section 4 considers publications that could be matched to PRISM's ROD. For the most part, we ignore those publications which fell within our designated biomedical subject categories and sub-fields, but which, for one reason or another could not be found in ROD. We analyse the sources of funding for biomedical research as they are acknowledged on the outcomes of that research — published articles indexed in the SCI.

In this study, the term *funded* means that acknowledgment was made (usually explicit, but sometimes implicit) in a research publication to an *external* source of funding. We are not concerned in this report with intramural funding through the internal recurrent budget of the institutions to which the authors of research publications are affiliated.

Parts 7 to 10 of this section distinguish between funded and unfunded publications. We have defined funded in the preceding paragraph. In this study, the term *unfunded* refers to those publications that were matched to the ROD database but which contained no acknowledgments. It does not include publications for which no match was found.

In parts 9 to 11 of this section, we undertake analyses aimed at providing some purchase on how successful different funding sectors (or funding bodies, or funding countries, etc) are at 'picking the winners' — whether they are successful at identifying the researchers or research projects likely to have a high impact on the research community.

The coverage of the analyses in this section is:

- ⊕ articles published in 1993 and 1994
- ⊕ citations received between 1993 and 1995
- ⊕ the 14 biomedical sub-fields of the ASRC
- ⊕ the 58 biomedical ISI subject categories
- ⊕ publications not matched to the ROD database are excluded from the analyses

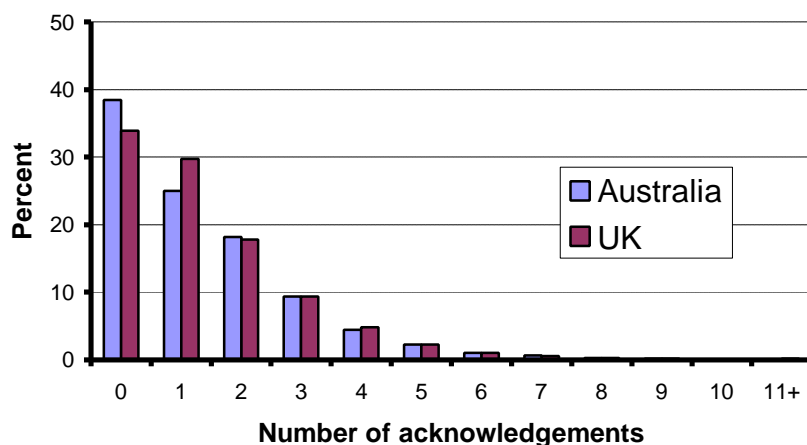
### 4.1 The size of the analysis

As mentioned previously, 12,429 of 13,620 (91%) of Australia's biomedical publications were matched with publications in the ROD. Of these, 4,777 contained no acknowledgments, while the remaining 7,650 contained 16,841 acknowledgments of funding. This provided us with a body of data sufficiently large to undertake detailed analysis down to the level of ASRC sub-field and ISI subject category.

## 4.2 Number of funding acknowledgments

We were able to compare the number of acknowledgments contained in Australian biomedical publications with the number contained in similar UK publications (Chart 8).

*Chart 8: Distribution of funded Australian biomedical publications by number of funding acknowledgments*

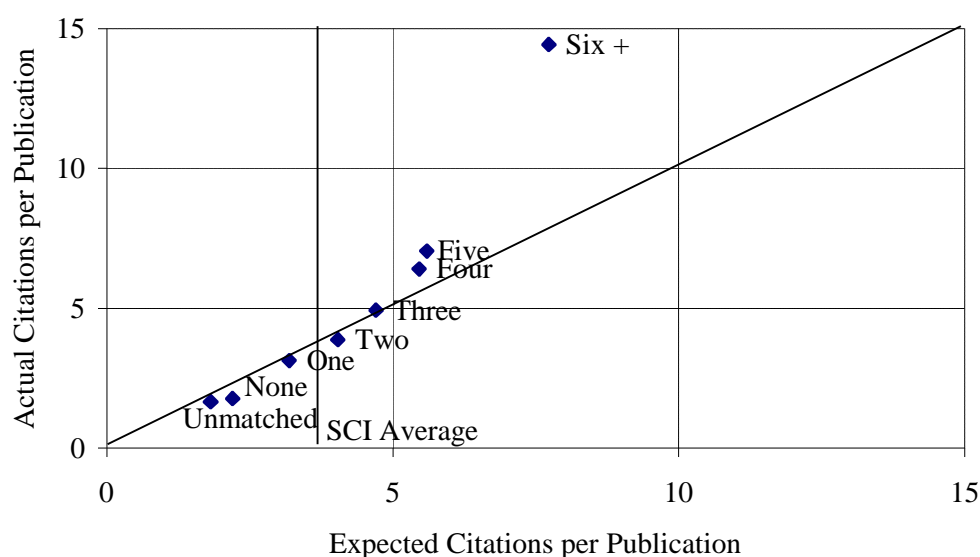


The underlying data for this chart is given in Appendix C, Table C11.

The distribution of acknowledgments in Australia's publications mirrors that for UK publications, though with a slightly larger Australian proportion not listing any (38.4% compared to 33.9%). Of those that did acknowledge an external funding source, the majority (60%) listed more than one.

We sought to determine if there was any difference in the impact achieved by publications with different numbers of acknowledgments, and used the measure of actual and expected citations to examine this question (Chart 9).

Chart 9: Actual and expected citation rates by number of funding acknowledgments



The underlying data for this chart is given in Appendix C, Table C12.

There are at least two ways of interpreting this chart:

- i. Research judged by the scientific community as worthy of close scrutiny (as judged by citations) could be judged so even at the proposal stage — it was successful in attracting multiple sources of funding; and,
- ii. the peer review system used in examining research grant proposals works very well at identifying ‘successful’ research.

No doubt both interpretations hold true to a certain extent. But it is important to introduce a note of caution. These are highly aggregated figures, and data in later sections will show that what is true in general is not necessarily true in the particular. Not all highly cited publications are financed from a number of external sources — indeed some make no acknowledgment of external funding.

### 4.3 Type of funding

The ROD database contains information on the type of support mentioned in acknowledgments, and it is of interest here to investigate this characteristic of Australian funding.

Table 6: Type of funding acknowledged on Australian biomedical publications

Type of funding received	Number	%
Extramural grants and contracts	11522	68.4
Intramural support	2197	13.1
Personal support	1593	9.5
In-kind support	1456	8.7
Travel funding	46	0.3
Non-specified support	27	0.2

Two-thirds of all acknowledgments are direct grants and contracts, while a further 10% refer to assistance given in the form of scholarships, fellowships and meeting

travel expenses. Intramural support was inferred where no direct acknowledgment to a funding agency was given but it was implied in the address of the institution to which the researcher was affiliated. For example, ARC support was inferred for publications listing an Australian address of a Cooperative Research Centre, Special Research Centre or Key Centre of Teaching and Learning. Similarly, many UK addresses contained information linking them to one of the Research Councils, though this acknowledgment was not explicitly given in the publication. A significant proportion (30%) of industry funds came in the form of in-kind support.

#### 4.4 Funding sectors

The ROD database identifies 11 funding sectors and in Table 7 we show the distribution of acknowledgments across the sectors, distinguishing between those that are Australian and those that are from other countries. The total of all percentages will be significantly greater than 100% because of multiple acknowledgments within publications. Duplications within a sector have been removed, but not across sectors. For example, if a publication lists funding from the ARC, the NHMRC and the UK's MRC, we will count it only once in the Australian Government Agency sector (which covers the ARC and the NHMRC), but will also count it in the International Government Agency sector.

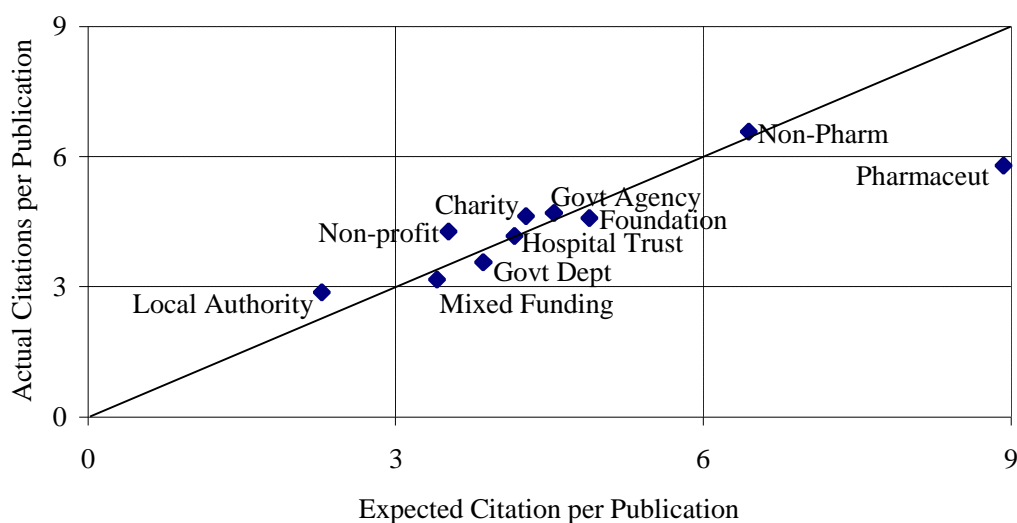
*Table 7: Distribution of acknowledgments by funding sector*

<b>Sector</b>	<b>No. Pubs</b>	<b>%</b>
<i>Australian:</i>		
Government agency	4370	68.8
Charity	1120	17.6
Non-profit organisation	892	14.1
Government department	543	8.6
Mixed fund	495	7.8
Local authority	464	7.3
Industry (non-pharmaceutical)	463	7.3
Foundation	417	6.6
Hospital trust	395	6.2
Industry(pharmaceutical)	163	2.6
Other	32	0.5
<i>Total</i>	<i>6348</i>	<i>100.0</i>
<i>International:</i>		
Government agency	1332	39.7
Industry (pharmaceutical)	663	19.7
Government department	545	16.2
Foundation	527	15.7
Charity	423	12.6
Industry (non-pharmaceutical)	421	12.5
Non-profit	386	11.5
Mixed fund	230	6.8
Local authority	45	1.3
Hospital trust	29	0.9
Other	556	16.6
<i>Total</i>	<i>3359</i>	<i>100.0</i>

Over two-thirds of external Australian funds come directly from government agencies. This is hardly surprising as this sector includes both the ARC and the NHMRC. But it is also important to note that, having removed duplications across constituent sectors, 37% of all publications containing acknowledgments list at least one non-profit source of funds, while only 8% list industry sources. This contrasts markedly to the UK experience where 27% of publications contain acknowledgments to the industry sectors.

To gain an insight of the relative impact of research funded by the different Australian sectors, we used the measure of actual and expected citation rates (Chart 10).

*Chart 10: Actual and expected citation rates by Australian funding sector*



The underlying data for this chart is given in Appendix C, Table C13.

After a perusal of Chart 10, two Australian sectors demand closer attention. The Pharmaceutical sector is funding research that is appearing in very high impact journals, but these publications are achieving citation levels significantly below the expected level. The non-profit sector, in contrast, is achieving a level of citation well above the expected level. All other sectors are aligned closely to the diagonal line, denoting actual citation rates very close to expected rates. Further detailed analysis would need to be done on other characteristics of the publications funded by these sectors to gain a fuller understanding of the strength of their performance. Level of research and field of research will influence a sector's position along the x-axis in this graph as both greatly influence the expected citation rate. But at face value, all except the Pharmaceutical sector have been successful in identifying research projects that are also judged well by their peers in the journal community.

#### 4.5 Funding countries

All funding bodies are assigned a code for the country in which they are located. Table 8 details the number of Australian publications (and the percentage of the total) that contain acknowledgments to funding bodies located in each country. The table lists only countries that received acknowledgments from at least 20 Australian publications, but details for all countries can be found in Appendix C, Table C14.

Double-counting due to a publication acknowledging more than one funding body from a country have been eliminated. As the majority of publications acknowledge more than one external funding source, the sum of percentages for all countries will exceed 100%.

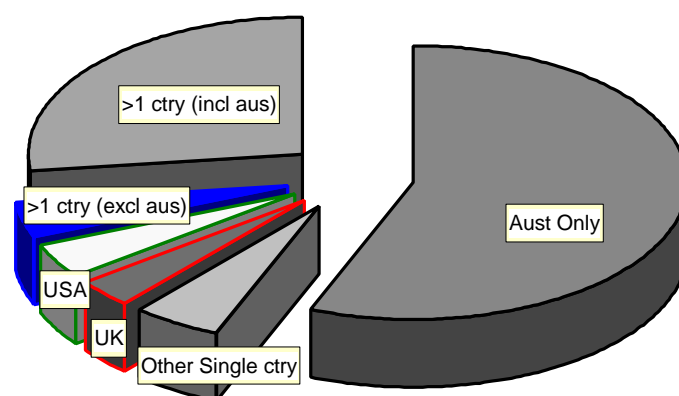
*Table 8: Country source of funding for Australian biomedical publications*

<b>Country</b>	<b>No. Pubs</b>	<b>%</b>
Australia	6348	83.0
US	1282	16.8
UK	990	12.9
Multinational body	517	6.8
Germany	233	3.0
Worldwide	200	2.6
Switzerland	193	2.5
France	170	2.2
Sweden	141	1.8
Canada	118	1.5
New Zealand	89	1.2
Japan	85	1.1
Denmark	54	0.7
Netherlands	49	0.6
Italy	35	0.5
Europe	31	0.4
China	24	0.3
Finland	24	0.3
Austria	21	0.3
Belgium	20	0.3
Papua New Guinea	20	0.3
South Africa	20	0.3
Other countries	174	2.3
<b>Total</b>	<b>7652</b>	<b>141.6</b>

The underlying data for this table is given in Appendix C, Table C14.

It is important to note in Table 8 that not all publications acknowledged Australian sources — 17% listed only overseas funding bodies. To gain an indication of the overall make-up of funding sources for Australian publications (in terms of the location of the funding bodies), we further classified this characteristic. Chart 11 shows graphically the proportion that had funding sources from more than one country (divided according to whether the list of countries includes or excludes Australia) and those that received all their funding from a single country.

Chart 11: Distribution of Australian biomedical publications by source of funds



The underlying data for this chart is given in Appendix C, Table C15.

Only 56% of publications containing acknowledgments relied entirely on Australian funding bodies. In some cases funding from another country will be the result of Australian researchers collaborating with colleagues from that country. Table 9 examines the extent to which funds are accessed through collaboration. By comparing the proportion of papers that feature researchers from a country with the proportion of papers that acknowledge funding from that country we are able to see whether Australia is a net attractor of funds (ratio > 1) or a net supplier of funds (ratio < 1).

Table 9: Comparative presence of selected countries in the addresses and acknowledgments on Australian biomedical publications

Country	% with address	% with funding	Ratio
Switzerland	1.2	2.5	2.19
UK	6.0	12.9	2.16
US	11.1	16.8	1.51
France	1.7	2.2	1.33
Germany	2.4	3.0	1.28
Sweden	1.5	1.8	1.23
Denmark	0.6	0.7	1.17
New Zealand	1.3	1.2	0.93
Canada	1.8	1.5	0.87
Japan	1.4	1.1	0.79
Finland	0.4	0.3	0.75
Italy	0.7	0.5	0.67
Netherlands	1.1	0.6	0.56
China	0.6	0.3	0.51
Thailand	0.5	0.1	0.17

The underlying data for this table is given in Appendix C, Table C16.

Australia relies heavily on external funds from the UK and US, but this is not always gained through collaborative research. In the case of the UK, less than half the funding acknowledgments can be associated with collaborative effort. Australia appears to have reasonable access to funding bodies in the US and UK, who in turn have a high enough regard of the work carried out here to provide significant funds

for this country. The high ratio for Switzerland is an indication of Australia’s lack of a sizeable pharmaceutical industry and its reliance on other countries as a source of funds in this area. Of all acknowledgments to Swiss funding bodies, 55% (109 of 193 publications) are to pharmaceutical companies.

In contrast, Australia attracts little in the way of funding from countries such as China and Thailand, even though it has a number of collaborators in these countries. It is likely that in these countries Australia is seen in the same light as the US and UK is to us — as a possible source of funds for biomedical research.

#### 4.6 Funding bodies

The funding bodies assisting biomedical researchers in Australia are many and varied. Table 10 lists the most commonly acknowledged bodies in Australia and overseas. Table C17 in Appendix C expands the list of bodies to include those acknowledged on at least 25 publications.

*Table 10: Major bodies funding Australian biomedical publications*

<b>Funding Bodies</b>	<b>No. Pubs</b>
<i>Australian bodies:</i>	
National Health and Medical Research Council	3134
Australian Research Council	1092
National Heart Foundation	293
DEETYA	222
Ramaciotti Foundation	149
Victorian Anti-Cancer Council	148
Meat Research Council of Australia	118
New South Wales Government	116
University of Queensland Funds	115
CSIRO	102
University of Sydney Funds	101
<i>International bodies:</i>	
World Health Organisation	149
Wellcome Trust (UK)	149
National Cancer Institute (USA)	136
Medical Research Council (UK)	133
National Institutes of Health (USA)	109
Deutsche Forschungsgemeinschaft (Ger)	107
National Institute of Allergy and Infectious Diseases (USA)	105
London School Hygiene and Tropical Medicine (UK)	105

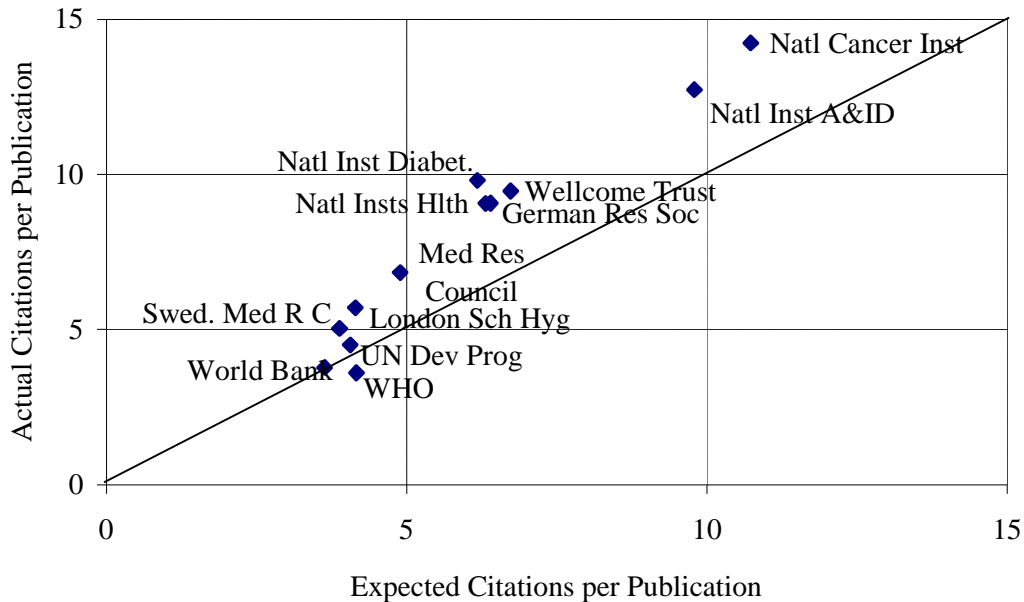
The underlying data for this table is given in Appendix C, Table C17.

It is not surprising to see NHMRC at the top of the list of funding bodies, being acknowledged on 3,134 of the 12,429 publications (25%), nor that the ARC is ranked second.

In Charts 12 to 14 we have sought to differentiate between funding bodies on the basis of the impact of the research they fund, rather than the absolute size of publication

numbers. We included in Chart 12 all international funding bodies mentioned on at least 50 Australian publications, except for the Howard Hughes Medical Institute in the US which exhibited a particularly high citation impact. This funding body was mentioned on 51 publications, but with an average citation rate of 38.0 and expected rate of 18.5 it was such an exceptional outlier that it could not be easily incorporated into the chart.

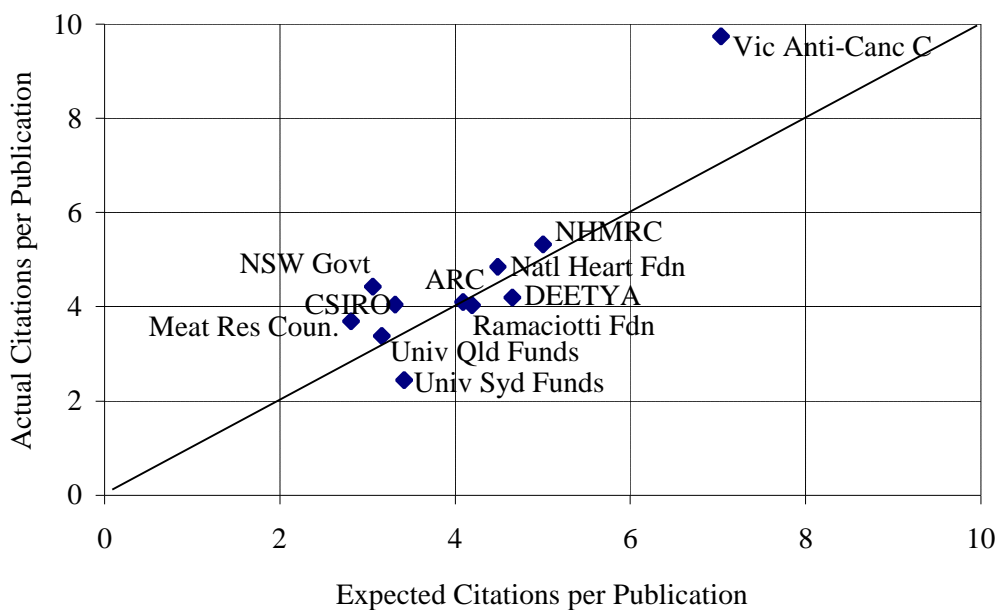
*Chart 12: Actual and expected citation rates — international funding bodies*



The underlying data for this chart is given in Appendix C, Table C18.

Most publications acknowledging funding from major overseas agencies attract citations at a significantly higher rate than expected. It is perhaps not surprising to see a strong citation performance for publications funded by these bodies. As we have noted in a previous section, Australian researchers attract a considerable amount of overseas funding in their own right, not just through involvement in collaborative work (see Table 9, section 4.5). They are unlikely to succeed in winning grants ahead of research in the funding bodies own country unless they have proved their research to be at the forefront of their field.

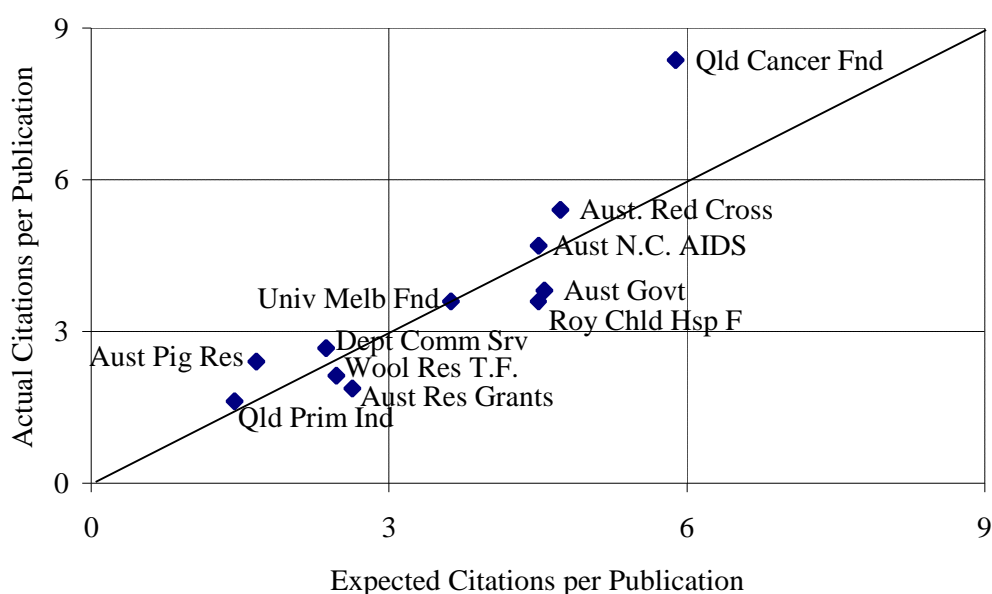
Chart 13: Actual and expected citation rates — Australian organisations funding more than 100 publications



The underlying data for this chart is given in Appendix C, Table C19.

We have not examined in detail the performance of any funding bodies other than the NHMRC. An analysis of the publications containing acknowledgments to the NHMRC follows in Section 5. There are obviously other funding bodies aligned with publications achieving considerable impact that would be worthy of further analysis, in particular the Victorian Anti-Cancer Council, CSIRO, the Meat Research Council and NSW Government. The one funding body achieving significantly less than the expected level of citations is the ‘University of Sydney Fund’. This ‘funding body’ consists of a number of funds, foundations, scholarships, etc. administered by the university (e.g. The Medical Foundation of the University of Sydney; the Henry Langley Foundation; the Rowe Thornett Scholarship). One possible explanation is that these are viewed as ‘a last resort’ for researchers from the University of Sydney who are unable to obtain external funding from any other source, or at best only a limited amount.

Chart 14: Actual and expected citation rates — Australian organisations funding between 50 and 99 publications



The underlying data for this chart is given in Appendix C, Table C20.

The number of publications on which Chart 14 is based is not large and the comparisons could be distorted by one or two highly cited items. We are reluctant to read too much into the results depicted by this chart. However it is particularly interesting to note that the position of the Queensland Cancer Fund is very similar to that of the Victorian Anti-Cancer Council in Chart 13.

#### 4.7 Level of research

In Table 11 we show the proportion of Australian biomedical publications classified to each level of research according to whether they contain funding acknowledgments or not. In addition, we show the funding sectors to which the funding sources belong.

Table 11: Differential funding of biomedical publications by level of research

	Funded	Unfunded	Govt	Industry	Non-Profit
Clinical observation	34.7	65.3	51.8	7.8	39.3
Clinical mix	56.3	43.7	53.2	7.9	40.0
Clinical investigation	71.6	28.4	65.9	9.7	40.6
Basic research	79.8	20.2	73.7	7.0	32.9

The underlying data for this table is given in Appendix C, Table C21.

Table 11 clearly demonstrates the relationship between funding acknowledgments and the level of research to which a publication is classified. Over three-quarters of all basic research publications acknowledge external sources of funding, while only 30% of publications appearing in the more applied journals do so. The funding for this research is most likely to be found from within the recurrent budgets of the hospitals and universities.

## 4.8 Publishing sectors

From our data we are able to determine the proportion of research articles attracting external funding by each of the research sectors that is undertaking the work. The results of this analysis are detailed in Table 12.

*Table 12: Differential funding of sectors undertaking biomedical research*

	<b>Funded</b>	<b>Unfunded</b>
Government	71.8	28.2
Hospitals	47.1	52.9
Medical research institutes	82.6	17.4
CSIRO	71.2	28.8
Universities	65.3	34.7
Other Institutions	73.1	26.9
<b>Total</b>	<b>61.6</b>	<b>38.4</b>

The underlying data for this table is given in Appendix C, Table C22.

Caution should be exercised in regard to the findings of this analysis. At first sight it would appear that the medical research institutes are particularly successful at attracting external funding. However the previous section has shown us that the level of external funding is linked closely with the level of the research being undertaken. As medical research institutes focus heavily on basic research we would expect a high proportion of funded articles for them. Conversely, the hospital sector is primarily focused on more applied research and a lower proportion would be expected for this sector.

## 4.9 ASRC sub-fields

We tabulated the differential funding rates for the biomedical ASRC sub-fields and this data is presented in Table 13. We also show alongside the funding rates the sectors from which the funds have been received.

*Table 13: Differential funding of biomedical publications by ASRC sub-field*

<b>Sub-fields</b>	<b>Funded</b>	<b>Unfunded</b>	<b>Govt</b>	<b>Industry</b>	<b>Non-Profit</b>
Genet. mol. biol & biotech	74.7	25.3	65.0	7.0	37.3
General biology	75.5	24.5	73.2	8.7	31.9
General medical research	70.9	29.1	68.2	11.3	43.5
Immunology	78.4	21.6	66.4	11.2	40.0
Medical bioch & clin chem	55.9	44.1	51.5	27.3	33.3
Medical microbiology	83.3	16.7	70.0	13.3	31.7
Pharmacology	69.3	30.7	70.4	9.4	37.9
Physiology	74.6	25.4	76.2	4.4	38.2
Neurosciences	74.5	25.5	78.4	4.4	34.5
Clinical sciences	53.1	46.9	58.8	7.4	40.1
Public health research	63.6	36.4	56.8	10.1	37.8
Health services research	25.3	74.7	47.3	6.8	33.8
Other medical & hlth sci	44.4	55.6	62.5	9.4	34.4
<b>Interdisciplinary biomedical</b>	<b>78.0</b>	<b>22.0</b>	<b>70.1</b>	<b>6.8</b>	<b>34.0</b>
<b>Total</b>	<b>61.6</b>	<b>38.4</b>	<b>64.8</b>	<b>7.9</b>	<b>37.0</b>

The underlying data for this table is given in Appendix C, Table C23.

The funding rates attributable to different levels of research need to be borne in mind when the data in Table 13 is analysed. We would expect lower funding rates for those fields which are at the more applied end of the research spectrum, such as Clinical sciences and Health services research. This relationship is depicted in Chart E1 in Appendix E, though there is one major outlier — Health services research.

#### 4.10 ISI subject category

This analysis was limited to subject categories that contained more than 100 Australian publications. Table 14 lists ISI categories in which more than 70% of articles acknowledged at least one source of funding while Table 15 lists ISI categories in which less than 50% of Australian articles acknowledged any funding. The tables are limited to those categories which contain more than 50 Australian articles.

*Table 14: Differential funding of biomedical publications by selected ISI subject category — most funded categories*

<b>ISI subject category</b>	<b>Funded</b>	<b>Unfunded</b>	<b>Govt</b>	<b>Industry</b>	<b>Non-profit</b>
Vascular diseases	100.0	0.00	58.2	9.1	50.9
Parasitology	83.4	16.6	72.3	7.8	42.6
Virology	83.3	16.7	70.0	13.3	31.7
Immunology	78.4	21.6	66.7	11.2	39.9
Microbiology	77.9	22.1	68.9	6.7	28.2
Endocrinology & metabolism	77.7	22.3	73.8	7.5	30.5
Anatomy & morphology	77.5	22.5	71.0	6.5	54.8
Genetics & heredity	77.4	22.6	60.2	7.9	37.8
Biochemistry & molecular biology	77.2	22.8	73.7	9.3	32.8
Tropical medicine	76.9	23.1	60.0	3.3	25.0
Infectious diseases	75.3	24.7	63.9	5.7	34.4
Cell biology	75.2	24.8	71.7	6.8	37.1

The underlying data for this table is given in Appendix C, Table C24.

*Table 15: Differential funding of biomedical publications by selected ISI subject category — least funded categories*

<b>ISI subject category</b>	<b>Funded</b>	<b>Unfunded</b>	<b>Govt</b>	<b>Industry</b>	<b>Non-profit</b>
Medicine, general & internal	43.3	56.7	59.5	10.4	38.7
Orthopedics	42.3	57.7	36.4	9.1	63.6
Surgery	38.7	61.3	36.7	5.8	50.4
Otorhinolaryngology	37.9	62.1	52.0	20.0	24.0
Radiology & nuclear medicine	37.0	63.0	53.5	9.9	43.7
Pediatrics	32.7	67.3	41.0	6.6	39.3
Pathology	31.0	69.0	47.1	3.4	52.9
Medicine, miscellaneous	25.6	74.4	47.9	6.8	34.2
Anesthesiology	24.3	75.7	22.4	10.3	39.7
Critical care	22.5	77.5	40.4	10.6	36.2

The underlying data for this table is given in Appendix C, Table C24.

As with ASRC sub-fields, the research level of a category appears to greatly influence the extent to which it attracts funding. This is demonstrated in Chart E4 in Appendix E. With smaller categories and an analysis based on relatively small numbers, the relationship identified in the previous section is not as clear-cut, though the general trends still remain valid: research at the basic end of the CHI scale is more likely to attract funding than research of a more applied nature.

#### 4.11 Highly cited publications

In this section we tabulate the proportion of publications in the top 1% and 5% bands that acknowledge external funding, and also contrast this to the proportion of total publications that acknowledge funding in the sub-field. The ratio showing the proportion of highly cited publications compared to the proportion of total publications that acknowledge funding is also calculated.

Data relating to the biomedical sub-fields of the ASRC are shown in Table 16, while that relating to selected ISI subject categories is shown in Table 17.

*Table 16: Funding of most highly cited publications by ASRC sub-field*

	<b>Total</b>	<b>Top 5% most highly cited</b>			<b>Top 1% most highly cited</b>		
	Funded <i>a</i>	No. Cites	Funded <i>b</i>	Ratio <i>b/a</i>	No. Cites	Funded <i>c</i>	Ratio <i>c/a</i>
General biology	75.5	17	89.5	1.2	40	95.0	1.4
Genetics & molecular biology	74.7	18	92.9	1.2	63	92.9	1.4
General medical & health sci	70.9	20	94.4	1.3	39	100.0	1.4
Immunology	78.4	19	90.9	1.2	37	90.0	1.2
Medical microbiology	83.3	12	83.3	1.0	19	100.0	1.2
Pharmacology	69.3	9	80.5	1.2	21	75.0	1.1
Physiology	74.6	10	97.1	1.3	20	100.0	1.4
Neurosciences	74.5	11	91.8	1.2	21	88.9	1.2
Clinical sciences	53.1	11	81.7	1.5	25	88.9	1.8
Public health	63.6	9	88.0	1.2	21	80.1	1.4
Interdisciplinary biomedicine	78.0	13	100.0	1.3	25	77.8	1.0

The underlying data for this table is given in Appendix C, Table C25.

For all sub-fields, over three-quarters of the publications with the highest citation impact acknowledge external funding. In all cases, the proportion acknowledging funding is higher for these high impact journals than for all publications in the sub-field. In Clinical sciences the discrepancy is particularly large — only 53.1% of publications acknowledge external funding sources, but 81.7% of the top 5% most highly cited publications (and 88.9% of the top 1%) contain acknowledgments.

The analysis of ISI subject categories is limited to those categories in which Australia publishes more than 100 publications. This is to ensure that the term ‘top 1%’ refers to at least one publication.

We have also extracted details of the most highly cited publication in each ISI subject category. This information is detailed in Appendix D.

Table 17: Funding of most highly cited publications by ISI subject category

	Total	Top 5% most highly cited			Top 1% most highly cited		
	Funded <i>a</i>	No. Cites	Funded <i>b</i>	Ratio <i>b/a</i>	No. Cites	Funded <i>c</i>	Ratio <i>c/a</i>
Anesthesiology	24.3	12	18.2	0.7	26	0.0	0.0
Biochemistry & molec biol	77.2	19	88.0	1.1	45	93.3	1.2
Biology	73.0	11	93.3	1.3	20	100.0	1.4
Biomethods	59.0	10	80.0	1.4	18	100.0	1.7
Cardiovascular system	69.1	17	88.2	1.3	26	100.0	1.5
Cell biology	75.2	21	80.9	1.1	86	85.7	1.1
Clinical neurology	59.8	9	76.5	1.3	19	100.0	1.7
Critical care	22.5	11	23.1	1.0	26	0.0	0.0
Dentistry, oral surgery & med	47.9	4	75.0	1.6	12	100.0	2.1
Endocrinology & metabolism	77.7	13	88.5	1.1	28	100.0	1.3
Gastroenterology & hepatol	64.3	14	81.8	1.3	22	100.0	1.6
Genetics & heredity	77.4	19	80.6	1.0	63	100.0	1.3
Hematology	73.8	20	86.7	1.2	38	100.0	1.4
Immunology	78.4	19	90.9	1.2	37	90.0	1.1
Infectious diseases	75.3	18	88.9	1.2	34	100.0	1.3
Medicine, general & internal	43.3	13	83.7	1.9	39	100.0	2.3
Medicine, miscellaneous	25.6	8	25.0	1.0	25	0.0	0.0
Med, research & experimental	70.9	20	94.4	1.3	39	100.0	1.4
Microbiology	77.9	14	74.1	1.0	29	80.0	1.0
Neurosciences	74.5	11	91.8	1.2	20	100.0	1.2
Nutrition & dietetics	61.5	17	100.0	1.6	23	100.0	1.6
Obstetrics & gynecology	55.3	11	69.2	1.3	23	100.0	1.8
Oncology	63.6	17	78.9	1.2	28	100.0	1.6
Ophthalmology	61.8	8	100.0	1.6	14	100.0	1.7
Parasitology	83.4	11	93.8	1.1	18	66.7	0.8
Pathology	31.0	7	51.5	1.7	16	100.0	3.2
Pediatrics	32.7	6	57.1	1.7	10	100.0	3.1
Pharmacology & pharmacy	70.2	9	81.1	1.2	19	71.4	1.0
Physiology	74.2	9	93.1	1.3	14	100.0	1.3
Psychiatry	44.3	10	86.7	2.0	21	75.0	1.7
Psychology	57.8	8	100.0	1.7	39	100.0	1.7
Public Health	64.5	9	76.9	1.2	19	50.0	0.8
Radiology & nuclear med	37.0	11	81.8	2.2	24	100.0	2.8
Reproductive systems	72.8	12	77.8	1.1	23	100.0	1.4
Respiratory system	63.0	12	55.6	0.9	21	50.0	0.8
Surgery	38.7	8	69.0	1.8	23	83.3	2.2
Toxicology	57.3	8	85.7	1.5	34	100.0	1.7
Transplantation	65.0	19	71.4	1.1	37	100.0	1.5
Urology & nephrology	49.1	10	57.1	1.2	13	50.0	1.0
Virology	83.3	12	83.3	1.0	23	100.0	1.2

The underlying data for this table is given in Appendix C, Table C26.

The analysis of highly cited publications shows even more dramatic results when viewed at the lower aggregation of ISI subject category. Only in two categories is the

proportion acknowledging funding in the top 5% band lower than the proportion acknowledging funding in the category as a whole — Anesthesiology and Respiratory system. At this lower level of aggregation, the difference between the proportions also covers a wider range, and for three categories the ratio is over 2.0 — Pathology, Radiology & nuclear medicine, and Surgery.

At the highest level of impact (top 1%), the ability of researchers to attract external funding is even more pronounced. In 25 of the 41 categories, all publications in this top 1% band contain funding acknowledgments.

The data appear to be an endorsement of peer review — in both the grant giving and journal publishing systems. Funding bodies are identifying and supporting those projects which do indeed ‘succeed’ in the judgement of other journal authors.

#### **4.12 Section summary**

The main findings of the bibliometric analyses of the funding acknowledgments contained in Australian biomedical publications are:

- ✦ Over 60% of Australian biomedical publications acknowledge external funding sources, and of these 60% acknowledge more than one source.
- ✦ There is a strong positive relationship between the number of funding acknowledgments on a publication and the citation impact of that publication
- ✦ Two-thirds of acknowledgments were to the combined government sectors and one-third to the combined non-profit sectors, with very few to industry.
- ✦ All sectors other than the pharmaceutical industry achieved at or above the expected level of citations for the journals in which their publications appeared. The non-profit sector had the strongest performance using this measure.
- ✦ Only 56% of publications listed only Australian funding bodies. 17% listed only international bodies, while the remainder (27%) listed a combination of Australian and international funding bodies.
- ✦ USA and UK funding bodies comprised the bulk of international acknowledgments.
- ✦ The major Australian funding bodies were NHMRC and ARC, followed by the National Heart Foundation. NHMRC accounted for 25% of the funding acknowledgments. The two largest international funding bodies were the World Health Organisation and the Wellcome Trust.
- ✦ The sets of publications from nearly all international funding bodies achieved citations at a rate significantly above the expected level for their journal mix.
- ✦ The sets of publications from many Australian funding bodies also achieved at or above their expected citation levels. The Victorian Anti-Cancer Council and the Queensland Cancer Fund were the two most outstanding funding bodies by this measure. NHMRC-funded publications achieve above the expected citation level for their journal mix.

- ✦ The level of research of a field is an important determinant of the level of external funding attracted.
- ✦ There is a strong positive relationship between success in attracting external funding sources and success in achieving very high citation impact. In 27 of the 41 ISI subject categories studied, **all** the most highly cited publications attracted external funding.

## 5 NHMRC-FUNDED RESEARCH

In section 5 the focus of our analysis is narrowed to those publications that acknowledge receiving funding from the NHMRC. Much of the analysis focuses on comparing articles with acknowledgments to NHMRC ('NHMRC funded publications') to articles with acknowledgments to other funding sources ('Other funded publications'). Account had to be taken of multiple acknowledgments on a single publication. 'NHMRC funded publications' may contain acknowledgement to other funding bodies, but none of the publications in the 'Other funded publications' group will contain acknowledgments to the NHMRC.

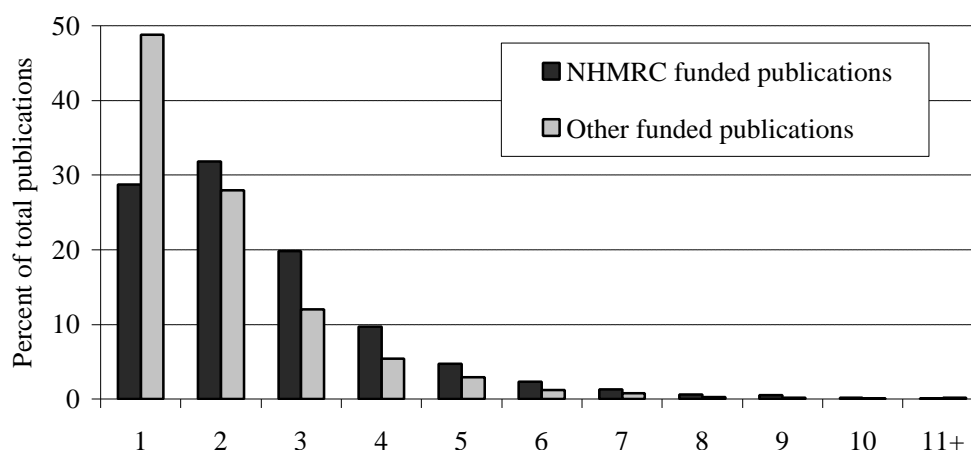
All the bibliometric measures used in this section have been discussed previously in sections 4 and/or 5. We did not feel it necessary to repeat any discussion of the methodology, so in this section we simply present the charts and tables detailing the performance of NHMRC funded publications and comment on this.

The coverage of the analyses in this section is:

- ⊕ articles published in 1993 and 1994
- ⊕ citations received between 1993 and 1995
- ⊕ the 14 biomedical sub-fields of the ASRC
- ⊕ the 58 biomedical ISI subject categories
- ⊕ Australian publications containing an acknowledgment of NHMRC funding

### 5.1 Number of funding acknowledgments

*Chart 15: Distribution of NHMRC-funded publications by number of acknowledgments*



The underlying data for this chart is given in Appendix C, Table C27.

There is a distinct difference between the two groups of publications. Less than 30% of publications rely on the NHMRC as their sole source of external funds. Success in attracting NHMRC funds is most likely to be linked with success in obtaining funds from at least one other body.

## 5.2 Type of funding

Table 18: Distribution of NHMRC-funded publications by type of funding

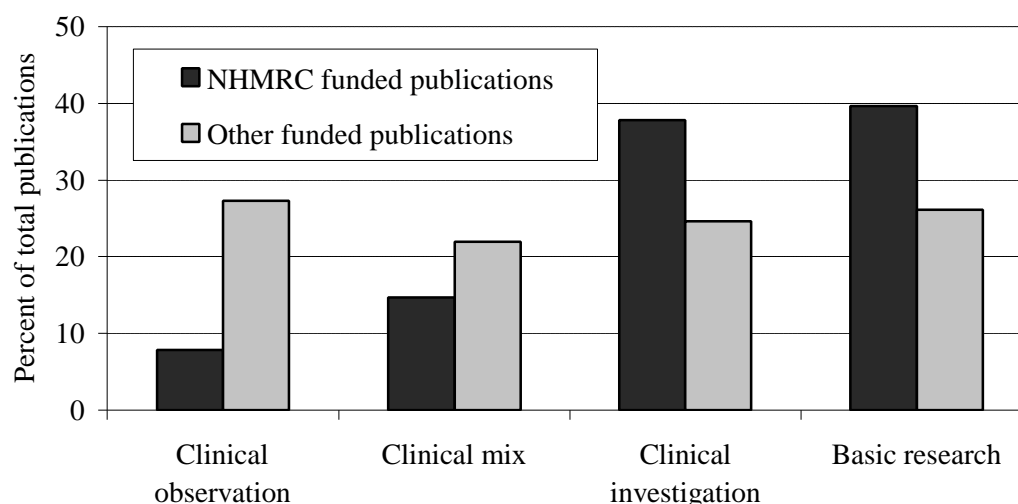
	NHMRC acknowledgments	Other funding acknowledgments
Extramural grants and contracts	85.5	64.2
Intramural support	3.1	15.5
Personal support	11.1	9.1
In-kind support	0.3	10.7
Travel funding	0.0	0.3
Non-specified support	0.1	0.2

The underlying data for this table is given in Appendix C, Table C28.

Most acknowledged support from the NHMRC was in the form of grants and contracts or personal support (fellowships and scholarships). Little was in the form of intramural support.

## 5.3 Type of research

Chart 16: Distribution of NHMRC-funded publications by type of research

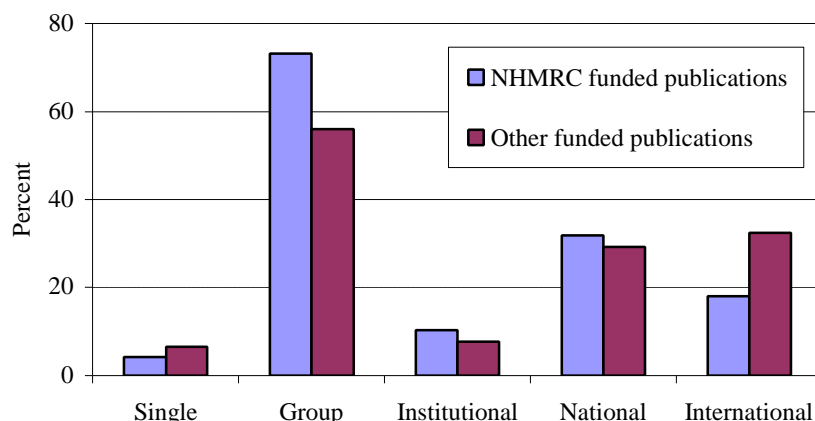


The underlying data for this chart is given in Appendix C, Table C29.

As we would expect, NHMRC funded publications are quite clearly concentrated at the basic end of research. The distribution in Chart 16 suggests that researchers turning to funding bodies other than the NHMRC when their work is more clinically oriented.

## 5.4 Collaboration

Chart 17: Distribution of NHMRC-funded publications by type of collaboration



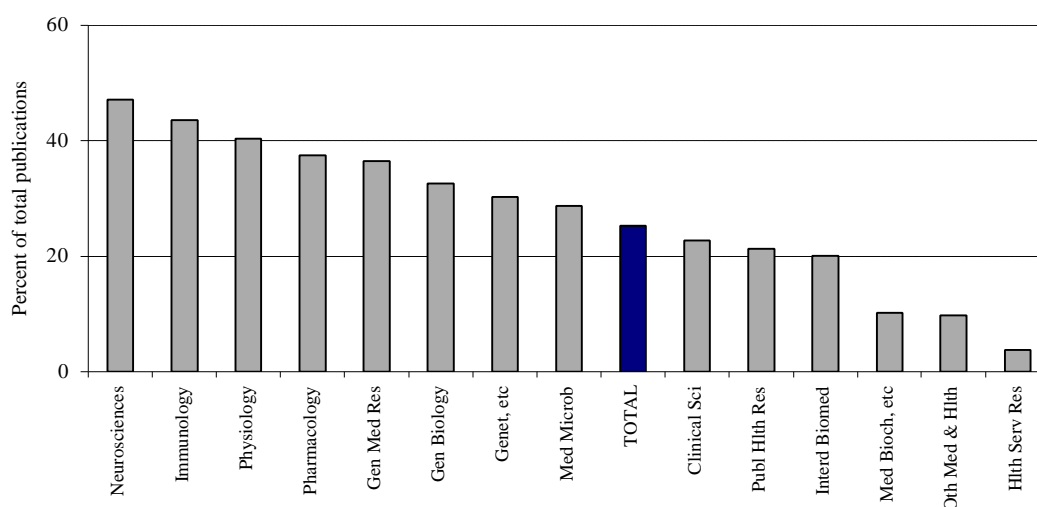
The underlying data for this chart is given in Appendix C, Table C30.

The reliance of NHMRC funded research on group collaboration is noteworthy. It is surprising to see the relatively low level of international collaboration involved in NHMRC funded publications. We would have expected it to be somewhat less than the level for all other funded publications, which included a considerable number of acknowledgments to international funding bodies, but we did not expect to see the level lower than for biomedical publications in general (see Chart 4).

## 5.5 ASRC sub-fields

We were interested to determine the extent to which NHMRC funds supported research in specific ASRC fields. In Chart 17 above we calculated the proportion of all publications, not just of those matched to the ROD database, that contained acknowledgments to the NHMRC. This may well underestimate the importance of NHMRC as a source of funds in a particular field, but nevertheless we felt it an important indicator.

Chart 18: Proportion of total Australian publications with NHMRC funding — ASRC sub-fields



The underlying data for this chart is given in Appendix C, Table C31.

The centrality of NHMRC to research in the Neurosciences, Immunology and Physiology is evident from Chart 18. It is also clear that the NHMRC has a more minor role to play in the more applied biomedical fields of research — Clinical sciences, Public health research, etc. Chart E4 in Appendix E provides details of the level of research for each ASRC sub-field of research.

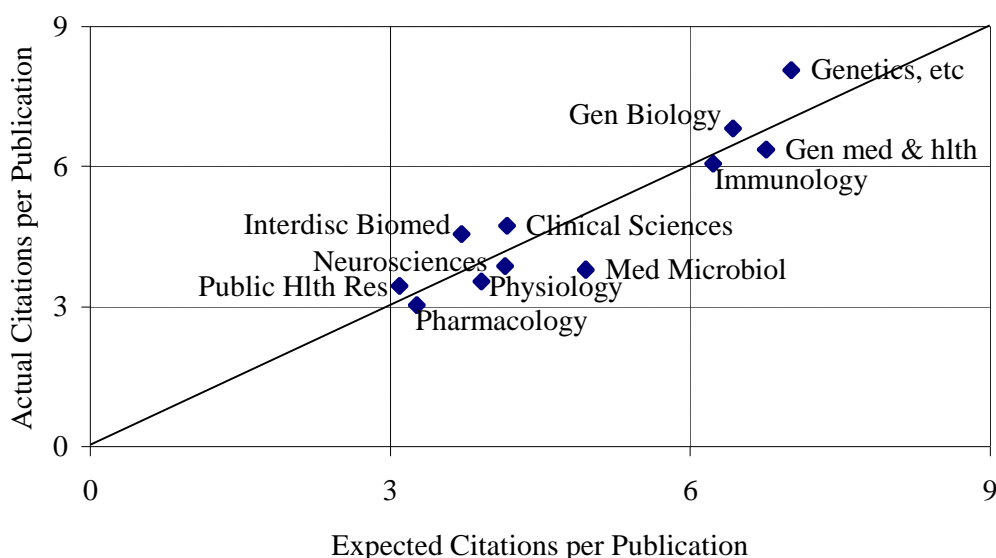
Table 19: Distribution of NHMRC-funded publications by ASRC sub-fields

Sub-fields	NHMRC	Other
Genet, mol. biol & biotech	11.4	11.6
General biology	15.8	14.4
General medical research	3.9	2.6
Immunology	11.9	6.6
Medical microbiology	2.0	2.6
Pharmacology	9.5	5.6
Physiology	8.6	5.1
Neurosciences	12.7	5.1
Clinical sciences	40.7	37.8
Public health research	3.0	4.1
Interdisciplinary biomedical	5.6	11.1

The underlying data for this table is given in Appendix C, Table C32.

Table 19 confirms a stronger focus by the NHMRC on funding research in the more basic fields of research.

Chart 19: Actual and expected citation rates of NHMRC-funded publications by ASRC sub-fields



The underlying data for this chart is given in Appendix C, Table C33.

When looked at on the basis of ASRC sub-fields of research, most NHMRC-funded sets of publications are at or above the diagonal line, indicating a strong citation performance. The main outlier is Medical microbiology, which falls well below the expected level, though this is based on only a small number of publications (62).

It is important to compare Chart 19 to Chart E1 in Appendix E, which gives details of the expected citation rate for all articles in a sub-field, not just those in the journals in which NHMRC funded publications appear. Such a comparison shows us that, for most sub-fields, NHMRC funded research is appearing in journals of higher than average impact, and none exhibit ‘worse’ than average impact. This contrasts quite markedly to the Australia’s overall performance in some sub-fields (see section 3.5).

## 5.6 ISI subject categories funded

As noted in section 2 where we describe our methodology, the use of ASRC sub-fields obscures a wealth of detail that can be gained by looking at individual ISI subject categories. This section examines the acknowledgments to NHMRC funding on the basis of ISI categories. Not all 60 categories can be listed or analysed for each measure. In some cases we are now starting to run into small number problems, in others it would be too overwhelming to look at every category. However, Appendix C contains expanded data for all subject categories where relevant.

*Table 20: Proportion of total Australian publications with NHMRC funding – selected ISI categories (NHMRC > 33% and < 15%)*

<b>High NHMRC funding</b>	<b>NHR%</b>	<b>Low NHMRC funding</b>	<b>NHR%</b>
Vascular diseases	54.5	Toxicology	14.0
Neurosciences	47.1	Radiology & nuclear medicine	13.5
Endocrinology & metabolism	46.8	Surgery	13.1
Immunology	43.7	Medicine, general & internal	12.9
Hematology	41.8	Pathology	12.1
Physiology	41.7	Pediatrics	10.2
Pharmacology & pharmacy	39.9	Behavioural sciences	7.1
Gastroenterology & hepatology	39.1	Critical care	5.3
Cardiovascular system	38.9	Medicine, miscellaneous	3.9
Cell biology	38.0	Anesthesiology	1.7
Med, research & experimental	36.5		
Respiratory system	34.1		

The underlying data for this table is given in Appendix C, Table C34.

In general, the NHMRC’s presence is far higher in the more basic fields of research (such as Neurosciences, Endocrinology & metabolism and Immunology) and less in the more applied fields of research (such as Anesthesiology, Critical care and Surgery).

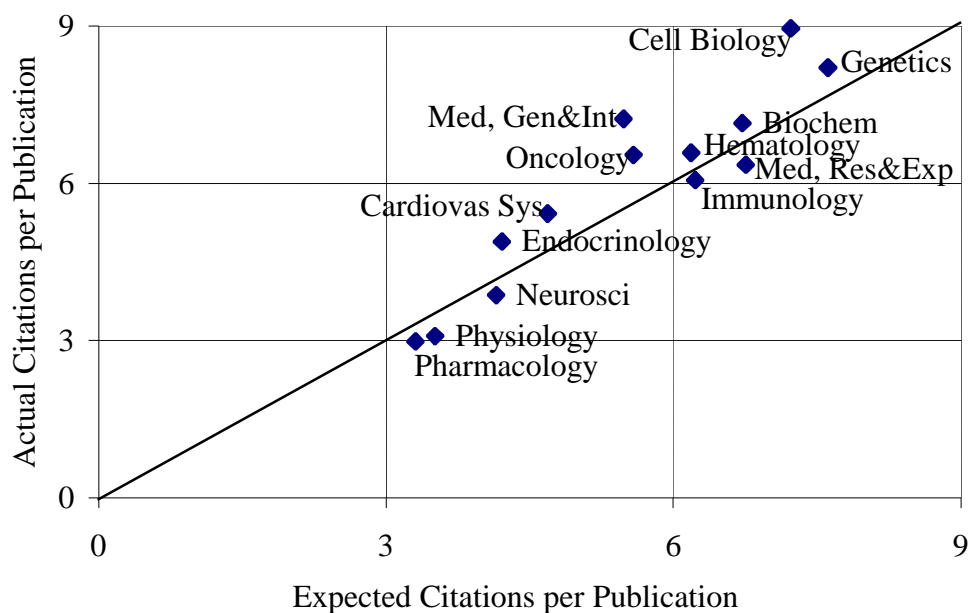
Table 21: Distribution of NHMRC-funded publications by ISI subject categories

<b>ISI Category</b>	<b>NHMRC</b>	<b>Other</b>
Biochemistry & molecular biology	14.6	12.1
Neurosciences	12.7	5.1
Immunology	11.9	6.5
Pharmacology & pharmacy	9.0	4.8
Physiology	7.8	4.2
Endocrinology & metabolism	7.7	3.5
Cell biology	6.6	4.5
Genetics & heredity	5.0	7.2
Medicine, general & internal	4.2	6.9
Medicine, research & experimental	3.9	2.6
Hematology	3.8	2.0
Cardiovascular system	3.7	2.0
Oncology	3.6	2.8
Parasitology	2.9	3.7
Clinical neurology	2.8	1.8
Gastroenterology and hepatology	2.6	1.2
Microbiology	2.6	6.5
Psychiatry	2.6	1.7
Biology	2.4	2.4
Virology	2.0	2.6
Respiratory system	1.9	1.1
Public health	1.8	2.4
Infectious diseases	1.7	1.5

The underlying data for this table is given in Appendix C, Table C35.

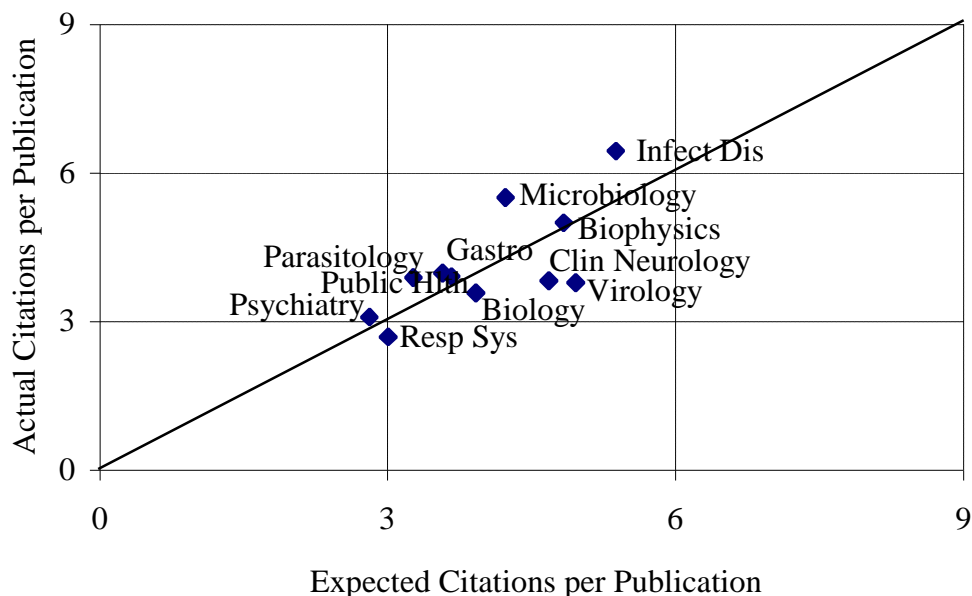
The distribution of NHMRC funded publications across the ISI subject categories has a pattern quite distinct from that of other funded publications. Again we see in Table 21 evidence of the NHMRC's concentration in the more basic fields of endeavour.

Chart 20: Actual and expected citation rates by ISI categories — categories in which NHMRC funded > 100 publications



The underlying data for this chart is given in Appendix C, Table C36.

Chart 21: Actual and expected citation rates by ISI categories — categories in which NHMRC funded 50 - 99 publications



The underlying data for this chart is given in Appendix C, Table C37.

It is very instructive to compare the results of the analysis of NHMRC funded publications on the basis of actual and expected citations by ISI subject category with total Australian publications in each category (Charts 6 and 7) and with world averages (Charts E2 and E3 in Appendix E). For nearly all subject categories, the performance of NHMRC funded publications is significantly better than the total Australian performance. NHMRC publications are appearing in journals of higher

than world average impact, and in many cases are achieving citations at a rate significantly above the expected level.

Only in Virology are NHMRC publications appearing in relatively low impact journals and achieving less than the expected level of citations for these journals. Cell biology, Neurosciences and Physiology are the only other categories where NHMRC publications appear in journals of average impact, but in the case of Cell biology the publications achieve well above the expected level. The performance of NHMRC publications in Oncology, Cardiovascular systems, Microbiology, General & internal medicine and Infectious diseases are also particularly strong, appearing in high impact journals and achieving well above the expected rate for those journals.

## 5.7 Highly cited publications

Table 22: Most highly cited NHMRC-funded publications by ASRC sub-field

	Total % ackn NHMRC <i>a</i>	Top 5% most highly cited			Top 1% most highly cited		
		No. Cites	% ackn NHMRC <i>b</i>	Ratio <i>b/a</i>	No. Cites	% ackn NHMRC <i>c</i>	Ratio <i>c/a</i>
General biology	32.6	17	44.2	1.4	40	55.0	1.7
Genetics & molecular biol	30.3	18	58.6	1.9	63	57.1	1.9
General medical & health sci	36.5	20	55.6	1.5	39	50.0	1.4
Immunology	43.5	19	52.3	1.2	37	60.0	1.4
Medical microbiology	28.7	12	25.0	0.9	19	50.0	1.7
Pharmacology	37.5	9	56.1	1.5	21	50.0	1.3
Physiology	40.3	10	67.6	1.7	20	83.3	2.1
Neurosciences	47.1	11	67.3	1.4	21	55.6	1.2
Clinical sciences	22.7	11	39.8	1.8	25	40.0	1.8
Public health	21.3	9	40.0	1.9	21	0.0	0.0
Interdisciplinary biomed	20.1	13	44.1	2.2	162	44.4	2.2

The underlying data for this table is given in Appendix C, Table C38.

The importance of NHMRC funding becomes very apparent from a study of Table 22. Almost half of the most highly cited publications (in the top 1% band) contain acknowledgment of NHMRC funding, in contrast to just over one-quarter of all publications. The proportion of publications acknowledging NHMRC funding in the top 5% band is also much higher than would be expected from its share of total publications. In Physiology, five of the six most highly cited publications acknowledged the NHMRC.

Table 23 examines this information in more detail by going down to the level of ISI subject category. The analysis is limited to those categories in which we matched more than 100 publications to the ROD database.

Table 23: Most highly cited NHMRC-funded publications by ISI subject category

	Total % ackn NHMRC <i>a</i>	Top 5% most highly cited			Top 1% most highly cited		
		No. Cites	% ackn NHMRC <i>b</i>	Ratio <i>b/a</i>	No. Cites	% ackn NHMRC <i>c</i>	Ratio <i>c/a</i>
Biochemistry & molec biol	31.1	19	40.0	1.3	45	53.3	1.7
Biology	29.8	11	20.0	0.7	20	0.0	0.0
Cardiovascular system	38.9	17	58.8	1.5	26	75.0	1.9
Cell biology	38.0	21	63.6	1.7	86	42.9	1.1
Clinical neurology	30.8	9	41.2	1.3	19	33.3	1.1
Endocrinol & metabolism	46.8	13	53.8	1.1	28	66.7	1.4
Gastroenterol & hepatology	39.1	14	45.5	1.2	22	0.0	0.0
Genetics & heredity	25.4	19	46.9	1.8	63	66.7	2.6
Hematology	41.8	20	53.3	1.3	38	66.7	1.6
Immunology	43.7	19	52.3	1.2	37	60.0	1.4
Infectious diseases	33.3	18	44.4	1.3	34	50.0	1.5
Medicine, gen & internal	12.9	13	34.7	2.7	39	44.4	3.4
Medicine, res & experim	36.5	20	55.6	1.5	39	50.0	1.4
Microbiology	16.9	14	29.6	1.8	29	40.0	2.4
Neurosciences	47.1	11	67.3	1.4	20	66.7	1.3
Obstetrics & gynecology	18.4	11	15.4	0.8	23	33.3	1.8
Oncology	30.1	17	52.6	1.7	28	75.0	2.5
Ophthalmology	16.9	8	11.1	0.7	14	0.0	0.0
Parasitology	29.3	11	43.8	1.5	18	66.7	2.3
Pediatrics	10.2	6	21.4	2.1	10	50.0	4.9
Pharmacology & pharmacy	39.9	9	59.5	1.5	19	57.1	1.4
Physiology	41.7	9	69.0	1.7	14	80.0	1.9
Psychiatry	23.0	10	33.3	1.4	21	25.0	1.1
Public health	22.0	9	46.2	2.1	19	0.0	0.0
Reproductive systems	19.8	12	22.2	1.0	23	33.3	2.1
Respiratory system	34.1	12	11.1	0.3	21	50.0	1.5
Surgery	13.1	8	34.5	2.6	23	33.3	2.5
Virology	28.7	12	25.0	0.9	23	50.0	1.7

The underlying data for this table is given in Appendix C, Table C39.

In looking at individual ISI categories, particularly when focusing on the top 1% and 5%, we are starting to run into the problem of small numbers, so caution needs to be exercised. However, even at this lower level of aggregation, the centrality of NHMRC as a funder of high impact research is obvious. Only in four categories do we see less than the expected number of NHMRC publications in the top 1% and top 5% bands. In 16 of the 28 categories listed here, NHMRC publications account for 50% or more of the most highly cited 1%.

## 5.8 Funded institutions

To conclude the analysis of NHMRC publications we have looked at the question of where the research it is funding has been conducted. The first table, Table 24, lists all institutions that acknowledge NHMRC support in at least 50 of their publications. A fuller list covering those who acknowledge support in 20 or more publications is contained in Table C40, in Appendix C.

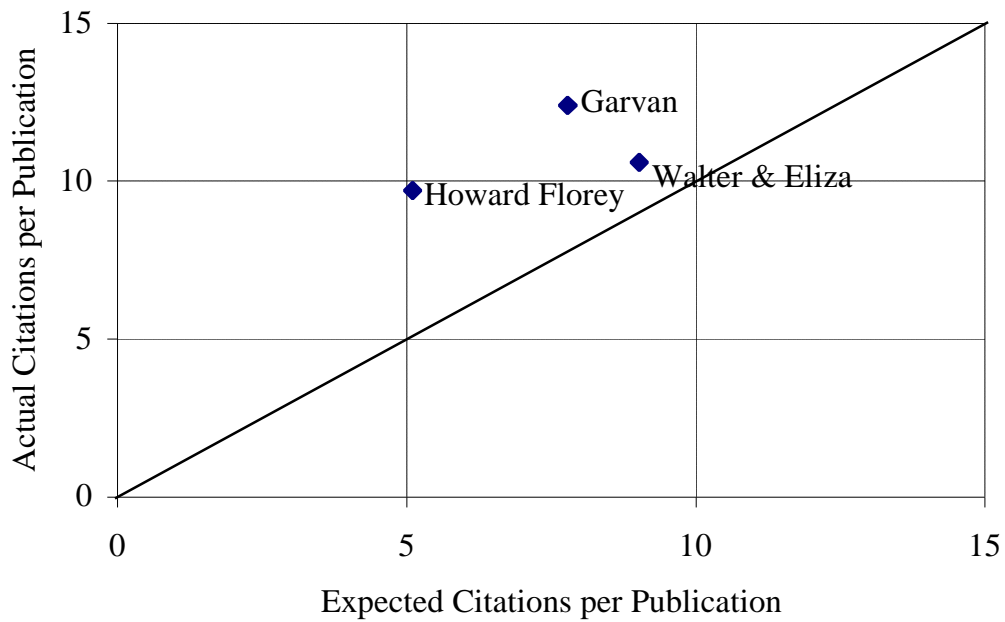
Table 24: Institutions producing research publications funded by NHMRC

<b>Institution</b>	<b>Number</b>	<b>%</b>
University of Melbourne	425	13.6
University of Sydney	333	10.6
Monash University	253	8.1
University of Queensland	250	8.0
University of New South Wales	215	6.9
Walter and Eliza Hall Institute of Medical Research	190	6.1
Flinders University of South Australia	184	5.9
University of Western Australia	159	5.1
Queensland Institute of Medical Research	137	4.4
University of Adelaide	121	3.9
Royal Prince Alfred Hospital	103	3.3
Australian National University	91	2.9
Baker Medical Research Institute	74	2.4
Prince of Wales, Prince Henry Hospitals Group	72	2.3
Adelaide Medical Centre for Women and Children	70	2.2
St Vincents Hospital, Sydney	65	2.2
Garvan Institute of Medical Research	62	2.1
Prince Henrys Institute of Medical Research	60	2.0
Royal Childrens Hospital, Melbourne	57	1.8
Howard Florey Institute	57	1.8
Amalgamated Melbourne and Essendon Hospitals	53	1.7
Westmead Hospital and Medical Centre	52	1.7

The underlying data for this table is given in Appendix C, Table C40.

We sought to add to the information contained in Table 24, which rests on publication numbers, with an analysis of the impact of the research carried out in each institution, using the measure of actual and expected citations. Three institutions did not fit easily into a chart based on publication numbers because of their very high citation rates, and these are analysed separately in Chart 22. The other institutions are divided between Chart 23 and Chart 24 on the basis of publication numbers.

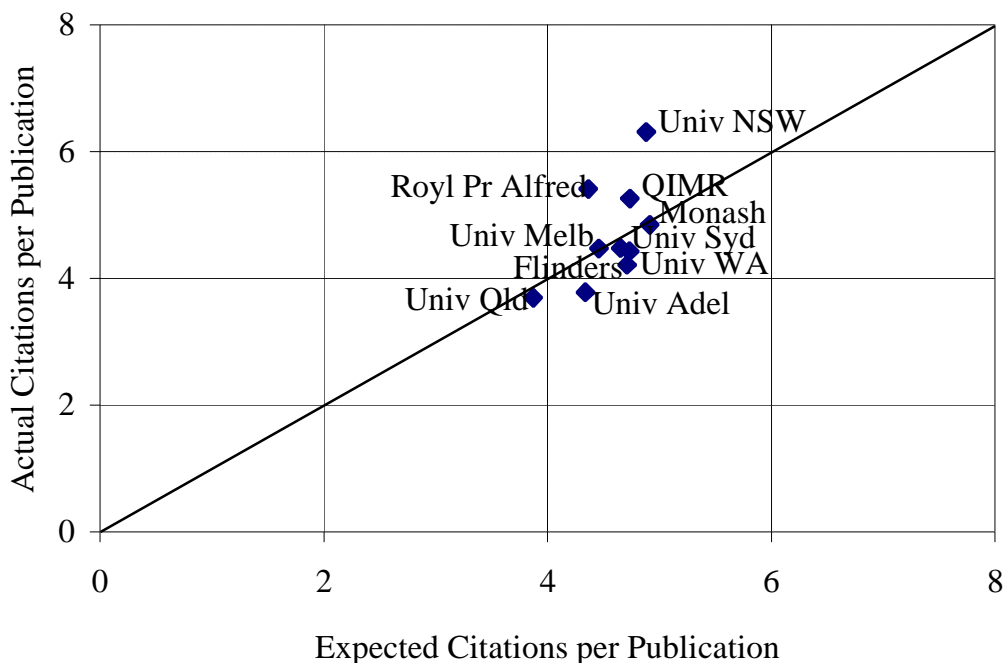
Chart 22: Actual and expected citation rates – NHMRC-funded institutions with an average cpp > 8



The underlying data for this chart is given in Appendix C, Table C41.

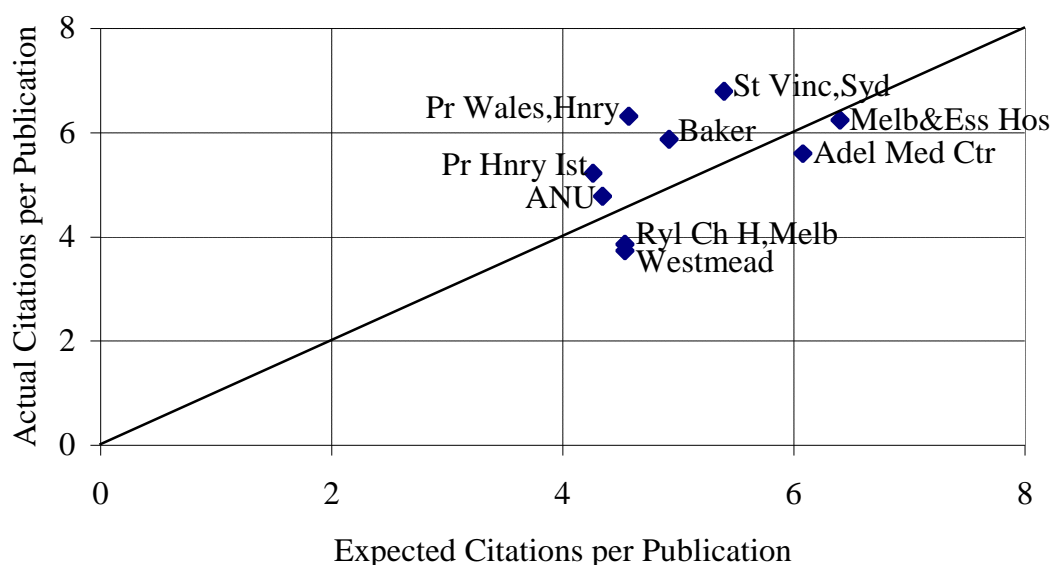
These three institutions, all members of the Australian Association of Medical Research Institutes, exhibit very strong citation performance by their NHMRC funded publications — all achieve citations well above the expected level for the journals in which they publish.

Chart 23: Actual and expected citation rates – institutions publishing more than 100 NHMRC-funded publications



The underlying data for this chart is given in Appendix C, Table C42.

Chart 24: Actual and expected citation rates — institutions publishing between 50 and 99 NHMRC funded publications



The underlying data for this chart is given in Appendix C, Table C43.

For this group of their publications, most institutions achieve above the expected level of citations, some by a considerable margin. Their relative positions along the x-axis, showing the average impact of the journals in which they publish, is heavily dependent on the fields of biomedicine in which they are active. While an analysis at the field or sub-field level could be contemplated for a few institutions, most do not have sufficient publication numbers to make the analysis worthwhile.

## 5.9 Section summary

The main findings of the bibliometric analyses of publications containing acknowledgment of NHMRC funding are:

- ✦ 25% of publications acknowledge funding from NHMRC.
- ✦ On average, NHMRC-funded publications contained more funding acknowledgments.
- ✦ 97% of NHMRC acknowledgments were to grants and contracts or to personal support (such as fellowships).
- ✦ 77% of NHMRC-funded publications were classified to the two basic levels of research, compared to only 51% of other funded publications.
- ✦ Collaborative effort in NHMRC-funded publications is more heavily invested in group collaboration (73% compared to 56% for other funded publications), and less heavily in international collaboration (18% compared to 32%).
- ✦ ASRC sub-fields:

NHMRC funding is acknowledged on more than 40% of all publications in Neuroscience, Immunology and Physiology.

Less than 20% of publications in Medical biochemistry, Other medical & health sciences, and Health services research acknowledge NHMRC funding.

Using the measure of actual and expected citations, Genetics and Interdisciplinary biomedicine are the strongest performers, while Medical microbiology is the weakest.

✦ ISI subject categories:

NHMRC funding is acknowledged on more than 40% of all publications in Vascular diseases, Neurosciences, Endocrinology and metabolism, Immunology, Hematology and Physiology.

Less than 10% of publications in six categories acknowledge NHMRC funding — Behavioural science, Critical care, Miscellaneous medicine, and Anesthesiology.

Using the measure of actual and expected citations, the strongest performers are Cell biology, General and internal medicine, Oncology, Infectious diseases and Microbiology. The weakest performers are Clinical neurology and Virology.

✦ While NHMRC funded only 25% of all publications, it was acknowledged in 40% of publications in the top 5% most highly cited band, and 47% in the top 1% band.

✦ The University of Melbourne produced the most number of publications with acknowledgement of NHMRC (425), followed by the University of Sydney (333). Monash University, the University of Queensland and the University of New South Wales acknowledged NHMRC in more than 200 publications, while a further 11 did so in at least 100 publications.

Many institutions achieved levels well above the expected level for their mix of journals, most notably a number of the medical research institutes, the University of New South Wales, the Royal Prince Alfred Hospital, the Prince of Wales and Prince Henry Hospital and St Vincents Hospital (Sydney). None of the major institutions had citation rates significantly below the expected level.

## 6 CONCLUSION

Summaries of the main findings of our analyses are contained at the conclusion of each of the preceding three sections. Here we offer a few concluding remarks.

The analyses contained in this report have rested primarily on the funding acknowledgments given in biomedical publications. We could not apportion the amount of funding from the different sources relevant to each publication, or indeed to the total basket of biomedical publications. However, it is interesting to note that the proportion of publications reporting NMHRC funding is very close to their share of total biomedical funding — 25%. We are unable to say whether the proportions we have shown for other sectors are also accurate, though others may be able to comment on this.

One further step that could in theory be taken is to examine the final reports of NHMRC grant recipients which contain details of the publications resulting from the research funded by the grant. This step requires the extensive manual input of bibliographic data into a new database. However, if this proves feasible, the linking of this database to both the REPP and ROD databases would make possible an even more detailed and comprehensive analysis targeted at NHMRC supported research. We have already undertaken a study of this type for the Australian Research Council (ARC), focussing on the biological sciences. We are confident that the methodology developed for that study would translate well to the medical sciences and would provide additional insight into the funding of such research in Australia.

## Appendix A Translation of ISI subject categories to ASRC sub-fields

ASRC code	ASRC field/sub-field	ISI subject categories
080000	BIOLOGICAL SCIENCES	
08xxxx <sup>1</sup>	General biology	Biochemistry and molecular biology <sup>2</sup> Biology <sup>3</sup> Biology, miscellaneous <sup>3</sup>
080200	Genetics, molecular biology and biotechnology	Cell biology Genetics and heredity Biotechnology and applied microbiology
100000	MEDICAL AND HEALTH SCI	
10xxxx	General medical & health sci <sup>4</sup>	Medicine, research and experimental
100100	Immunology	Allergy Immunology
100200	Medical biochemistry & clin chem	Chemistry, clinical and medicinal
100300	Medical microbiology	Virology
100400	Pharmacology	Pharmacology and pharmacy Toxicology
100500	Physiology	Anatomy and morphology Physiology
100600	Neurosciences	Neurosciences
100700	Clinical Sciences	Andrology Anesthesiology Cardiovascular system Clinical neurology Critical care Dentistry / oral surgery & medicine Dermatology & venereal diseases Endocrinology & metabolism Gastroenterology & hepatology Geriatrics & gerontology Hematology Infectious diseases Medicine, general & internal Obstetrics & gynecology Oncology Ophthalmology Orthopedics Otorhinolaryngology Pathology Pediatrics Psychiatry Psychology Radiology & nuclear medicine Reproductive systems Respiratory system Rhematology Surgery Transplantation, Tropical medicine Urology & nephrology Vascular diseases
100800	Public health research	Nutrition & dietetics Public health Substance abuse
100900	Health services research	Medicine, legal

109900	Other medical and health sciences	Medicine, miscellaneous Medical informatics Medical laboratory technology Sport sciences
xxxxxx	Interdisciplinary biomedicine <sup>5</sup>	Behavioural sciences Biotechnology & applied microbiology Microbiology Parasitology

---

<sup>1</sup> This was a 'dummy' group created to cater for ISI subject categories that spanned more than one field of the biological sciences.

<sup>2</sup> Spans two sub-fields: 080100 Biochemistry, and 080200 Genetics, molecular biology and biotechnology

<sup>3</sup> Spans most of the sub-fields of the biological sciences

<sup>4</sup> This was a 'dummy' group created to cater for an ISI subject category that spanned most of the sub-fields of the medical and health sciences

<sup>5</sup> This was a 'dummy' group created to cater for the four ISI subject categories that appeared to span both the biological and medical and health sciences, without either field predominating. To a lesser extent, the subject categories also spanned the veterinary sciences sub-field of agricultural sciences.

## Appendix B Journals in each ISI subject category

<b>Allergy</b>	CAN ANAE SJ	ADV MICROB	BIOMED BIOC	FOL HIST C
ALLERGY	CAN J ANAES	ADV POLYAM	BIOMED CHRO	FREE RAD B
ANN ALLER A	INT ANESTH	ADV PR TH L	BIOMETALS	FREE RAD R
ANN ALLERGY	J CARDIOTHO	ADV PROS T	BIOORG CHEM	FREE RAD RE
CHEM IMMUNO	PAIN	ADV PROTEIN	BIOORG MED	GENE
CL R ALL IM	SEM ANESTH	AGR BIOL CH	BIOPHARM DR	GENE ANAL T
CLIN ALLERG		AM J RESP C	BIOPHYS CH	GENE THER
CLIN EXP AL		AMINO ACIDS	BIOPOLYMERS	GENE-COMBIS
CLIN IMMUN A	<b>Behavioural</b>	AMYLOID	BIOS BIOT B	GLYCOBIOLOG
CLIN R ALL	<b>sciences</b>	AN QUIM C	BIOSCI REP	GLYCOCON J
CONTACT DER	ADV BEHAV P	ANAL LETT B	BIOT APP B	GROW FACTOR
IMMUN INFEK	ADV STUDY B	ANAL LETTER	BIOTECHNIQU	H-S Z PHYSL
IMMUNOL ALL	AGGR BEHAV	ANALYT BIOC	BIO THERAPY	HEMOGLOBIN
INT A AL IM	ANIM BEHAV	ANN CLIN BI	BONE MINER	HUM MOL GEN
INT A ALLER	ANIM LEAR B	ANN R BIO B	CAN J BIO C	I J BIOCH B
J ALLERG CL	BEHAV AN L	ANN R BIOCH	CAN J BIOCH	INORG BIOCH
MG ALLERGY	BEHAV BRAIN	ANN R CELL	CAN J MICRO	INSEC BIO M
PROG ALLERG	BEHAV ECO S	ANN R PLANT	CANC BIOC B	INSECT BIOC
REV FR ALLE	BEHAV ECOL	ANTI-CAN DR	CARLSBERG R	INT J BIOC
	BEHAV GENET	ANTIVIR CHE	CEL MOL B R	INT J BIO M
	BEHAV NEUR	APPL BIOC B	CELL	INT J BIOCH
	BEHAV NEURO	ARCH BIOCH	CELL AD COM	INT J PEPT
	BEHAV PROC	ARCH I PHYS	CELL BIOC F	IRCS-BIOCH
	BEHAV SCI	ARCH INS B	CELL BIOL R	ISI AT BIOC
<b>Anatomy &amp;</b>	BEHAVIOUR	ARCH PHYS B	CELL GROWTH	ISOZYMES
<b>morphology</b>	BIOL BEHAV	B MOL BIOL	CELL MOL B	ITAL J BIOC
ACT ANATOM	CARNIVORE	B S CH FR 2	CELL MOL N	J BIO STRUC
ACT MORP HU	CHEM SENSE	B S CHIM FR	CELL MOTIL	J BIOCH BIO
ACT MORPH H	CORTEX	BBA-BIOENER	CELL SIGNAL	J BIOCH TOX
ACT MORPH N	ETHOLOGY	BBA-BIOMEMB	CHEM BIOL	J BIOCHEM
ADV ANAT EM	HOMEOSTASIS	BBA-GEN SUB	CHEM PHYS L	J BIOENER B
AM J ANAT	HORMONE BEH	BBA-GENE ST	CHEM-BIO IN	J BIOL CHEM
ANAT ANZ	HUMAN FACT	BBA-LIPID L	CHROMOS RES	J BIOLUM CH
ANAT CLIN	J BIOL RHYT	BBA-MOL BAS	CLIN BIOC C	J BIOM NMR
ANAT EMBRYO	J BIOSOC SC	BBA-MOL CEL	CLIN BIOCH	J CARB CHEM
ANAT REC	J COM PSYCH	BBA-PROT ST	CLIN CHIM A	J CARB-NUCL
ANN ANATOMY	J EXP AN BE	BBA-REV BIO	CLIN PHYS B	J CELL BIO
ARCH ANAT M	J EXP PSY A	BBA-REV CAN	COLD S HARB	J CELL BIOC
DEV DYNAM	NEUROBIOL L	BIO CHEM HS	COLLAG REL	J CHEM ECOL
DEVELOPMENT	NEUROPSYCHO	BIOC BIOP A	COMP BIOC A	J CHEM NEUR
EUR J MORPH	NEUROSCI B	BIOC BIOP R	COMP BIOC B	J CHIM PHYS
J ANAT	PAV J BIOL	BIOC CELL B	COMP BIOC C	J CYCL NUCL
J CRAN GENE	PHYSL BEHAV	BIOC MOL B	COMPR BIOCH	J CYCLIC NU
J EMB EXP M	RES COMM P	BIOC PHY PF	CONNECT TIS	J ENZ INHIB
J MORPH	SLEEP	BIOCH ARCH	CR R BIOCHE	J EVOL BIOC
J PINEAL R		BIOCH MED M	CR R ONCOG	J FOOD BIOC
MORF NORM B	<b>Biochemistry &amp;</b>	BIOCH MOL M	CRC C R BI	J INORG BIO
SUR RAD AN	<b>molecular</b>	BIOCH PHARM	CUR OP GEN	J INTERF CY
VIRC ARCH A	<b>biology</b>	BIOCH SOC S	CURR OP STR	J INTERF R
Z MIK-ANAT	ACT BIO MED	BIOCH SOC T	CURR T MEM	J LIPID M
ZBL VET C	ACT BIOCH H	BIOCH SYST	CURR T MEMB	J LIPID M C
ZOOMORPHOL	ACT BIOCH P	BIOCHEM	CYTOKINE	J LIPID RES
	ACT CHEM B	BIOCHEM ACT	DIAGN MOL P	J MEMBR BIO
	ACT CHEM SC	BIOCHEM GEN	DNA	J MOL BIOL
	ACT CRYST D	BIOCHEM INT	DNA CELL B	J MOL EVOL
	AD SEC MESS	BIOCHEM J	EICOSANOIDS	J MOL GRAPH
	ADV BIO PSY	BIOCHEM SSR	ELECTROPHOR	J MOL NEURO
	ADV CARB C	BIOCHEM-MOS	EMBO J	J MUSCLE R
	ADV COMP PB	BIOCHIMIE	ENZYME	J NEUROCHEM
	ADV CY NU P	BIOCONJ CHE	ENZYME PROT	J PHOTOCH B
	ADV CY NU R	BIOELECTR B	ESSAYS BIO	J PROTEIN C
	ADV ENZYM	BIOESSAYS	EUR J BIOCH	J RECEPT SI
	ADV ENZYME	BIOFACTORS	EUR J CL CH	J STEROID B
	ADV ENZYME	BIOG AMINE	EXP CLIN IM	J STRUCT B
	ADV INORG B	BIOL MEMB	FASEB J	J TR ELEM E
	ADV LIPID R	BIOL MET	FEBS LETTER	J TR ELEM M
		BIOL TR EL	FISH PHYS B	LIPIDS

LYMPH CYT R  
MAGNES TR E  
MAGNESIUM  
MAGNESIUM-B  
MAMM GENOME  
MATRIX  
MATRIX BIOL  
MECH AGE D  
MEDIAT INFL  
MEMBR BIOCH  
METAL IONS  
METH BIOC A  
METH ENZYM  
MOL ASP MED  
MOL BIOCH P  
MOL BIOL  
MOL BIOL CE  
MOL BIOL EV  
MOL BIOL M  
MOL BIOL RP  
MOL BIOTHER  
MOL C BIOCH  
MOL CARCINO  
MOL CELL B  
MOL CELL PR  
MOL CELLS  
MOL ECOL  
MOL G GENET  
MOL IMMUNOL  
MOL MED  
MOL MED TOD  
MOL MEMBR B  
MOL MICROB  
MOL PL MICR  
MOL REPROD  
MOLEC PHARM  
MUT R-DNAGI  
MUT RES-F M  
NAT MED  
NAT ST BIOL  
NEUROCHEM I  
NEUROCHEM R  
NEW BIOL  
NUCL ACID R  
NUCLEOS NUC  
ONCOGENE  
PEPTIDE RES  
PEPTIDES  
PEST BIOCH  
PHOTOBIOCH  
PHOTOCHEM P  
PHYSIOL CHE  
PHYSL CHEM  
PL CELL  
PLANT MOL B  
POST BIOCH  
PREP BIOCH  
PROCESS BIO  
PROG BIOPHY  
PROG LIPID  
PROG MED CH  
PROG NUCL A  
PROS LEUK E  
PROT EX PUR  
PROTEIN ENG  
PROTEIN PRO  
PROTEIN SCI  
PROTEINS  
RECEP REC B  
RECEPTOR

RES COM M P  
REV PHYS B  
REV RO BIOC  
SEIKAGAKU  
SOM CELL M  
STEROIDS  
STRUCTURE  
THER DRUG M  
TR ELEM EL  
TRANSGEN RE  
TRENDS BIOC  
UCLA SY MOL  
UKR BIOKHM  
VITAM HORM  
VOP MED KH  
YEAST  
Z NATURFO C

### **Biology**

ACT BIOL H  
ACT BIOL HU  
ACT BIOTH  
ACT TROP  
ADV RAD BIO  
ANN AP BIOL  
ANN BIOL CL  
ANN HUM BIO  
ANNEE BIOL  
ARCH BIOL  
ARCH BIOL M  
ARCH IT BIO  
ARCH PROTIS  
AUST J BIOL  
BIO-TECHNOL  
BIOCH MED M  
BIOESSAYS  
BIOFACTORS  
BIOL B  
BIOL J LINN  
BIOL MET  
BIOL REV  
BIOL RH RES  
BIOL ZBL  
BIOLOGIA  
BIOLOGICALS  
BIOMETALS  
BIOSCIENCE  
BIOSYSTEMS  
BIOTROPICA  
CARLSBERG R  
CHEM-BIO IN  
CLADISTICS  
CONSER BIOL  
CR R BIOTEC  
CR SOC BIOL  
CURR T DEV  
DEVELOP BIO  
ENDOCYT CEL  
EVOL ECOL  
EXP BIOL  
FASEB J  
FED PROC  
FOL BIOL  
GROW DEV AG  
GROWTH  
HUMAN BIOL  
I J EX BIOL  
IAN BIOL  
IAN SSS BIO

ISI ATL AN  
J BIOL RHYT  
J BIOSCI  
J EL MICR T  
J EVOL BIOL  
J EXP BIOL  
J HIST BIOL  
J I INST SC  
LIFE SCI  
MICROSC RES  
MOL BIOCH P  
NEW BIOL  
ORIGIN LIFE  
P BIOL SOC  
P JPN AC B  
P KON NED C  
P ROY SOC B  
PATHOB ANN  
PER BIOL  
PHI T ROY B  
PLANT J  
POLAR BIOL  
PROTEIN SCI  
Q REV BIOL  
REP KEVO  
REPROD FERT  
REPROD NUTR  
REPROD TOX  
REV CAN BI  
REV CAN BIO  
SYM SOC EXP  
W ROUX A DB  
ZH OBS BIOL

### **Biology,**

**miscellaneous**  
AM BIOL TEA  
AM J P ANTH  
B MATH BIOL  
BIOL BEHAV  
BIOL CYBERN  
CABIOS  
CHRONOBIOL  
CRYO-LETT  
CRYOBIOLOGY  
EVOLUT BIOL  
IMA J MATH  
INT BIOD B  
J BIOL STAN  
J HUM EVOL  
J MATH BIOL  
J THEOR BIO  
J THERM BIO  
KOSM B AV M  
MATH BIOSCI  
METAL IONS  
OX REV REPR  
PROG T BIOL  
SYST BIOL  
YEAR PH ANT

### **Biomethods**

ACT CRYST D  
BIOCONJ CHE  
BIOESSAYS  
BIOMED CHRO  
BIOTECHNIQU

CHROMATOGR  
CYTOMETRY  
ELECTROPHOR  
GENET ANAL  
J BIOCH BIO  
J CHROM SCI  
J CHROMAT A  
J CHROMAT B  
J LABEL C R  
J LIQ CHROM  
J MICROB M  
J VIROL MET  
METH ENZYM  
MOL CELL PR  
NEUROIMAGE  
PROT EX PUR  
TRANSGEN RE

### **Cardiovascular system**

ADV MICRO  
AM HEART J  
AM J CARD  
ANGIOLOGY  
ANN CARD AN  
ANN THORAC  
ANN VASC S  
APPL CARD P  
ARCH MAL C  
ART THROM V  
ARTER THROM  
ARTERIOSCLE  
ARTERY  
ATHEROSCL R  
ATHEROSCLER  
BAS R CARD  
BLOOD VESS  
BR HEART J  
BR J DIS CH  
CARD ELDER  
CARDI ELDER  
CARDIO DR R  
CARDIO DRUG  
CARDIO PATH  
CARDIO RES  
CARDIOLOGY  
CARDIOSCIEN  
CATHET CARD  
CEREB DIS  
CIRC SHOCK  
CIRCUL RES  
CIRCULATION  
CLIN CARD  
CLIN EXP A  
CLIN EXP B  
CLIN EXP HY  
CORON ART D  
CURR P CARD  
EUR HEART J  
HEART LUNG  
HERZ  
HERZ KREISL  
HYPERTENS P  
HYPERTENSIO  
INT J CAR I  
INT J CARD  
INT J MICRO  
J AM COL C

J AM LEATH  
J CARD ELEC  
J CARDIO PH  
J CARDIOTHO  
J ELCARDIOL  
J HYPERTENS  
J MAL VASC  
J MOL CEL C  
J NUCL CARD  
J THOR SURG  
J VASC SURG  
JPN CIRC J  
JPN HEART J  
KARDIOLOGIY  
MICROC ENDO  
MICROCIRC  
MICROVASC R  
MOD C CARDI  
PACE  
PAR ARTER  
PEDIAT CARD  
PROG CARD  
RESP MED  
SEM THROMB  
SHOCK  
STROKE  
THOR CARD S  
THROMB HAEM  
THROMB RES  
TREND CARD  
TUBERC LUNG  
VASA  
VASC SURG  
Z KARDIOL

### **Cell biology**

ACT CYTOL  
ACT HIST CY  
ACT HISTOCH  
ADV ANAT EM  
ADV ENZYME  
AM J RESP C  
ANAL CELL P  
ANAL QUAN C  
ARCH HIST C  
ARCH HIST J  
BAS APP HIS  
BIO CELL  
BIOC CELL B  
BIOCELL  
BIOL MEMB  
BIOL MEMBR  
BIOTECH HIS  
CALCIF TIS  
CAN J GENET  
CEL MOL B R  
CELL  
CELL AD COM  
CELL BIO IN  
CELL BIOC F  
CELL BIOL I  
CELL BIOL R  
CELL BIOL T  
CELL BIOPHY  
CELL CALC  
CELL DIF DE  
CELL DIFFER  
CELL GROWTH  
CELL IMMUN

CELL MATER  
 CELL MEMB M  
 CELL MOL B  
 CELL MOL N  
 CELL MOTIL  
 CELL NUCL  
 CELL PROLIF  
 CELL REGUL  
 CELL SIGNAL  
 CELL STRUCT  
 CELL SURF R  
 CELL TISS RE  
 CELL TISS K  
 CELL TRANSP  
 CONNECT TIS  
 CR R ONCOG  
 CUR OP GEN  
 CURR OP CEL  
 CURR OP STR  
 CURR T CELL  
 CYTOBIOS  
 CYTOG C GEN  
 CYTOKINE  
 CYTOLOGIA  
 CYTOMETRY  
 CYTOPATHOLO  
 DEV BIOL ST  
 DEVELOP GR  
 DIAGN HISTO  
 DIFFERENTIA  
 DNA CELL B  
 EMBO J  
 ENDOCYT CEL  
 EPITH CEL B  
 EUR CYTOKIN  
 EUR J BASIC  
 EUR J CELL  
 EUR J HIST  
 EXP CELL B  
 EXP CELL RE  
 FOL HIST C  
 FOL HIST CY  
 GAMETE RES  
 GENOME  
 GROW FACTOR  
 HIST HISTOP  
 HISTOCHEM C  
 HISTOCHEM J  
 HISTOCHEMIS  
 HISTOPATHOL  
 IMM CELL B  
 IN VITRO  
 IN VITRO C  
 IN VITRO-AN  
 IN VITRO-PL  
 INFLAMMATIO  
 INT J CELL  
 INT J BIO C  
 INT J TISS  
 INT R CONN  
 INT REV CYT  
 J BIOENER B  
 J CELL BIOC  
 J CELL BIOL  
 J CELL PHYS  
 J CELL SCI  
 J HIST CYTO  
 J HISTOTECH  
 J LIPID M C  
 J MEMBR BIO

J MUSCLE R  
 J NEUROCYT  
 J RECEPT RES  
 J RECEPT SI  
 J STRUCT B  
 J SUBMIC CY  
 J ULT MOL S  
 J ULTRA RES  
 MATRIX BIOL  
 MECH AGE D  
 MEDIAT INFL  
 MEMBR BIOCH  
 METH CELL B  
 METH ENZYM  
 MOL C BIOCH  
 MOL C ENDOC  
 MOL BIOL CE  
 MOL CELL B  
 MOL CELL PR  
 MOL MEMBR B  
 MOL MED  
 MOL MED TOD  
 MOL REPROD  
 MORF NORM A  
 NAT MED  
 NAT ST BIOL  
 ONCOGENE  
 PATHOBIOLOG  
 PIGM CELL R  
 PLATELETS  
 PROG HISTOC  
 PROTOPLASMA  
 RBC-CELL BI  
 RECEPTOR  
 ROUX A DB  
 SEM CELL B  
 SOM CELL G  
 SOM CELL M  
 STAIN TECH  
 STEM CELLS  
 STRUCTURE  
 TISSUE ANTI  
 TISSUE CELL  
 TR CELL BIO  
 TSITOL GEN  
 TSITOLOGIYA  
 UCLA SY MOL  
 VIRC ARCH A  
 VIRC ARCH B

**Chemistry,  
 clinical &  
 medicinal**  
 ADV CLIN C  
 ANN CLIN BI  
 BIOORG MED  
 CLIN BIOCH  
 CLIN CHEM  
 CLIN CHIM A  
 EUR J CL CH  
 EUR J MED C  
 J MED CHEM  
 MED RES REV

**Clinical  
 Neurology**  
 ACT NEUR SC

ACT NEUROCH  
 ACT NEURO P  
 ALZ DIS A D  
 AM J NEUROR  
 ANN NEUROL  
 ARCH NEUROL  
 BAIL CLIN N  
 BRAIN  
 BRAIN DEVEL  
 BRAIN PATH  
 CAN J NEUR  
 CEREB DIS  
 CHILD NERV  
 CLIN ELECTR  
 CLIN NEUR  
 CLIN NEURO P  
 DEMENTIA  
 DEVELOP MED  
 EEG CL NEUR  
 EPILEPSIA  
 EPILEPSY R  
 EUR ARCH PS  
 EUR NEUROL  
 EUR NEUROPS  
 F NEUR PSYC  
 HEADACHE  
 HUM PSYCHOP  
 ITAL J NEUR  
 J AFFECT D  
 J CHILD NEU  
 J CL EXP N  
 J CL PSYCH  
 J COMP NEUR  
 J INTEL DIS  
 J NE EXP NE  
 J NE NE PSY  
 J NERV MENT  
 J NEUR TR-P  
 J NEURO-ONC  
 J NEUROL  
 J NEURO P CL  
 J NEUROSURG  
 J PSYCHOPH  
 MOVEMENT D  
 NERVENARZT  
 NEURO-OPHTH  
 NEUROCHIRE  
 NEUROEPIDEM  
 NEUROG MOT  
 NEUROLOGY  
 NEUROMUSC D  
 NEUROP AP N  
 NEUROPEDIAT  
 NEURORADIOL  
 NEUROSCI B  
 NEUROSURGER  
 PAIN  
 PED NEUROS  
 PROG NEUR-P  
 PSYCH RES-N  
 PSYCHOPH B  
 REV NEUROL  
 SCHIZO BULL  
 SCHIZOPHR R  
 SLEEP  
 STROKE  
 SURG NEUROL

**Critical care**

AM J R CRIT  
 ANAESTH I C  
 CRIT CARE M  
 INTEN CAR M  
 J AC EMER M  
 J TRAUMA  
  
**Dentistry / oral  
 surgery &  
 medicine**  
 ACT ODON SC  
 AM J DENT  
 AM J ORTHOD  
 ANGL ORTHOD  
 ARCH ORAL B  
 AUST DENT J  
 BR DENT J  
 BR J ORAL M  
 BR J ORAL S  
 CARIES RES  
 CLEF PAL J  
 CLEF PAL-CR  
 COMM DEN OR  
 EUR J OR SC  
 EUR J ORTHO  
 GERODONTOLO  
 INT DENT J  
 INT J OR M  
 INT J OR SU  
 INT J PER R  
 J AM DENT A  
 J BIOL BUCC  
 J CLIN PER  
 J CRAN MAX  
 J DENT  
 J DENT CHIL  
 J DENT RES  
 J ENDODONT  
 J MAXIL SUR  
 J ORAL MAX  
 J ORAL PATH  
 J ORAL REH  
 J ORAL SURG  
 J PERIOD RE  
 J PERIODONT  
 J PROS DENT  
 J PUBLIC H  
 OPER DENT  
 ORAL MICROB  
 ORAL ONCOL  
 ORAL SURG O  
 SC J DENT R  
 SWED DENT J

**Dermatology &  
 venereal  
 diseases**  
 ACT DER-VEN  
 AM J DERMAT  
 ANN DER VEN  
 ARCH DERM R  
 ARCH DERMAT  
 BR J DERM  
 BR J VEN DI  
 CLIN EXP D  
 CONTACT DER  
 CUTIS

DERM SURG  
 DERMATOLOG  
 DERMATOLOGY  
 EUR J DERM  
 GENITOURIN  
 HAUTARZT  
 INT J COSM  
 INT J DERM  
 J AM ACAD D  
 J CUT PATH  
 J DERM SURG  
 J DERM TR  
 J DERMA SCI  
 J INVES DER  
 LEPROSY REV  
 MYCOSES  
 MYKOSEN  
 PHOTODERM P  
 PHOTODERMAT  
 SEX TRA DIS  
 SKIN PHARM  
 V DERM VEN

**Endocrinology  
 & metabolism**

ACRIDA  
 ACT DIABET  
 ACT DIABETO  
 ACT ENDOCR  
 ADV PR TH L  
 ADV PROS T  
 ANN ENDOCR  
 ANN NUTR M  
 BAIL CLIN E  
 BIOCHEM ACT  
 BONE  
 BONE MINER  
 CALCIF TIS  
 CLIN END ME  
 CLIN ENDOCR  
 COMP ENDOCR  
 CONTRACEPT  
 DIABET CARE  
 DIABET NUTR  
 DIABET RE C  
 DIABETE MET  
 DIABETES  
 DIABETOLOG  
 DOM ANIM EN  
 END METAB C  
 ENDOCR EXP  
 ENDOCR J  
 ENDOCR J-UK  
 ENDOCR JPN  
 ENDOCR PATH  
 ENDOCR RES  
 ENDOCR REV  
 ENDOCR-R CA  
 ENDOCRINE  
 ENDOCRINE R  
 ENDOCRINOL  
 ENDOCRINOLO  
 ENDOKRINOL  
 EUR J ENDOC  
 EXP CL E D  
 EXP CLIN EN  
 FRONT HORM  
 FRONT NEURO

GEN C ENDOC  
 GROW REGUL  
 HORMONE BEH  
 HORMONE MET  
 HORMONE RES  
 INT J FERT  
 INT J OBES  
 INT J PANCR  
 J BONE MIN  
 J CEREBR B  
 J CLIN END  
 J ENDOC INV  
 J ENDOCR  
 J INH MET D  
 J MOL ENDOC  
 J NEUROENDO  
 J PED END M  
 J PED ENDOC  
 J PINEAL R  
 J REPR FERT  
 J STEROID B  
 METAB BONE  
 METAB BRAIN  
 METABOLISM  
 MIN ELECT M  
 MOL C ENDOC  
 MOL ENDOCR  
 NEUROENDO L  
 NEUROENDO CR  
 NEUROPEPTID  
 OSTEOPOR IN  
 PANCREAS  
 PROG NEUREN  
 PROS LEUK E  
 PROS LEUK M  
 PROSTAG MED  
 PROSTAGLAND  
 PROSTATE  
 PSYCHONEURO  
 REC PROG H  
 REGUL PEPT  
 REPROD NUTR  
 REV DOY INM  
 STEROIDS  
 THYROID  
 TR ELEM EL  
 TRENDS ENDO  
 VITAM HORM

**Gastroenterol -  
 ogy&hepatology**  
 ABDOM IMAG  
 ALIM PHARM  
 AM J GASTRO  
 BAIL CLIN G  
 CLIN GASTRO  
 CURR OPIN G  
 DIABET RE C  
 DIG DIS SCI  
 DIGESTION  
 DIS COL REC  
 ENDOSCOPY  
 GASTRO CL B  
 GASTRO CLIN  
 GASTROENTY  
 GASTROIN EN  
 GASTROIN RA  
 GUT

HEP-GASTRO  
 HEPATOLOGY  
 INF KLIN ER  
 INFUSIONSTH  
 INT HEPAT C  
 ITAL J GAST  
 J CLIN GAST  
 J GASTR HEP  
 J HEPATOL  
 J PED GASTR  
 LEBER MAG D  
 LIVER  
 MED CHIR D  
 NEUROG MOT  
 PROG LIVER  
 SC J GASTR  
 SEM LIV DIS  
 Z GASTROENT

**Genetics &  
 heredity**

ACT GENET M  
 ADV GENETIC  
 ADV HUM GEN  
 AM J HU GEN  
 AM J MED G  
 ANIM BL GR  
 ANIM GENET  
 ANN GENET  
 ANN HUM GEN  
 ANN R GENET  
 BEHAV GENET  
 BIOCHEM GEN  
 BIOT GEN EN  
 CAN J GENET  
 CANC GENET  
 CARYOLOGIA  
 CHEM MUTAG  
 CHROMOSOMA  
 CLIN GENET  
 CUR OP GEN  
 CURR GENET  
 CYTOG C GEN  
 DEV GENET  
 DIS MARKER  
 DNA  
 DNA CELL B  
 DNA SEQ  
 ENV MOL MUT  
 ENV MUTAGEN  
 EUR J IMM  
 EVOL ECOL  
 EVOLUT BIOL  
 EVOLUTION  
 EXP CLIN IM  
 GAMETE RES  
 GEN SEL EVO  
 GENE  
 GENE ANAL T  
 GENE CHROM  
 GENE DEV  
 GENE THER  
 GENET ANAL  
 GENET EPID  
 GENET POL  
 GENET RES  
 GENETICA  
 GENETICS

GENETIKA  
 GENOME  
 GENOMICS  
 HEREDITAS  
 HEREDITY  
 HUM GENE TH  
 HUM GENET  
 HUM MOL GEN  
 HUMAN BIOL  
 HUMAN HERED  
 I J GENET P  
 IMMUNOGENET  
 J CRAN GENE  
 J EVOL BIOL  
 J GENET HUM  
 J GENETICS  
 J HEREDITY  
 J IMMUNOGEN  
 J INH MET D  
 J INTEL DIS  
 J MED GENET  
 J MENT DEF  
 J MOL EVOL  
 J MOL MED-J  
 J NEUROGEN  
 JPN J BREED  
 JPN J GENET  
 JPN J HUM G  
 MAMM GENOME  
 MOL G GENET  
 MUT R-DNA R  
 MUT R-DNAGI  
 MUT RES LET  
 MUT RES-ENV  
 MUT RES-F M  
 MUT RES-G T  
 MUT RES-R G  
 MUTAGENESIS  
 MUTAT RES  
 NAT GENET  
 ONCOGENE  
 ONCOGENE R  
 PLASMID  
 PROG MED GE  
 REV BRA GEN  
 SOCIAL BIOL  
 SOM CELL G  
 TER CAR MUT  
 THEOR A GEN  
 THEOR POP B  
 TREND ECOL  
 TRENDS GEN  
 TSITOL GEN  
 VIRUS GENES

**Geriatrics &  
 gerontology**

AGE  
 AGE AGEING  
 ARCH GER G  
 CARDI ELDER  
 DRUG AGING  
 EXP AGING R  
 EXP GERONT  
 GERIATRICS  
 GERODONTOLO  
 GERONTOLOGY  
 GIOR GERONT

GROW DEV AG  
 J AM GER SO  
 J GERIAT PS  
 J GERONT A  
 J GERONT B  
 J GERONTOL  
 MATURITAS  
 MECH AGE D

**Hematology**

ACT HAEMAT  
 ADV MICROC  
 AM J HEMAT  
 AM J PED H  
 ANIM BL GR  
 ANN HEMATOL  
 BAIL CL HAE  
 BAIL CLIN H  
 BL CELL M D  
 BL COAG FIB  
 BLOOD  
 BLOOD CELLS  
 BLOOD REV  
 BLUT  
 BONE MAR TR  
 BR J HAEM  
 CIRCUL RES  
 CIRCULATION  
 CLIN HAEMAT  
 CLIN HEMORH  
 CLIN LAB H  
 COMP HAEMAT  
 CR R ONC H  
 CRC C R ONC  
 EUR J HAEMA  
 EUR PAED H  
 EXP HEMATOL  
 FIBRINOLYS  
 HAEMATOLOG  
 HAEMOSTASIS  
 HEMAT ONCOL  
 HEMATOL ONC  
 HEMOGLOBIN  
 HERZ  
 INFUSIONSTH  
 J CEREBR B  
 J CL HEMAT  
 J CLIN APH  
 J INFLAMM  
 J LEUK BIOL  
 J PED H ONC  
 J VASC RES  
 LEUK RES  
 LEUKEMIA  
 NOUV RF HEM  
 PED HEM ONC  
 PLATELETS  
 PROG HEMAT  
 PROG HEMOST  
 REV FR TR H  
 REV FR TR I  
 SC J HAEMAT  
 SEM HEMATOL  
 SEM THROMB  
 THROMB HAEM  
 THROMB RES  
 TR MED REV  
 TRANSF CL B  
 TRANSFUS M

TRANSFUSION  
 VOX SANGUIN

**Immunology**

A I P IMMUN  
 ACT PAT S C  
 ADV IMMUNOL  
 ADV NEUROIM  
 AFR J CLIN  
 AIDS  
 AIDS RES  
 AIDS RES H  
 ALLERGY  
 AM J REPROD  
 ANN ALLER A  
 ANN IMMUNOL  
 ANN R IMMUN  
 ANTIBODY IM  
 APMIS  
 APPL IMMUNO  
 ARCH IMMUN  
 B I PASTEUR  
 B IST SIER  
 BAIL CLIN I  
 BONE MAR TR  
 BRAIN BEH  
 CAN J MICRO  
 CANCER IMMU  
 CELL IMMUN  
 CHEM IMMUNO  
 CL DIAG LAB  
 CL IMMUNOTH  
 CLIN EXP AL  
 CLIN EXP IM  
 CLIN IMM IM  
 CLIN IMMN A  
 CLIN IMMUN  
 CLIN INF D  
 CLIN R ALL  
 COMP IMMUN  
 COMPAR IMM  
 CONT T IMM  
 CONT T MOL  
 CR R IMMUN  
 CRC C R IMM  
 CURR OP IM  
 CURR T MICR  
 CYTOKINE  
 DEV COMP IM  
 DEV IMMUNOL  
 DIAGN CL IM  
 DIAGN IMMUN  
 EOS-RIV IMM  
 EUR J CL M  
 EUR J IMM  
 EUR J IMMUN  
 EXP CLIN IM  
 FEMS IM MED  
 FEMS MIC IM  
 FUND CL I  
 HUMAN IMMUN  
 HYBRIDOMA  
 I J MED R A  
 I J MED R-A  
 I J MED RES  
 IMM CELL B  
 IMMUN INFEK  
 IMMUNITY  
 IMMUNOBIOL

IMMUNOGENET  
IMMUNOL ALL  
IMMUNOL COM  
IMMUNOL INV  
IMMUNOL LET  
IMMUNOL RES  
IMMUNOL REV  
IMMUNOL TOD  
IMMUNOLOGY  
IMMUNOP TOD  
IMMUNOPH IM  
IMMUNOPHARM  
INF AGENT D  
INF DIS C P  
INF DIS CL  
INFEC IMMUN  
INFECTIOIN  
INFUSIONSTH  
INMUNOLOGIA  
INT A AL IM  
INT A ALLER  
INT IMMUNOL  
INT J ANT A  
INT J IM PH  
INT J IMM T  
INT J IMMUN  
ISI ATL IMM  
J ACQ IMM D  
J ALLERG CL  
J ANTIBIOT  
J AUTOIMMUN  
J BIOL RESP  
J CLIN IMM  
J CLIN LAB  
J EXP MED  
J HYG EP MI  
J IMMUNOASS  
J IMMUNOGEN  
J IMMUNOL  
J IMMUNOL M  
J IMMUNOL R  
J IMMUNOPH  
J IMMUNOTH  
J INFEC DIS  
J INFECTION  
J INFLAMM  
J INTERF CY  
J LEUK BIOL  
J MOL C IMM  
J NEUROIMM  
J REPRO IMM  
J RETIC SOC  
LYMPH CYT R  
LYMPHOK RES  
MED MICROBI  
MICROB IMMU  
MICROB PATH  
MOL IMMUNOL  
ORAL MICROB  
PARASITE IM  
PROG NEUREN  
RES IMMUNOL  
REV FR ALLE  
REV FR TR I  
REV INFEC D  
SC J IMMUN  
SC J IN DIS  
SPR SEM IMM  
SURV IMMUN  
THYMUS

TISSUE ANTI  
TRANSF CL B  
TRANSPLAN P  
TRANSPLANT  
VACCINE  
VET IMMUNOL  
VIRAL IMMUN  
ZH MIKROB E

**Infectious  
diseases**

AIDS  
AIDS RES H  
BAIL CLIN I  
CL DIAG LAB  
CLIN INF D  
DIAG MICR I  
EPIDEM INFE  
IMMUN INFEK  
INF AGENT D  
INF DIS C P  
INF DIS CL  
INFEC IMMUN  
INFECT CONT  
INFECTION  
J ACQ IMM D  
J HOSP INF  
J INFEC DIS  
J INFECTION  
PEDIAT INF  
SC J IN DIS

**Medicine,  
general &  
internal**

ACAD MED  
ACT CLIN B  
ACT MED AUS  
ACT MED H  
ACT MED HU  
ACT MED SC  
ADV INTERN  
ADV PAIN R  
AM FAM PHYS  
AM J MED  
AM J MED SC  
ANGIOLOGY  
ANN CLIN R  
ANN INT MED  
ANN MED  
ANN MED IN  
ANN R MED  
ANNU REP M  
ARCH BIOL M  
ARCH IN MED  
AUST NZ J M  
B NY AC MED  
BR J CLIN P  
BR J GEN PR  
BR J HOSP M  
BR MED B  
BR MED J  
CAN MED A J  
CHIN MED J  
CIBA F SYMP  
CLEV CLIN Q  
CLIN INVES

CURR MED R  
DAN MED B  
DEUT MED WO  
DIABET CARE  
DIABETES  
DIABETOLOG  
DM-DIS MON  
E AFR MED J  
EUR J CL IN  
FOREN SCI I  
HARVEY LECT  
HIROS J MED  
HOSP PRACT  
I J MED R A  
I J MED R-A  
I J MED RES  
INF DIS C P  
INTERNIST  
IRISH J MED  
IRISH MED J  
ISR J MED S  
J AC EMER M  
J AM MED A  
J AM OSTEO P  
J CHRON DIS  
J CLIN EPID  
J FAM PRACT  
J INTERN M  
J INVES MED  
J LA CL MED  
J ROY COL G  
J ROY COL P  
J ROY S MED  
J VASC RES  
JOHNS H MED  
JPN J MED S  
KLIN WOCH  
KLINICH MED  
LANCET  
LILLE MED  
LUPUS  
LYON MED  
MATURITAS  
MAYO CLIN P  
MED CLIN NA  
MED J AUST  
MED CLIN  
MEDICINA  
MEDICINE  
METH INF M  
MINN MED  
MT SINAI J  
MUN MED WOC  
N ENG J MED  
NETH J MED  
NOUV PRESSE  
NURS RES  
NY ST J MED  
NZ MED J  
P KON NED C  
P SOC EXP M  
P U OTAGO M  
PHYS THER  
POSTG MED J  
POSTGR MED  
PRACTITION  
PRESSE MED  
PREV MED  
Q J MED  
QJM-MON J A

REV INV CLI  
REV MED CHI  
S AFR MED J  
SB LEKAR  
SCHW MED WO  
SCOT MED J  
SEM HOP PAR  
SOUTH MED J  
SOV MED  
SUPP CARE C  
T A AM PHYS  
THERAPEVT AR  
THER UMSCH  
TR ELEM MED  
TRANSACT AS  
UN MED CAN  
V ROSS AK M  
VA MED NAUK  
WEST J MED  
WHO TECH R  
WIEN KLIN W

**Medical  
informatics**

ACAD MED  
ARTIF INT M  
BIOMED TECH  
COMPUT M PR  
INT J BIO-M  
INT J TE A  
J AM MED IN  
J MED EN TE  
MED BIO E C  
MED DECIS M  
MED EDUC  
METH INF M

**Medical  
laboratory  
technology**

AM J MED TE  
ANN CLIN L  
ARCH PATH L  
ARTIF INT M  
BR J BIOMED  
CL DIAG LAB  
CR R CL LAB  
CRC C R LAB  
DIAG MICR I  
J CL LAB AN  
J ELECTROPH  
J LA CL MED  
J MED TECH  
J MOL MED-J  
LASER MED S  
LASER SURG  
MED LAB SCI  
NMR BIOMED  
TR ELEM EL

**Medicine, legal**

FOREN SCI I  
INT J LEGAL  
J FOR SCI  
J FOREN SCI  
J MED ETHIC

MED SCI LAW  
PHARM FORUM  
REGUL TOX P  
SCI JUSTICE  
Z RECHTSMED

**Medicine,  
miscellaneous**

ACAD MED  
ACUTE CARE  
AM J NURS  
AM J PHYS M  
ANAESTH I C  
ARCH PHYS M  
AVIAT SP EN  
CRIT CARE M  
EXERC SPORT  
FOREN SCI I  
INT J SP M  
INTEN CAR M  
J AUDIOV M  
J FOREN SCI  
J HOSP INF  
J MED EDUC  
J MED ETHIC  
KOSM B AV M  
MED DECIS M  
MED EDUC  
MED SCI SPT  
MED TEACH  
METH INF M  
NURS RES  
PHYS THER  
SC J RE MED  
UNDERS BIOM  
UNDERS HYP

**Medicine,  
research &  
experimental**

ACT MED OKA  
ADV DRUG DE  
ADV EXP MED  
ADV PAIN R  
AIDS RES H  
ANAL CELL P  
ANN BIOL CL  
ANN CLIN BI  
ANTISEN RES  
ARCH BIOL M  
ARCH INV M  
ARCH PATH L  
ATLA-ALT L  
AUST J EX B  
B EXP B MED  
BIOCH MED M  
BIOCH MOL M  
BIOCHEM MED  
BIOFACTORS  
BIOLOGICALS  
BIOMED EXPR  
BIOMED PHAR  
BIOMED RES  
BIOMEDICINE  
BIOORG MED  
BIOTHERAPY

BL COAG FIB	SC J CL INV	J GEN MICRO	BRAIN RES R	J NEURO-ONC
BONE MINER	SELECT CANC	J HYG EP MI	CAN J NEUR	J NEUROBIOL
BRAZ J MED	TEX REP BIO	J INFECTION	CELL MOL N	J NEUROCHEM
CANC CEL-MR	TOH J EX ME	J MED MICRO	CEPHALALGIA	J NEUROCYT
CANC COMMUN	TREND CARD	J MICROB M	CEREB BRAIN	J NEUROENDO
CANC DRUG D	UPSAL J MED	LETT APPL M	CEREB CORT	J NEUROGEN
CANC J	YALE J BIOL	MED MICROBI	CEREB DIS	J NEUROIMM
CELL MATER		METH MICROB	CHEM SENSE	J NEUROL
CLIN BIOCH		MICROB EC H	CHILD BRAIN	J NEUROP CL
CLIN CHEM	<b>Microbiology</b>	MICROB ECOL	CLIN ELECTR	J NEUROSC
CLIN CHIM A	A VAN LEEUW	MICROB IMMU	CLIN NEUR	J NEUROSC M
CLIN INVEST	ACT MICR HU	MICROB PATH	CLIN NEUOP	J NEUROSC R
CLIN RES	ACT MICRO H	MICROBIO-UK	CLIN NEUROS	J NEUROSCI
CLIN SCI	ACT MICRO P	MICROBIOL R	CLIN VIS SC	J NEUROSURG
CONTR CL TR	ACT PAT M B	MICROBIOL S	CNS DRUGS	J NEUROTRAU
CRC C R MED	ACT PAT S B	MICROBIOLO	CORTEX	J NEURPHYSL
CURR MED R	ADV APPL MI	MICROBIOLOG	CR R NEUR	J PINEAL R
CURR THER R	ADV MICR EC	MICROBIOS	CRC C R NEU	J PSYCHOPH
DIAGN IMMUN	AM J REPR I	MOL MICROB	DEMENTIA	J SLEEP RES
EUR J CL CH	ANN MICROB	ORAL MICROB	DEV BRAIN R	J THEOR N
EUR J CL IN	ANN R MICRO	PROTISTOLOG	DEV NEUROS	MACH LEARN
EXP HEMATOL	ANTIB KHIM	RES MICROB	DEV NEUROSC	METAB BRAIN
FLUORIDE	ANTIM AG CH	REV INFEC D	DEVEL NEURO	MOL BRAIN R
FUNKT BIO M	ANTON LEEUW	SYMBIOSIS	DEVELOP MED	MOL CELL NE
I J MED R-B	APMIS	SYST APPL M	EEG CL NEUR	MOL CHEM NE
IMM CELL B	APPL ENVIR	VET MICROB	ELECT MOTOR	MOL NEUROB
INFLAMMATIO	APPL MICR B	YEAST	EPILEPSIA	MUSCLE NERV
INT J CELL	ARCH MICROB	Z ALLG MIKR	EPILEPSY R	NERVENARZT
INT J CL L	B I PASTEUR	Z MIK-ANAT	EUR ARCH PS	NEURAL COMP
J BIOL RESP	B IST SIER	ZBL BAKT	EUR J NEURO	NEURAL NETW
J BIOM SC P	BIKEN J	ZBL BAKT A	EUR NEUROL	NEURO-CHIRE
J BONE MIN	BIOTECH LET	ZBL BAKT B	EUR NEUROPS	NEURO-OPHTH
J CL EXP N	CAN J MICRO	ZBL BAKT C	EVOKED POT	NEUROB TOX
J CLIN CHEM	CL DIAG LAB	ZBL BAKT II	EXP BRAIN R	NEUROBIOL A
J CLIN INV	CLIN INF D	ZBL HYG UMW	EXP NEUROL	NEUROBIOL L
J EXP MED	COMPAR IMM	ZBL MIKROB	F NEUR PSYC	NEUROC PATH
J IMMUNOTH	CR R MICROB	ZH MIKROB E	FRONT NEURO	NEUROCHEM I
J INT BIOM	CRC C R MIC		GLIA	NEUROCHEM R
J INT MED R	CURR MICROB		HEADACHE	NEUROCHIRA
J INTERD CY	CURR T MICR	<b>Neurosciences</b>	HEARING RES	NEUROCHIRE
J INVES MED	DEV IND MIC	ACT NEUR SC	HIPPOCAMPUS	NEURODEGENE
J LA CL MED	DIAG MICR I	ACT NEUROB	HOMEOSTASIS	NEUROENDO L
J LONG-TE E	ELECTRON MI	ACT NEUROCH	HUM NEUROB	NEUROENDOCR
J MED	ENZYMIE MICR	ACT NEUROP	INT J DEV N	NEUROEPIDEM
JPN J EXP M	EPIDEM INFE	ACTIV NERV	INT J NEURS	NEUROG MOT
LAB INV	EUR J APPL	ADV BIO PSY	INT J PSYCP	NEUROIMAGE
LIFE SCI	EUR J CL M	ADV NEUROIM	INT R NEURO	NEUROLOGY
MAGNES TR E	EUR J PROT	ALZ DIS A D	ITAL J NEUR	NEUROMUSC D
MAGNESIUM	FEMS IM MED	AM J NEUROR	J AUT PHARM	NEURON
MED BIOL	FEMS MIC EC	ANN NEUROL	J AUTON NER	NEUROP AP N
MED HYPOTH	FEMS MIC IM	ANN R NEUR	J CEREBR B	NEUROPEDIAT
MED RES REV	FEMS MIC R	APPL NEUOP	J CHEM NEUR	NEUROPEPTID
MED SCI RES	FEMS MICROB	ARCH IT BIO	J CHILD NEU	NEUROPHARM
MEM I OSW C	FOL MICROB	ARCH NEUOL	J CL EXP N	NEUROPHYSIO
MOL ASP MED	FOOD MICROB	ARCH PSYCHI	J CL NEUOP	NEUROPSYCH
MOL BIOL M	GAMETE RES	BEH BRA RES	J COGN NEUR	NEUROPSYCHB
MOL BIOTHER	GEN PHYSL B	BEHAV BRAIN	J COMP NEUR	NEUROPSYCHO
MOL CELL PR	INFECTION	BEHAV NEUR	J HIRNFOR	NEURORADIOL
MOL MED	INT J ANT A	BEHAV NEURO	J INTEL DIS	NEUROREPORT
MOL MED TOD	INT J F MIC	BEHAV PHARM	J MENT DEF	NEUROSC R C
NAT MED	INT J SY B	BRAIN	J MOL NEURO	NEUROSCI B
NEW BIOL	J ANTIMICRO	BRAIN BEH	J NE EXP NE	NEUROSCI L
NMR BIOMED	J APPL BACT	BRAIN BEHAV	J NE NE PSY	NEUROSCI R
OX REV REPR	J BACT	BRAIN COGN	J NERV MENT	NEUROSCI RE
P SOC EXP M	J BASIC MIC	BRAIN DEVEL	J NEUR SCI	NEUROSCIENC
PERSP BIOL	J BIOSCI	BRAIN LANG	J NEUR TR-G	NEUROSURGER
RES CLIN L	J CLIN MICR	BRAIN PATH	J NEUR TR-P	NEUROTOX T
RES COMM S	J EUKAR MIC	BRAIN RES	J NEUR TR-S	NEUROTOXICO
RES EXP MED	J GEN A MIC	BRAIN RES B	J NEUR TRAN	PAIN
RIC CL LAB			J NEURAL TR	PED NEUROS

PERSP DEV N  
 PROG BRAIN  
 PROG CLIN N  
 PROG NEUR-P  
 PROG NEUREN  
 PROG NEURO  
 PROG NEUROB  
 PROG NEUROP  
 PSYCH RES-N  
 PSYCHONEURO  
 PSYCHOPH B  
 PSYCHOPHAR  
 RES PUBL AS  
 REST NEUROL  
 REV NEUROL  
 SEM NEUROSC  
 SOMAT MOT R  
 SOMATOSEN R  
 STER FUNC N  
 STROKE  
 SURG NEUROL  
 SYNAPSE  
 TRANS AM N  
 TRENDS NEUR  
 VIS NEUROSC  
 VISION RES  
 ZH NEVR PS  
 ZH VYSS NER

**Nutrition & dietetics**

ADV NUTR R  
 ADV NUTR T  
 AKT ERNAHR  
 AM J CLIN N  
 ANN NUTR M  
 ANN R NUTR  
 APPETITE  
 BIOFACTORS  
 BR J NUTR  
 CR R F SCI  
 CRC C R F S  
 DIABET NUTR  
 ECOL FOOD N  
 ERNAHR UMSC  
 EUR J CL N  
 FOOD CHEM  
 FOOD POLICY  
 FOOD REV IN  
 HUM NUTR-CL  
 INF KLIN ER  
 INFUSIONSTH  
 INT J OBES  
 INT J VIT N  
 J AM COL N  
 J AM DIET A  
 J CL BIOC N  
 J FOOD BIOC  
 J HUM NU DI  
 J NUTR  
 J NUTR BIOC  
 J NUTR EDUC  
 J NUTR SC V  
 J PARENT EN  
 J PED GASTR  
 NUTR CANCER  
 NUTR REP IN  
 NUTR RES

NUTR REV  
 NUTRIT  
 P NUTR SOC  
 PROG FOOD  
 PROG FOOD N  
 QUAL PLANT  
 REPROD NUTR  
 REV FR CORP  
 WORLD REV N  
 Z ERNAHRUNG

**Obstetrics & gynecology**

ACT OBST SC  
 AM J OBST G  
 AM J REPROD  
 ANN CHIR GY  
 ARCH GYN OB  
 ARCH GYNEC  
 BAIL CLIN O  
 BIOL REPROD  
 BIOL RES PR  
 BIRTH DEFEC  
 BR J OBST G  
 CLIN O GYNE  
 CLIN OB GYN  
 CLIN PERIN  
 COLPOSC GYN  
 CONTR DEL S  
 CONTRACEPT  
 DIAGN GYN O  
 EAR HUM DEV  
 EUR J OB GY  
 FERT STERIL  
 GAMETE RES  
 GEBURTSH FR  
 GYNAKOLOGE  
 GYNECOL OBS  
 GYNECOL ONC  
 HYPERTENS P  
 INT J BIOL  
 INT J FER M  
 INT J FERT  
 INT J GYN C  
 INT J GYN O  
 INT J GYN P  
 J GYNECOL S  
 J MAT FETAL  
 J PERIN MED  
 J REPR FERT  
 J REPRO MED  
 J SOC GYN I  
 MATURITAS  
 MENOPAUSE  
 OB GYN CLIN  
 OBSTET GYN  
 PLACENTA  
 PRENAT DIAG  
 REPROD TOX  
 REV PERIN M  
 SEM PERINAT  
 SURG GYN OB  
 Z GEBU PERI

**Oncology**

ACTA OECOL  
 ACTA ONCOL

ADV CANC R  
 AM J CL ONC  
 AM J PED H  
 ANN ONCOL  
 ANN SURG O  
 ANTI-CAN DR  
 ANTI-CANC D  
 ANTICANC R  
 ARCH GESCHW  
 B CANCER  
 BBA-REV CAN  
 BONE MAR TR  
 BR J CANC  
 BR J EX PAT  
 BREAST CANC  
 CANC BIOC B  
 CANC BIOTH  
 CANC CAUSE  
 CANC CEL-MR  
 CANC CHEMOT  
 CANC CLIN T  
 CANC COMMUN  
 CANC DRUG D  
 CANC GENE T  
 CANC GENET  
 CANC J  
 CANC METAST  
 CANC RES TH  
 CANC SURV  
 CANC TR REP  
 CANC TR REV  
 CANCER  
 CANCER IMMU  
 CANCER INV  
 CANCER LETT  
 CANCER RES  
 CARCINOGENE  
 CHEMOTHERA  
 CLIN EXP M  
 CR R ONC H  
 CR R ONCOG  
 CRC C R ONC  
 CURR P CANC  
 EKSP ONKOL  
 ENDOCR-R CA  
 ENV CARC EC  
 ENV CARC R  
 EUR J CAN C  
 EUR J CANC  
 EUR PAED H  
 EXP CELL RE  
 EXP ONCOL  
 GANN  
 GANN MG CAN  
 GENE CHROM  
 GYNECOL ONC  
 HEMAT ONCOL  
 HEMATOL ONC  
 IARC PUBL  
 INT J CANC  
 INT J GYN C  
 INT J HYPER  
 INT J ONCOL  
 INT J RAD O  
 INV NEW DR  
 INVAS METAS  
 J BIOL RESP  
 J CANC RES  
 J CL HEMAT  
 J CL ONCOL

J DERM SURG  
 J ENV SCI C  
 J IMMUNOTH  
 J NAT CANC  
 J NEURO-ONC  
 J PED H ONC  
 J SURG ONC  
 J TUMOR M  
 JPN J CANC  
 LEUK RES  
 LEUKEMIA  
 LUNG CANC  
 MED PED ONC  
 METH CANC R  
 MOL CARCINO  
 NEOPLASMA  
 NUTR CANCER  
 ONCO BIOL M  
 ONCOGENE  
 ONCOGENE R  
 ONCOL REP  
 ONCOLOGY  
 ONKOLOGIE  
 ORAL ONCOL  
 PED HEM ONC  
 PROG EX TUM  
 RADIOTH ONC  
 REC RES CAN  
 SELECT CANC  
 SEM CANC B  
 SEMIN ONCOL  
 SUPP CARE C  
 TER CAR MUT  
 TUMOR BIOL  
 TUMORDIAGN  
 TUMORDIAGNO  
 TUMORI  
 TUMOUR BIOL  
 VOP ONKOL

**Ophthalmology**

A GRAEFES A  
 ACT OPHTH K  
 ACT OPHTH S  
 AM J OPHTH  
 ANN OPHTH-G  
 ANN OPHTHAL  
 ARCH OPHTH  
 AUS NZ J OP  
 AUST J OPH  
 BR J OPHTH  
 CAN J OPHTH  
 CLIN VIS SC  
 CURR EYE R  
 DOC OPHTHAL  
 EXP EYE RES  
 EYE  
 EYE-T OPH S  
 GR ARCH CL  
 INT OPHTHAL  
 INV OPHTH V  
 J FR OPHTAL  
 JPN J OPHTH  
 KLIN MONATS  
 METAB PED O  
 NEURO-OPHTH  
 OPHTHAL RES  
 OPHTHAL SUR

OPHTHALMOL  
 OPHTHALMOLA  
 PROG RET EY  
 PROG RET R  
 SURV OPHTHA  
 T OPHTH SOC  
 V OFTALMOL  
 VISION RES

**Orthopedics**

ACT ORTH SC  
 ARCH ORTHOP  
 BONE  
 CALCIF TIS  
 CLIN ORTHOP  
 INT ORTHOP  
 J BONE-AM V  
 J BONE-BR V  
 J LONG-TE E  
 J ORTHOP R  
 METAB BONE  
 ORTHOPED CL  
 OSTEOPOR IN  
 PHYS THER  
 REV CHIR OR  
 Z ORTHOP GR

**Otorhinolaryngology**

ACT OTO-LAR  
 AM J OTOL  
 AM J RHINOL  
 ANN OTOL RH  
 ARCH OTO-R  
 ARCH OTO-RH  
 ARCH OTOLAR  
 AUDIOLOGY  
 BR J AUDIOL  
 CLIN OTOLAR  
 EAR HEAR  
 EUR ARCH OT  
 HEAD NECK  
 INT J PED O  
 J LARYNG OT  
 LARYNGOSCO  
 OTO H N SUR  
 OTOLAR CLIN  
 SC AUDIOL

**Parasitology**

ACT TROP  
 ADV PARASIT  
 ANN PARASIT  
 ANN TROP M  
 EXP PARASIT  
 FOL PARASIT  
 IMMUNOP TOD  
 INT J PARAS  
 J HELMINTH  
 J PARASITOL  
 MOL BIOCH P  
 P HELM SOC  
 PARASIT RES  
 PARASIT TOD  
 PARASITE  
 PARASITE IM

PARASITOL  
PARAZITOLOG  
SYST PARAS  
TROP MED P  
TROPENMED P  
VET PARASIT  
Z PARASITEN  
ZBL BAKT  
ZBL BAKT A

### Pathology

ACT NEURO P  
ACT PAT JPN  
ACT PAT M A  
ACT PAT M C  
ACT PAT S A  
ALZ DIS A D  
AM J CLIN P  
AM J PATH  
AM J SURG P  
ANAL CELL P  
ANN PATHOL  
APMIS  
ARCH PATH L  
BR J EX PAT  
BRAIN PATH  
CARDIO PATH  
CELL MATER  
CLIN IMMUN  
CLIN NEUR  
CURR T PATH  
CYTOPATHOLO  
DIAGN HISTO  
DIAGN MOL P  
DIS MARKER  
ENDOCR PATH  
EXP CELL B  
EXP MOL PAT  
EXP PATHOL  
EXP TOX PAT  
HISTOPATHOL  
HUMAN PATH  
INT J EXP P  
INT J GYN P  
INT J IM PH  
INT J LEGAL  
INT J LEPR  
INT R EXP P  
J CLIN P-CL  
J CLIN PATH  
J COMP PATH  
J CUT PATH  
J ENV P TOX  
J ENV PATH  
J EXP PATH  
J FOR SCI  
J LONG-TE E  
J NE EXP NE  
J ORAL PATH  
J PATHOLOGY  
J SUBMIC CY  
LAB INV  
LEPROSY REV  
MED SCI LAW  
MOD PATHOL  
MOL CHEM NE  
MORF NORM B  
MYCOPATHOLO  
NEUROC PATH

NEURO P AP N  
ORAL SURG O  
PATH BIOL  
PATH IMMUN  
PATH RES PR  
PATHOBIOLOG  
PATHOL ANN  
PATHOL ANNU  
PATHOL INT  
PATHOLOGE  
PATHOLOGY  
PATOL-MEX-  
PED P LAB M  
PED PATHOL  
PROG NEURO P  
RES COM M P  
RES COMM CP  
SCI JUSTICE  
SPR SEM IMM  
SURV SYN P  
ULTRA PATH  
VEROFF PATH  
VET PATH  
VIRC ARCH A  
VIRC ARCH B  
VIRCHOWS AR  
Z RECHTSMED  
ZH NEVR PS

### Pediatrics

ACT PAED SC  
ACT PAEDIAT  
AM J DIS CH  
AM J PED H  
ARCH DIS CH  
ARCH FR PED  
ARCH PED  
ARCH PED AD  
AT&T BELL L  
AT&T TECH J  
AUST PAEDIA  
BIOL NEONAT  
CHILD BRAIN  
CHILD NEPHR  
CHILD NERV  
CHIR PEDIAT  
CLIN PEDIAT  
CLIN PERIN  
DEVELOP MED  
EAR HUM DEV  
EUR J PED  
EUR J PED S  
EUR PAED H  
HELV PAED A  
INT J PED N  
INT J PED O  
J CHILD NEU  
J DENT CHIL  
J PAEDIAT C  
J PED END M  
J PED ENDOC  
J PED GASTR  
J PED H ONC  
J PED SURG  
J PEDIAT  
J PERIN MED  
J TROP PEDI  
KLIN PADIAT  
MED PED ONC

METAB PED O  
METAB PED S  
MON PAEDIAT  
MONATS KIND  
NEURO PEDIAT  
PAED PERIN  
PED CLIN NA  
PED HEM ONC  
PED NEUROS  
PED P LAB M  
PED PATHOL  
PEDIAT CARD  
PEDIAT INF  
PEDIAT NEUR  
PEDIAT PHAR  
PEDIAT PULM  
PEDIAT RAD  
PEDIAT RES  
PEDIATRICS  
PRENAT DIAG  
REV PERIN M  
RIV ITAL P  
Z GEBU PERI  
Z KINDERCH

### Pharmacology & pharmacy

ACT CRYST D  
ACT PHAR SI  
ACT PHARM J  
ACT PHARM N  
ACT PHARM S  
ACT PHARM T  
ACT PHARMA  
ACT PHYS PH  
ACT POL PH  
ADV BEHAV P  
ADV BIO PSY  
ADV DRUG DE  
ADV PHARM C  
ADVERS DRUG  
AGENT ACTIO  
ALCOHOL  
ALIM PHARM  
AM J HEAL S  
AM J HOSP P  
AM J PHAR E  
AM PHARM  
ANN PHARM F  
ANN PHARMAC  
ANN R PHARM  
ANNU REP M  
ANTI-CAN DR  
ANTI-CANC D  
ANTIB KHIM  
ANTIBIOTIKI  
ANTIM AG CH  
ANTIVIR CHE  
ARCH I PHAR  
ARCH IMMUN  
ARCH PHARM  
ARZNEI-FOR  
BEHAV PHARM  
BIOCH PHARM  
BIOL PHAR B  
BIOMED CHRO  
BIOMED PHAR  
BIOPHARM DR

BR J CL PH  
BR J PHARM  
CAN J PH SC  
CAN J PHYSL  
CANC CHEMOT  
CARDIO DRUG  
CHEM PHARM  
CHEMOTHERA  
CHIRALITY  
CL IMMUNOTH  
CLIN DRUG I  
CLIN EXP A  
CLIN EXP B  
CLIN EXP HY  
CLIN EXP PH  
CLIN NEURO P  
CLIN PHARM  
CLIN PHARMA  
CNS DRUGS  
COMM PSYCHO  
COMP BIOC C  
CONT PHARM  
CONTR CL TR  
CR R THER  
CRC C R THE  
CURR MED R  
CURR THER R  
DEV PHARM T  
DICP ANN PH  
DRUG AGING  
DRUG CHEM T  
DRUG DEV IN  
DRUG DEV R  
DRUG EXP CL  
DRUG INTEL  
DRUG INVEST  
DRUG META D  
DRUG METAB  
DRUG NUTR  
DRUGS  
EOS-RIV IMM  
EUR J CL PH  
EUR J DRUG  
EUR J MED C  
EUR J PH SC  
EUR J PH-EN  
EUR J PH-MO  
EUR J PHARM  
EUR NEUROPS  
FARMACO  
FARMACO SCI  
FARMAKOL T  
FLUORIDE  
FOL PHARM J  
FUN CL PHAR  
GEN PHARM  
GENE THER  
HUM PSYCHOP  
IMMUNOPH IM  
IMMUNOPHARM  
INF KLIN ER  
INFLAMM RES  
INT CLIN PS  
INT J CL P  
INT J CL PH  
INT J IM PH  
INT J IMMUN  
INT J PHARM  
INT PHARMAC  
INV NEW DR

ISI ATL PHA  
IUG PHYSL P  
J AM COLL T  
J ANTIBIOT  
J ANTIMICRO  
J AUT PHARM  
J CARDIO PH  
J CL PSYCH  
J CLIN HOSP  
J CLIN PH T  
J CLIN PHAR  
J CONTR REL  
J DRUG TAR  
J ETHNOPHAR  
J IMMUNOPH  
J INT MED R  
J LABEL C R  
J MED CHEM  
J MICROENC  
J NAT PROD  
J PHAR BIOP  
J PHARM B  
J PHARM BEL  
J PHARM EXP  
J PHARM MET  
J PHARM PHA  
J PHARM SCI  
J PHARM TOX  
J PHARMACOB  
J PHARMACOL  
J PSYCHOPH  
J VET PHARM  
JPN J PHARM  
KHIM FAR ZH  
LIFE SCI  
MED LETT DR  
MED RES REV  
METH FIND E  
MOLEC PHARM  
N-S ARCH PH  
NEUROPHARM  
NEUROPSYCH  
NEUROTOXICO  
P WEST PH S  
PEDIAT PHAR  
PHARM ACT H  
PHARM BIO B  
PHARM FORUM  
PHARM INT  
PHARM RES  
PHARM REV  
PHARM THERA  
PHARM TOX  
PHARM WEEK  
PHARM WORLD  
PHARMAC RES  
PHARMACOL  
PHARMACOL R  
PHARMACOPS  
PHARMACOPSY  
PHARMACOTHE  
PHARMATHERA  
PHARMAZIE  
PHYTOTHER R  
PLANTA MED  
POL J PHAR  
PROG BIOCH  
PROG DRUG M  
PROG NEUR-P  
PROG NEURO

PROS LEUK M  
 PROSTAG MED  
 PSYCHOPH B  
 PSYCHOPHAR  
 PULM PHARM  
 QSAR  
 REGUL TOX P  
 RES COM M P  
 RES COMM CP  
 REV PHYS B  
 SKIN PHARM  
 STP PHARM S  
 THER DRUG M  
 THERAPIE  
 TOX APPL PH  
 TOXICOLOGY  
 TOXICON  
 TRENDS PHAR  
 XENOBIOTICA  
 YAKUGAKU ZA

INT J SP M  
 INT R PHYS  
 J APP PHYSL  
 J CELL PHYS  
 J COMP PH A  
 J COMP PH B  
 J COMP PHYS  
 J DEV PHYSL  
 J EVOL BIOC  
 J GEN PHYSL  
 J MEMBR BIO  
 J NEURPHYSL  
 J PHYSL LON  
 J PHYSL PAR  
 J PHYSL-PAR  
 J SLEEP RES  
 J VASC RES  
 JPN J PHYSL  
 LYMPHOLOGY  
 MED SCI SPT  
 MOLEC PHYSL  
 NEWS PHYSL  
 PANCREAS  
 PEST BIOCH  
 PFLUG ARCH  
 PHYSIOL CHE  
 PHYSIOL REV  
 PHYSL BEHAV  
 PHYSL BOHEM  
 PHYSL MEAS  
 PHYSL RES  
 PHYSL ZOOL  
 PSYCHOPHYSL  
 Q J EXP P-B  
 Q J EXP PHY  
 REGUL PEPT  
 RENAL PHYSL  
 RESP PHYSL  
 REV ESP FIS  
 REV PHYS B  
 SENS PROCES  
 STER FUNC N  
 TR ELEM EL  
 ZH VYSS NER

**Psychiatry**

ACT PSYC SC  
 ADDICTION  
 AM J ORTHOP  
 AM J PSYCHI  
 AM J PSYCHT  
 ANN MED PSY  
 ARCH G PSYC  
 ARCH PSYCHI  
 AUST NZ J P  
 BIOL PSYCHI  
 BR J ADDICT  
 BR J MED PS  
 BR J PSYCHI  
 BRAIN BEH  
 CAN J PSY  
 COMM PSYCHO  
 COMP PSYCHI  
 DEMENTIA  
 DRUG AL DEP  
 EUR ARCH PS  
 F NEUR PSYC  
 GEN HOSP PS  
 HOSP COMMUN

INT CLIN PS  
 INT J ADDIC  
 INT J CE HY  
 INT PHARMAC  
 J AFFECT D  
 J AM A CHIL  
 J AM PSYCHO  
 J CHILD PSY  
 J CL PSYCH  
 J CLIN PSY  
 J GERIAT PS  
 J INTEL DIS  
 J NE NE PSY  
 J NERV MENT  
 J NEURO CL  
 J NEUROPSY  
 J PSYCH RES  
 J PSYCH TR  
 J PSYCHOSOM  
 NERVENARZT  
 NEUROPSYCH  
 NEUROPSYCHB  
 PHARMACOPSY  
 PHARMACOPSY  
 PROG NEUR-P  
 PSYCH RES-N  
 PSYCH SERV  
 PSYCHIAT CL  
 PSYCHIAT R  
 PSYCHIATRY  
 PSYCHOL MED  
 PSYCHOPATH  
 PSYCHOPH B  
 PSYCHOPHAR  
 PSYCHOS MED  
 PSYCHOSOMAT  
 PSYCHOTH PS  
 RES PUBL AS  
 SCHIZO BULL  
 SCHIZOPHR R  
 SOCIAL PSY  
 Z PSYCHOS M  
 ZH NEVR PS

**Psychology**

AM J MENT D  
 AM J PSYCHT  
 ANN R PSYCH  
 BEHAV NEUR  
 BR J MED PS  
 BR J PSYCHO  
 CAN J BEH S  
 CAN J PSYCH  
 DEVELOP PSY  
 EXP AGING R  
 HUM PSYCHOP  
 HUMAN DEV  
 HUMAN FACT  
 INT J PSYCP  
 J CHILD PSY  
 J CL EXP N  
 J CL NEUROPSY  
 J CLIN PSYC  
 J COM PSYCH  
 J COM PHYSL  
 J EXP PSY A  
 J GERONT B  
 J STUD ALC  
 NEUROBIOL L  
 NEUROPSYCHO

PAV J BIOL  
 PERC PSYCH  
 PHARM BIO B  
 PHYSL PSYCH  
 PROG PSYCHB  
 PSYCHOBIOLO  
 PSYCHOL B  
 PSYCHOL MED  
 PSYCHOL REC  
 PSYCHOL REV  
 PSYCHOMETRI  
 PSYCHOPHYSL  
 PSYCHOS MED  
 PSYCHOSOMAT  
 PSYCHOTH PS  
 Q J EXP P-A  
 Q J EXP P-B  
 RES COMM P  
 SC J PSYCHO  
 SENS PROCES  
 Z PSYCHOS M

**Public health**

AM IND HYG  
 AM J EPIDEM  
 AM J IND M  
 AM J PUB HE  
 AM J TROP M  
 ANN HUM BIO  
 ANN OCCUP H  
 ARCH ENV HE  
 ARCH LEB HY  
 B NY AC MED  
 B WHO  
 BR J IND ME  
 BR J VEN DI  
 CANC CAUSE  
 CANC EPID B  
 COMM DEN OR  
 COMM MENT H  
 DIABET CARE  
 DIABETES  
 ENVIR H PER  
 ENVIR RES  
 EPIDEM INFE  
 EPIDEMIOLOG  
 GENET EPID  
 GENITOURIN  
 HOSP COMMUN  
 HOSPITALS  
 IND HEALTH  
 INFECT CONT  
 INT A OCCUP  
 INT J EPID  
 INT J TE A  
 J AEROS SCI  
 J AIR POLLU  
 J BIOSOC SC  
 J CHRON DIS  
 J CLIN EPID  
 J ENVIR HEA  
 J ENVIR S B  
 J EPIDEM C  
 J HOSP INF  
 J HYG CAMB  
 J HYG EP MI  
 J OCCUP ENV  
 J OCCUP MED  
 J PUBLIC H

J TOX ENV H  
 J TROP MED  
 J WATER P C  
 MED CARE  
 NEUROEPIDEM  
 NUCL SAFETY  
 OCC ENVIR M  
 PAED PERIN  
 PREV MED  
 PSYCH SERV  
 PUBL HEA RE  
 PUBL HEAL  
 REV EPIDEM  
 SC J WORK E  
 SEX TRA DIS  
 SOCIAL BIOL  
 T RS TROP M  
 THER DRUG M  
 TOX INDUS H  
 TROP GEO ME  
 WATER RES  
 WHO CHRON  
 WHO TECH R  
 Z WASSER AB  
 ZBL BAKT B  
 ZBL HYG UMW  
 ZH MIKROB E

**Radiology & nuclear medicine**

ABDOM IMAG  
 ACT RAD DGN  
 ACT RAD ONC  
 ACT RADIOL  
 ADV RAD BIO  
 AM J NEUROR  
 AM J ROENTG  
 ANN RADIOL  
 ANTIBODY IM  
 APPL RAD IS  
 BR J RADIOL  
 CAN ASSOC R  
 CLIN IMAG  
 CLIN NUCL M  
 CLIN RADIOL  
 COMPUT RAD  
 COMPUT TOMO  
 CR R DIAGN  
 CRC C R DIA  
 CT-J COMP T  
 DIAGN IMAG  
 EUR J NUCL  
 EUR RADIOL  
 FRONT NEUE  
 FRONT NUKL  
 FRONT RAD T  
 GASTROIN RA  
 HEALTH PHYS  
 IEEE MED IM  
 INOR CH A A  
 INT J A RAD  
 INT J CAR I  
 INT J HYPER  
 INT J NUC M  
 INT J RAD B  
 INT J RAD O  
 INV RADIOL

J BELG RAD  
 J CAN A RAD  
 J CLIN ULTR  
 J COMPUT AS  
 J DIGIT IM  
 J MED NUCL  
 J NUCL CARD  
 J NUCL ME A  
 J NUCL MED  
 J RADIAT R  
 J RADIOLOG  
 J ULTR MED  
 J VAS INT R  
 MAGN RES M  
 MAGN RES Q  
 MED PHYS  
 MED ULTRA  
 NEURORADIOL  
 NMR BIOMED  
 NUCL MED BI  
 NUKLEARMED  
 PEDIAT RAD  
 PHYS MED BI  
 PHYSIOL CHE  
 RAD CLIN NA  
 RAD EFF LET  
 RADIAT EFF  
 RADIAT ENV  
 RADIAT RES  
 RADIOGRAPHI  
 RADIOLOGE  
 RADIOLOGY  
 RADIOOTH ONC  
 SEM NUC MED  
 SEM ROENTG  
 SKELETAL RA  
 STRAHLENTHE  
 SUR RAD AN  
 T MAGN RES  
 ULTRASC MED  
 ULTRASON IM  
 ULTRASONICS  
 ULTRASOUN M  
 UROL RADIOL

**Reproductive systems**

AM J REPROD  
 ANIM REPROD  
 BIOL REPROD  
 EUR J OB GY  
 HUM REPR  
 INVERTEBR R  
 J REPR FERT  
 J REPRO IMM  
 MENOPAUSE  
 MOL REPROD  
 OX REV REPR  
 PLACENTA  
 REPROD DOM  
 REPROD FERT  
 REPROD NUTR  
 REPROD TOX  
 SEX PLANT R

**Respiratory system**

AM J R CRIT

AM J RESP C  
 AM R RESP D  
 ATEM LUNGEN  
 B EUR PHYS  
 BR J DIS CH  
 CHEST  
 CLIN CHEST  
 CLIN RESP P  
 EUR J RESP  
 EUR RESP J  
 EXP LUNG R  
 HEART LUNG  
 J CARDIO PH  
 J THOR SURG  
 LARYNGOSCOPI  
 LUNG  
 PEDIAT PULM  
 PULM PHARM  
 RESP MED  
 RESP PHYSL  
 RESPIRATION  
 SARCOIDOSIS  
 SEM RESP CR  
 SEM RESP M  
 THOR CARD S  
 THORAX  
 TUBERCLE

**Rheumatology**

ANN RHEUM D  
 ARTH RHEUM  
 B RHEUM DIS  
 BAIL CLIN R  
 BR J RHEUM  
 CLIN EXP RH  
 CLIN RHEUM  
 IMMUN INFEK  
 J RHEUMATOL  
 LUPUS  
 REV RHUM  
 RHEUM DIS C  
 RHEUM INTL  
 RHEUM REHAB  
 SC J RHEUM  
 SEM ARTH RH  
 Z RHEUMATOL

**Sport sciences**

BR J SP MED  
 INT J SP M  
 MED SCI SPT

**Substance abuse**

ADDICTION  
 ALC ALCOHOL  
 ALC CLIN EX  
 ALCOHOL  
 B NARCOTICS  
 BR J ADDICT  
 DRUG AL DEP  
 INT J ADDIC  
 J STUD ALC  
 RES COMM S

**Surgery**

ACT CHIR SC  
 ACT CHIR-EU  
 ACT NEUROCH  
 AM J SURG  
 AM J SURG P  
 AM SURG  
 ANN CHIR  
 ANN CHIR GY  
 ANN CHIR PL  
 ANN PL SURG  
 ANN RC SURG  
 ANN SURG  
 ANN SURG O  
 ANN THORAC  
 ANN VASC S  
 ARCH ORTHOP  
 ARCH OTOLAR  
 ARCH SURG  
 AUST NZ J S  
 BONE MAR TR  
 BR J PL SUR  
 BR J SURG  
 BR J UROL  
 CAN J SURG  
 CHIR PEDIAT  
 CHIR PLAST  
 CHIRURG  
 CHIRURGIE  
 CIRCUL RES  
 CIRCULATION  
 CLEF PAL J  
 CLEF PAL-CR  
 CLIN NEUROS  
 CLIN ORTHOP  
 CLIN PLAST  
 CURR P SURG  
 DERM SURG  
 ENDOSCOPY  
 EUR J PED S  
 EUR SURG RE  
 EURO J SURG  
 HEAD NECK  
 HEAD NECK S  
 HELV CHIR A  
 HEP-GASTRO  
 INT J OR M  
 J AM COLL S  
 J BONE-AM V  
 J BONE-BR V  
 J CHIR  
 J CLIN SURG  
 J CRAN MAX  
 J CRANIOF S  
 J DERM SURG  
 J LAPAROEND  
 J MAXIL SUR  
 J NEUROSURG  
 J PED SURG  
 J SURG ONC  
 J SURG RES  
 J THOR SURG  
 J TRAUMA  
 J VASC SURG  
 LANGENBECK  
 LASER SURG  
 MED CHIR D  
 NEURO-CHIRE  
 NEUROCHIRA  
 NEUROSURGER  
 OPHTHAL SUR

ORAL SURG O  
 OTO H N SUR  
 PED NEUROS  
 PHLEBOLOGY  
 PLAS R SURG  
 PROG SURG  
 REV CHIR OR  
 S AFR J SUR  
 SC J PLAST  
 SC J THOR C  
 SHOCK  
 SUR RAD AN  
 SURG CL NA  
 SURG GYN OB  
 SURG LAP EN  
 SURG NEUROL  
 SURGERY  
 T AM S ART  
 THOR CARD S  
 TRANSPLAN P  
 TRANSPLANT  
 VASC SURG  
 WORLD J SUR  
 Z KINDERCH  
 Z ORTHOP GR

**Toxicology**

ADVERS DRUG  
 ALCOHOL  
 ANN OCCUP H  
 ANN R PHARM  
 AQUAT TOX  
 ARCH ENV C  
 ARCH TOXIC  
 B ENVIR CON  
 CELL BIOL T  
 CHEM RES T  
 CHEM-BIO IN  
 CLIN TOXIC  
 COMP BIOC C  
 CR R TOXIC  
 CRC C R TOX  
 DRUG CHEM T  
 DRUG NUTR  
 DRUGS  
 ECOTOX ENV  
 ECOTOXICOL  
 ENV CARC EC  
 ENV TOX CH  
 ENV TOX WAT  
 EUR J PH-EN  
 EXP TOX PAT  
 FARMAKOL T  
 FOOD CHEM T  
 FOOD COSMET  
 FUND APPL T  
 HUM EXP TOX  
 HUM TOXICOL  
 IND HEALTH  
 INHAL TOXIC  
 INT J CL PH  
 J AM COLL T  
 J ANAL TOX  
 J APPL TOX  
 J ENV P TOX  
 J ENV PATH  
 J PHARM TOX  
 J TOX ENV H  
 J TOX-CLIN

J TOX-CUT O  
 J TOX-TOX R  
 MAR ENV RES  
 MUT R-DNA R  
 MUT RES LET  
 MUT RES-G T  
 MUT RES-R G  
 MUTAGENESIS  
 MUTAT RES  
 NEUROB TOX  
 NEUROTOX T  
 PHARM TOX  
 REGUL TOX P  
 REPROD TOX  
 REV BIOCH T  
 TER CAR MUT  
 THER DRUG M  
 TOX APPL PH  
 TOX ENV CH  
 TOX INDUS H  
 TOX LETT  
 TOX METHOD  
 TOX VITRO  
 TOXICOLOGY  
 TOXICON  
 VET HUM TOX  
 XENOBIOTICA

**Transplantation**

BONE MAR TR  
 CELL TRANSP  
 J NEUR TRAN  
 NEPH DIAL T  
 TRANSPLAN P  
 TRANSPLANT

**Tropical medicine**

ACT TROP  
 AM J TROP M  
 ANN SOC BEL  
 ANN TROP M  
 INT J LEPR  
 J TROP MED  
 J TROP PEDI  
 LEPROSY REV  
 REV I MED T  
 T RS TROP M  
 TROP GEO ME  
 TROP MED P  
 TROPENMED P

**Urology & nephrology**

AM J KIDNEY  
 AM J NEPHR  
 ANGIOLOGY  
 ANN UROL  
 BR J UROL  
 CHILD NEPHR  
 CLIN EXP DI  
 CLIN NEPHR  
 CONTR NEPHR  
 EUR UROL  
 GENITOURIN  
 INT J PED N

INT YB NEPH  
INV UROL  
J AM S NEPH  
J ENDOUROL  
J UROL  
J UROLOGIE  
KIDNEY INT  
NEPH DIAL T  
NEPHRON  
P EUR DIAL  
PERIT DIA I  
PERITON DIA  
PROSTATE  
RENAL PHYSL  
SC J UROL N  
SEM NEPHROL  
UREMIA INV  
UROL CLIN N  
UROL RADIOL  
UROL RES  
UROLOGE  
UROLOGY  
WORLD J URO  
Z UROL NEPH

VIROLOGY  
VIRUS GENES  
VIRUS RES  
VOP VIRUSOL  
ZBL BAKT  
ZBL BAKT A

**Vascular  
diseases**

ANGIOLOGY  
ANN VASC S  
ARCH MAL C  
ART THROM V  
ARTER THROM  
ARTERY  
ATHEROSCLER  
CEREB DIS  
J CARDIOTHO  
J MAL VASC  
J VASC RES  
J VASC SURG  
MICROVASC R  
SEM THROMB  
STROKE  
THROMB HAEM  
THROMB RES  
VASA

**Virology**

ACT VIROLOG  
ADV VIRUS R  
ANN VIROL  
ANTIVIR RES  
ARCH VIROL  
B I PASTEUR  
CL DIAGN V  
COMPR VIROL  
EPIDEM INFE  
INFECTION  
INTERVIROLO  
J GEN VIROL  
J MED VIROL  
J VIROL MET  
J VIROLOGY  
PROG MED VI  
RES VIROL  
REV MED VIR  
SEMIN VIROL  
VIRAL IMMUN

## Appendix C Detailed statistical tables

Table C1: Australia's share of biomedical publications by ISI subject category (Table 2)

ISI subject category	Aust. Pubs	World Pubs	% Share
Anatomy & morphology	93	2810	3.3
Anesthesiology	240	4137	5.8
Behavioural sciences	103	4218	2.4
Biochemistry & molecular biology	1643	83985	2.0
Biology	388	10701	3.6
Biology, miscellaneous	63	2235	2.8
Biomethods	162	8255	2.0
Cardiovascular system	352	22866	1.5
Cell biology	666	25888	2.6
Chemistry, clinical & medicinal	59	4142	1.4
Clinical neurology	323	16970	1.9
Critical care	213	2290	9.3
Dentistry, oral surgery & medicine	195	6324	3.1
Dermatology & venereal diseases	68	7167	0.9
Endocrinology & metabolism	575	17493	3.3
Gastroenterology & hepatology	224	9536	2.3
Genetics & heredity	705	20009	3.5
Geriatrics & gerontology	52	1931	2.7
Hematology	296	12719	2.3
Immunology	964	30822	3.1
Infectious diseases	183	7497	2.4
Medicine, general & internal	1043	27129	3.8
Medicine, miscellaneous	300	5028	6.0
Medicine, research & experimental	373	18104	2.1
Microbiology	531	21117	2.5
Neurosciences	882	44006	2.0
Nutrition & dietetics	145	6280	2.3
Obstetrics & gynecology	252	11124	2.3
Oncology	401	25318	1.6
Ophthalmology	193	6751	2.9
Orthopedics	66	4195	1.6
Otorhinolaryngology	68	4468	1.5
Parasitology	324	3900	8.3
Pathology	320	11483	2.8
Pediatrics	419	11954	3.5
Pharmacology & pharmacy	784	41049	1.9
Physiology	641	19052	3.4
Psychiatry	397	10475	3.8
Psychology	124	4617	2.7
Public health	298	12545	2.4
Radiology & nuclear medicine	211	15594	1.4
Reproductive systems	294	4232	6.9
Respiratory system	188	7974	2.4
Rheumatology	95	3574	2.7
Substance abuse	85	1748	4.9
Surgery	721	30493	2.4
Toxicology	165	10463	1.6
Transplantation	164	5460	3.0
Tropical medicine	78	2261	3.4
Urology & nephrology	176	9456	1.9
Vascular diseases	88	4666	1.9
Virology	222	7100	3.1
<b>TOTAL</b>	<b>12532</b>	<b>502358</b>	<b>2.5</b>

Table C2: Distribution of Australian biomedical publications by ISI subject category (Chart 1)

ISI subject category	Aust. Pubs		World Pubs	
	Number	%	Number	%
Anatomy & morphology	93	0.7	2810	0.6
Anesthesiology	240	1.9	4137	0.8
Behavioural Sciences	103	0.8	4218	0.8
Biochemistry & molecular biology	1643	13.1	83985	16.6
Biology, miscellaneous	63	0.5	2235	0.4
Biology	388	3.1	10701	2.1
Biomethods	162	1.3	8255	1.6
Cardiovascular system	352	2.8	22866	4.5
Cell biology	666	5.3	25888	5.1
Chemistry, clinical & medicinal	59	0.5	4142	0.8
Clinical neurology	323	2.6	16970	3.4
Critical care	213	1.7	2290	0.5
Dentistry, oral surgery & medicine	195	1.5	6324	1.2
Dermatology & venereal diseases	68	0.5	7167	1.4
Endocrinology & metabolism	575	4.6	17493	3.5
Gastroenterology & hepatology	224	1.8	9536	1.9
Genetics & heredity	705	5.6	20009	4.0
Geriatrics & gerontology	52	0.4	1931	0.4
Hematology	296	2.4	12719	2.5
Immunology	964	7.7	30822	6.1
Infectious diseases	183	1.5	7497	1.5
Medicine, general & internal	1043	8.3	27129	5.4
Medicine, miscellaneous	300	2.4	5028	1.0
Medicine, research & experimental	373	3.0	18104	3.6
Microbiology	531	4.2	21117	4.2
Neurosciences	882	7.0	44006	8.7
Nutrition & dietetics	145	1.2	6280	1.2
Obstetrics & gynecology	252	2.0	11124	2.2
Oncology	401	3.2	25318	5.0
Ophthalmology	193	1.5	6751	1.3
Orthopedics	66	0.5	4195	0.8
Otorhinolaryngology	68	0.5	4468	0.9
Parasitology	324	2.6	3900	0.8
Pathology	320	2.5	11483	2.3
Pediatrics	419	3.3	11954	2.4
Pharmacology & pharmacy	784	6.2	41049	8.1
Physiology	641	5.1	19052	3.8
Psychiatry	397	3.2	10475	2.1
Psychology	124	1.0	4617	0.9
Public health	298	2.4	12545	2.5
Radiology & nuclear medicine	211	1.7	15594	3.1
Reproductive systems	294	2.3	4232	0.8
Respiratory system	188	1.5	7974	1.6
Rheumatology	95	0.8	3574	0.7
Substance abuse	85	0.7	1748	0.3
Surgery	721	5.7	30493	6.0
Toxicology	165	1.3	10463	2.1
Transplantation	164	1.3	5460	1.1
Tropical medicine	78	0.6	2261	0.4
Urology & nephrology	176	1.4	9456	1.9
Vascular diseases	88	0.7	4666	0.9
Virology	222	1.8	7100	1.4
<b>TOTAL</b>	<b>12532</b>	<b>100.0</b>	<b>502358</b>	<b>100.0</b>

Table C3: Australia's share of biomedical publications in ASRC sub-fields (Table 3)

<b>ASRC sub-field</b>	<b>Aust. Pubs</b>	<b>World Pubs</b>	<b>% Share</b>
General biology	2023	94949	2.1
Genetics & molecular biology	1439	50021	2.9
General medical & health sciences	373	18104	2.1
Immunology	968	31667	3.1
Medical biochemistry & clinical chemistry	59	4142	1.4
Medical microbiology	222	7100	3.1
Pharmacology	879	48107	1.8
Physiology	734	21862	3.4
Neurosciences	882	44006	2.0
Clinical sciences	6566	251494	2.6
Public health research	528	20573	2.6
Health services research	309	5477	5.6
Other medical and health sciences	77	4255	1.8
Interdisciplinary biomedical	953	28982	3.3
<b>TOTAL</b>	<b>12532</b>	<b>502358</b>	<b>2.5</b>

Table C4: Distribution of Australian biomedical publications by ASRC sub-fields (Chart 2)

<b>ASRC sub-field</b>	<b>Aust. Pubs</b>		<b>World Pubs</b>	
	Number	%	Number	%
General biology	2023	16.1	94949	18.9
Genetics & molecular biology	1439	11.5	50021	10.0
General medical & health sciences	373	3.0	18104	3.6
Immunology	968	7.7	31667	6.3
Medical biochemistry & clinical chemistry	59	0.5	4142	0.8
Medical microbiology	222	1.8	7100	1.4
Pharmacology	879	7.0	48107	9.6
Physiology	734	5.9	21862	4.4
Neurosciences	882	7.0	44006	8.8
Clinical sciences	6566	52.4	251494	50.1
Public health research	528	4.2	20573	4.1
Health services research	309	2.5	5477	1.1
Other medical and health sciences	77	0.6	4255	0.8
Interdisciplinary biomedical	953	7.6	28982	5.8
<b>TOTAL</b>	<b>12532</b>	<b>100.0</b>	<b>502358</b>	<b>100.0</b>

Table C5: Distribution of Australian biomedical publications by level of research (Chart 3)

<b>CHI</b>	<b>Aust. Total</b>	<b>Aust. %</b>	<b>UK Total</b>	<b>UK %</b>
Clinical observation	2738	22.5	10122	19.0
Clinical mix	2457	20.2	13481	25.3
Clinical investigation	3404	27.9	13252	24.9
Basic research	3588	29.4	16394	30.8
<b>Total</b>	<b>12187</b>	<b>100.0</b>	<b>53249</b>	<b>100.0</b>

Table C6: Distribution of Australian biomedical publication by level of collaboration (Chart 4)

Level of collaboration	Aust. Pubs	Aust %
Single	1659	12.2
Group	8306	61.0
Institutional	1035	7.6
National	3680	27.0
International	2861	21.0
<b>TOTAL</b>	<b>13620</b>	<b>100.0</b>

Table C7: Relative citation impact of Australian biomedical publications in ASRC biomedical sub-fields (Table 4)

ASRC sub-fields	Aust.		World		Aust Share		RCI
	Pubs	Cites	Pubs	Cites	Pubs	Cites	
General biology	2023	9397	94949	550833	2.1	1.7	0.80
Genetics & molecular biology	1439	7086	50021	330630	2.9	2.1	0.74
General medical & health sciences	373	1619	18104	69288	2.1	2.3	1.13
Immunology	968	4504	31667	148552	3.1	3.0	0.99
Medical biochemistry & clinical chemistry	59	185	4142	13743	1.4	1.3	0.95
Medical microbiology	222	783	7100	36117	3.1	2.2	0.69
Pharmacology	879	2276	48107	121968	1.8	1.9	1.02
Physiology	734	1862	21862	75065	3.4	2.5	0.74
Neurosciences	882	2856	44006	175147	2.0	1.6	0.81
Clinical sciences	6566	18178	251494	698033	2.6	2.6	1.00
Public health research	528	1314	20573	44171	2.6	3.0	1.16
Health services research	309	620	5477	8683	5.6	7.1	1.27
Other medical & health sciences	77	78	4255	6654	1.8	1.2	0.65
Interdisciplinary biomedicine	953	3009	28982	88628	3.3	3.4	1.03
<b>TOTAL</b>	<b>12532</b>	<b>41427</b>	<b>502358</b>	<b>1850049</b>	<b>2.5</b>	<b>2.2</b>	<b>0.90</b>

Table C8: Actual and expected citation rates by ASRC biomedical sub-fields (Chart 5)

ASRC sub-fields	Aust. Pubs	Act. Cites	Exp. Cites	Av. Exp. Cites	Av. Act. Cites
General biology	2023	9397	9762	4.83	4.65
Genetics & molecular biology	1439	7086	7251	5.04	4.92
General medical & health sciences	373	1619	1731	4.64	4.34
Immunology	968	4504	4796	4.95	4.65
Medical microbiology	222	783	942	4.24	3.53
Pharmacology	879	2276	2434	2.77	2.59
Physiology	734	1862	2155	2.94	2.54
Neurosciences	882	2856	3448	3.91	3.24
Clinical sciences	6566	18178	17830	2.72	2.77
Public health research	528	1314	1250	2.37	2.49
Interdisciplinary biomedicine	953	3009	3031	3.18	3.16

Table C9: Relative citation impact of Australian biomedical publications by selected ISI categories (Table 5)

ISI subject category	Aust.		World		Aust. Share		RCI
	Pubs	Cites	Pubs	Cites	Pubs	Cites	
Anatomy & morphology	93	367	2810	14965	3.3	2.5	0.74
Anesthesiology	240	636	4137	11469	5.8	5.5	0.96
Behavioural sciences	103	219	4218	9484	2.4	2.3	0.95
Biochemistry & molecular biology	1643	8467	83985	523120	2.0	1.6	0.83
Biology, miscellaneous	63	78	2235	3932	2.8	2.0	0.70
Biology	388	1158	10701	37233	3.6	3.1	0.86
Biomethods	162	336	8255	25601	2.0	1.3	0.67
Cardiovascular system	352	1373	22866	69779	1.5	2.0	1.28
Cell biology	666	3749	25888	213813	2.6	1.8	0.68
Chemistry, clinical & medicinal	59	185	4142	13743	1.4	1.3	0.95
Clinical neurology	323	902	16970	49738	1.9	1.8	0.95
Critical care	213	555	2290	5692	9.3	9.8	1.05
Dentistry, oral surgery & medicine	195	160	6324	7614	3.1	2.1	0.68
Dermatology & venereal diseases	68	114	7167	11447	0.9	1.0	1.05
Endocrinology & metabolism	575	2206	17493	64111	3.3	3.4	1.05
Gastroenterology & hepatology	224	666	9536	26573	2.3	2.5	1.07
Genetics & heredity	705	3577	20009	117101	3.5	3.1	0.87
Geriatrics & gerontology	52	78	1931	3687	2.7	2.1	0.79
Hematology	296	1429	12719	61940	2.3	2.3	0.99
Immunology	964	4502	30822	147583	3.1	3.1	0.98
Infectious diseases	183	799	7497	30217	2.4	2.6	1.08
Medicine, general & internal	1043	3241	27129	93826	3.8	3.5	0.90
Medicine, miscellaneous	300	608	5028	8061	6.0	7.5	1.26
Medicine, research & experimental	373	1619	18104	69288	2.1	2.3	1.13
Microbiology	531	1971	21117	70858	2.5	2.8	1.11
Neurosciences	882	2856	44006	175147	2.0	1.6	0.81
Nutrition & dietetics	145	410	6280	11482	2.3	3.6	1.55
Obstetrics & gynecology	252	713	11124	21173	2.3	3.4	1.49
Oncology	401	1706	25318	101806	1.6	1.7	1.06
Ophthalmology	193	332	6751	11218	2.9	3.0	1.04
Orthopedics	66	85	4195	4085	1.6	2.1	1.32
Otorhinolaryngology	68	56	4468	3805	1.5	1.5	0.97
Parasitology	324	849	3900	8625	8.3	9.8	1.18
Pathology	320	488	11483	29647	2.8	1.6	0.59
Pediatrics	419	540	11954	18257	3.5	3.0	0.84
Pharmacology & pharmacy	784	2009	41049	108240	1.9	1.9	0.97
Physiology	641	1495	19052	60100	3.4	2.5	0.74
Psychiatry	397	907	10475	28120	3.8	3.2	0.85
Psychology	124	251	4617	10498	2.7	2.4	0.89
Public health	298	735	12545	29205	2.4	2.5	1.06
Radiology & nuclear medicine	211	494	15594	30633	1.4	1.6	1.19
Reproductive systems	294	935	4232	10749	6.9	8.7	1.25
Respiratory system	188	598	7974	21169	2.4	2.8	1.20
Rheumatology	95	318	3574	10266	2.7	3.1	1.17
Substance abuse	85	169	1748	3484	4.9	4.9	1.00
Surgery	721	1314	30493	61576	2.4	2.1	0.90
Toxicology	165	390	10463	20905	1.6	1.9	1.18
Transplantation	164	536	5460	11297	3.0	4.7	1.58
Tropical medicine	78	188	2261	3477	3.4	5.4	1.57
Urology & nephrology	176	424	9456	21946	1.9	1.9	1.04
Vascular diseases	88	370	4666	15008	1.9	2.5	1.31
Virology	222	783	7100	36117	3.1	2.2	0.69
<b>TOTAL</b>	<b>12532</b>	<b>41427</b>	<b>502358</b>	<b>1850049</b>	<b>2.5</b>	<b>2.2</b>	<b>0.90</b>

Table C10: Actual and expected citation rates by ISI categories (Charts 6 & 7)

<b>ISI subject category</b>	<b>Pubs</b>	<b>Act. Cites</b>	<b>Exp. Cites</b>	<b>Av. Exp. Cites</b>	<b>Av. Act. Cites</b>
Anatomy & morphology	93	367	387	4.16	3.95
Anesthesiology	240	636	616	2.57	2.65
Behavioural Sciences	103	219	273	2.65	2.13
Biochemistry & molecular biology	1643	8467	8797	5.35	5.15
Biology	388	1158	1193	3.07	2.98
Biology, miscellaneous	63	78	124	1.97	1.24
Biomethods	162	336	446	2.75	2.07
Cardiovascular system	352	1373	1267	3.60	3.90
Cell biology	666	3749	3639	5.46	5.63
Chemistry, clinical & medicinal	59	185	190	3.22	3.14
Clinical neurology	323	902	1214	3.76	2.79
Critical care	213	555	514	2.41	2.61
Dentistry, oral surgery & medicine	195	160	185	0.95	0.82
Dermatology & venereal diseases	68	114	118	1.73	1.68
Endocrinology & metabolism	575	2206	2105	3.66	3.84
Gastroenterology & hepatology	224	666	656	2.93	2.97
Genetics & heredity	705	3577	3775	5.36	5.07
Geriatrics & gerontology	52	78	76	1.46	1.50
Hematology	296	1429	1396	4.71	4.83
Immunology	964	4502	4789	4.97	4.67
Infectious diseases	183	799	884	4.83	4.37
Medicine, general & internal	1043	3241	3122	2.99	3.11
Medicine, miscellaneous	300	608	590	1.97	2.03
Medicine, research & experimental	373	1619	1731	4.64	4.34
Microbiology	531	1971	1974	3.72	3.71
Neurosciences	882	2856	3448	3.91	3.24
Nutrition & dietetics	145	410	288	1.99	2.83
Obstetrics & gynecology	252	713	561	2.23	2.83
Oncology	401	1706	1725	4.30	4.25
Ophthalmology	193	332	276	1.43	1.72
Orthopedics	66	85	122	1.85	1.29
Otorhinolaryngology	68	56	67	0.99	0.82
Parasitology	324	849	793	2.45	2.62
Pathology	320	488	634	1.98	1.53
Pediatrics	419	540	542	1.29	1.29
Pharmacology & pharmacy	784	2009	2242	2.86	2.56
Physiology	641	1495	1769	2.76	2.33
Psychiatry	397	907	884	2.23	2.28
Psychology	124	251	273	2.20	2.02
Public health	298	735	802	2.69	2.47
Radiology & nuclear medicine	211	494	443	2.10	2.34
Reproductive systems	294	935	703	2.39	3.18
Respiratory system	188	598	496	2.64	3.18
Rheumatology	95	318	283	2.98	3.35
Substance abuse	85	169	160	1.88	1.99
Surgery	721	1314	1131	1.57	1.82
Toxicology	165	390	349	2.11	2.36
Transplantation	164	536	399	2.43	3.27
Tropical medicine	78	188	143	1.84	2.41
Urology & nephrology	176	424	463	2.63	2.41
Virology	222	783	942	4.24	3.53

Table C11: Distribution of funded Australian biomedical publications by number of funding acknowledgments (Chart 8)

No. Ackn.	Aust. Pubs	Australia %	UK Pubs	UK %
0	4777	38.4	19221	33.9
1	3108	25.0	16827	29.7
2	2259	18.2	10095	17.8
3	1162	9.3	5305	9.4
4	550	4.4	2715	4.8
5	282	2.3	1286	2.3
6	128	1.0	559	1.0
7	79	0.6	309	0.5
8	35	0.3	168	0.3
9	25	0.2	82	0.1
10	12	0.1	36	0.1
11+	12	0.1	68	0.1
<b>TOTAL</b>	<b>12429</b>	<b>100.0</b>	<b>56671</b>	<b>100.0</b>

Table C12: Actual and expected citation rates by number of funding acknowledgments (Chart 9)

No. Ackn	Pubs	Act. Cites	Exp. Cites	Av. Exp. Cites	Av. Act. Cites
0	4777	8657	10937	2.29	1.81
1	3108	9769	9901	3.19	3.14
2	2259	8767	9124	4.04	3.88
3	1162	5728	5468	4.71	4.93
4	550	3525	3006	5.47	6.41
5	282	1989	1578	5.60	7.05
6+	291	4197	2248	7.73	14.42
Unmatched	1191	1985	2161	1.81	1.67
SCI Average				3.68	

Table C13: Actual and expected citation rates by Australian funding sector (Chart 10)

Australian funding sector	Pubs	Act. Cites	Exp. Cites	Av. Exp. Cites	Av. Act. Cites
Non-pharmaceutical	463	2047	1721	6.44	6.58
Pharmaceutical	163	607	638	8.93	5.79
Government agency	4370	20555	19851	4.54	4.70
Charity	1120	5189	4780	4.27	4.63
Foundation	417	1914	2038	4.89	4.59
Non-profit	892	3818	3136	3.52	4.28
Hospital trust	395	1649	1641	4.15	4.17
Government department	543	1933	2093	3.85	3.56
Mixed funding	495	1566	1682	3.40	3.16
Local authority	464	1329	1056	2.28	2.86

Table C14: Country source of funding for Australian biomedical publications (Table 8)

<b>Country</b>	<b>Total Pubs</b>	<b>%</b>
Australia	6348	83.0
US	1282	16.8
UK	990	12.9
Multinational body	517	6.8
Germany	233	3.0
Worldwide	200	2.6
Switzerland	193	2.5
France	170	2.2
Sweden	141	1.8
Canada	118	1.5
New Zealand	89	1.2
Japan	85	1.1
Denmark	54	0.7
Netherlands	49	0.6
Italy	35	0.5
Europe	31	0.4
China	24	0.3
Finland	24	0.3
Austria	21	0.3
Belgium	20	0.3
Papua New Guinea	20	0.3
South Africa	20	0.3
Hong Kong	18	0.2
Spain	15	0.2
Norway	13	0.2
Brazil	11	0.1
Indonesia	11	0.1
Malaysia	10	0.1
Israel	7	0.1
Russian Fed	7	0.1
Kenya	6	0.1
Thailand	6	0.1
Ireland	5	0.1
India	5	0.1
Iran	4	0.1
Poland	4	0.1
Taiwan	4	0.1
Czech (Former)	3	0.0
Mauritius	3	0.0
Pakistan	3	0.0
Venezuela	3	0.0
UAE	2	0.0
Bangladesh	2	0.0
Bulgaria	2	0.0
Czech Repub	2	0.0
Iceland	2	0.0
Mexico	2	0.0
Nepal	2	0.0
Philippines	2	0.0
Singapore	2	0.0
Other	18	0.2
<b>TOTAL</b>	<b>7652</b>	<b>100.0</b>

Table C15: Distribution of Australian biomedical publications by source of funds (Chart 11)

<b>Country</b>	<b>Pubs</b>	<b>%</b>
Australia Only	4293	56.1
>1 country (incl Aus)	2055	26.9
>1 country (excl Aus)	333	4.4
<i>Single Countries:</i>		
USA	310	4.1
UK	260	3.4
Unknown	80	1.0
France	39	0.5
Germany	37	0.5
Sweden	33	0.4
Multinational body	30	0.4
Canada	29	0.4
New Zealand	29	0.4
Switzerland	25	0.3
Japan	22	0.3
Netherlands	9	0.1
Denmark	9	0.1
Italy	9	0.1
Spain	5	0.1
Hong Kong	5	0.1
Malaysia	4	0.1
South Africa	4	0.1
Austria	3	0.0
China	3	0.0
India	3	0.0
Papua New Guinea	3	0.0
Czech Republic	2	0.0
Finland	2	0.0
Ireland	2	0.0
Iran	2	0.0
Bangladesh	1	0.0
Former Czechoslovakia	1	0.0
Europe	1	0.0
Indonesia	1	0.0
Israel	1	0.0
Kenya	1	0.0
Norway	1	0.0
Pakistan	1	0.0
Russian Federation	1	0.0
Singapore	1	0.0
United Arab Emirates	1	0.0
Venezuela	1	0.0
<b>TOTAL</b>	<b>7652</b>	<b>100.0</b>

Table C16: Comparative presence of selected countries in the addresses & acknowledgments of Australian biomedical publications (Table 9)

Country	No. with address	% with address	No. with funding	% with funding	Ratio
Austria	23	0.3	21	0.3	0.91
Bangladesh	4	0.1	2	0.0	0.50
Belgium	21	0.3	20	0.3	0.95
Bhutan	1	0.0	1	0.01	1.00
Brazil	13	0.2	11	0.1	0.85
Bulgaria	2	0.0	2	0.0	1.00
Canada	135	1.8	118	1.5	0.87
Chile	6	0.1	1	0.01	0.17
China	47	0.6	24	0.3	0.51
Croatia	2	0.0	1	0.01	0.50
Cyprus	1	0.0	1	0.01	1.00
Czech (Former)	5	0.1	3	0.0	0.60
Czech Repub	6	0.1	2	0.0	0.33
Denmark	46	0.6	54	0.7	1.17
Ecuador	2	0.0	1	0.01	0.50
Ethiopia	2	0.0	1	0.01	0.50
Finland	32	0.4	24	0.3	0.75
France	128	1.7	170	2.2	1.33
Germany	182	2.4	233	3.0	1.28
Ghana	2	0.0	1	0.01	0.50
Greece	3	0.0	1	0.01	0.33
Hong Kong	16	0.2	18	0.2	1.13
Hungary	4	0.1	1	0.01	0.25
Iceland	2	0.0	2	0.0	1.00
India	14	0.2	5	0.1	0.36
Indonesia	16	0.2	11	0.1	0.69
Ireland	7	0.1	5	0.1	0.71
Israel	20	0.3	7	0.1	0.35
Italy	52	0.7	35	0.5	0.67
Japan	107	1.4	85	1.1	0.79
Kenya	6	0.1	6	0.1	1.00
Malaysia	16	0.2	10	0.1	0.63
Mauritius	4	0.1	3	0.0	0.75
Mexico	3	0.0	2	0.0	0.67
Nepal	3	0.0	2	0.0	0.67
Netherlands	87	1.1	49	0.6	0.56
New Zealand	96	1.3	89	1.2	0.93
Norway	13	0.2	13	0.2	1.00
Pakistan	2	0.0	3	0.0	1.50
PNG	20	0.3	20	0.3	1.00
Philippines	10	0.1	2	0.0	0.20
Poland	3	0.0	4	0.1	1.33
Russian Fed	15	0.2	7	0.1	0.47
Saudi Arabia	4	0.1	1	0.01	0.25
Singapore	9	0.1	2	0.0	0.22
Solomon Islands	1	0.0	1	0.01	1.00
South Africa	15	0.2	20	0.3	1.33
Spain	14	0.2	15	0.2	1.07
Sri Lanka	2	0.0	1	0.01	0.50
Sweden	115	1.5	141	1.8	1.23
Switzerland	88	1.2	193	2.5	2.19
Taiwan	6	0.1	4	0.1	0.67
Thailand	35	0.5	6	0.1	0.17
Tonga	2	0.0	1	0.01	0.50
UAE	3	0.0	2	0.0	0.67
UK	458	6.0	990	12.9	2.16
Uruguay	2	0.0	1	0.01	0.50
US	850	11.1	1282	16.8	1.51
Venezuela	2	0.0	3	0.0	1.50

Table C17: Bodies funding Australian biomedical publications (Table 10)

<b>Australian funding bodies</b>	<b>Pubs</b>	<b>International funding bodies</b>	<b>Pubs</b>
NHMRC	3134	<b>Canada</b>	
ARC	1092	Canadian Medical Research Council	47
National Heart Fdn	293	Natl Science & Engr Research Council	34
DEETYA	222	<b>Switzerland</b>	
Ramaciotti Fdn	149	Swiss National Science Fdn	46
Vic Anti-Cancer Council	148	Sandoz Pharmaceuticals Ltd	44
Meat Res Council Aust.	118	Hoffmann-La Roche	31
NSW Govt	116	CIBA-Geigy A G, Switzerland	28
Univ Qld Funds	115	<b>Europe</b>	
CSIRO	102	Commission of the European Communities	31
Univ Sydney Funds	101	<b>France</b>	
Wool Research Trust Fund	99	Ctr Nationale de la Rech. Sci	41
Aust. Natl Council on A I D S	98	Inst Nat de la Sante Rech Medicale	39
Queensland Cancer Fund	92	Ass Devel Rech Contre le Cancer	30
Aust. Red Cross Society	85	<b>Germany</b>	
Aust. Government(not specified)	82	German Res Society	107
Dept. Community Serv & Hlth	73	<b>New Zealand</b>	
Qld Dept Primary Industry	59	New Zealand Medical Research Council	29
Aust. Research Grants Scheme	57	<b>International</b>	
Univ Melbourne Funds	56	WHO	149
Aust. Pig Res & Devel Corp	54	United Nations Devel Prog	57
Royal Children's Hosp Funds, Melb	52	World Bank	52
Anti-Cancer Fdn of Univ SA	49	<b>Sweden</b>	
Dairy Research & Dev Corp	45	Swedish Medical Res Council	62
Aust Dept Veterans' Affairs	44	<b>UK</b>	
Aust Internat Devel Assist Bureau	44	Wellcome Trust	149
Lions Charities Aust	38	Med Res Council	133
Aust Brain Foundation	38	London Sch Hyg & Trop Med	105
Govt Employees Assist to Med Res Fund	37	Smith Kline Beecham plc	37
Ministry of Defence	37	Glaxo Pharmaceuticals UK Ltd	37
Aust Kidney Fdn	35	Royal Society, London	32
Aust Dept Industry, Science & Tech	35	Agricultural & Food Research Council	27
Royal Perth Hosp Research Fdn	34	<b>US</b>	
Royal Prince Alfred Hosp Funds	34	Natl Cancer Inst	136
Mayne Bequest Fund	34	Natl Insts Hlth	109
Flinders Med Ctr Research Fdn	34	Natl Inst Allerg & Inf Dis	105
Aust Wool Resaerch & Devel Corp	33	Natl Inst Diabetes, Digest&Kidn	78
Rebecca L Cooper Fdn	33	Howard Hughes Med Inst	51
Victorian Dept of Agriculture	31	National Heart Lung & Blood Inst	44
Qld Dept of Health	31	Merck and Co. Inc	41
Menzies Fdn	31	National Science Fdn	39
Biotech Aust Pty Ltd	31	Natl Inst Child Health & Human Devel	35
WA Dept of Health	30	US Dept of Energy	32
Unin Adelaide Funds	30	US Dept of Agriculture	32
Univ Monash Funds	29	Public Health Service	30
Chiron Mimotopes Pty Ltd	28	Natl Inst Neurological Disorders&Stroke	30
Adelaide Children's Hosp Research Fdn	28	US Dept Veteran Affairs	28
Arthritis Association of Aust	28	Natl Inst of General Medical Sciences	27
South Aust Health Commission	27	American Drug Abuse&Mental Hlth Admin	26
Amrad Corp	27	Genentech Inc	25
Univ Western Aust Funds	26		
Natl Multiple Sclerosis Society of Aust	26		
Ian Potter Fdn	26		
Asthma Fdn NSW	25		
Aust Grains Research & Devel Corp	25		
Royal Australasian College of Surgeons	25		

Table C18: Actual and expected citation rates by international funding bodies (Chart 12)

<b>International organisations (Pubs &gt; 50)</b>	<b>Pubs</b>	<b>Act. Cites</b>	<b>Exp. Cites</b>	<b>Av. Exp. Cites</b>	<b>Av. Act. Cites</b>
Wellcome Trust(UK)	149	1409	1003	6.73	9.46
WHO(INTERNATIONAL)	149	537	620	4.16	3.60
National Cancer Inst (US)	136	1936	1460	10.73	14.24
Medical Res Council (UK)	133	909	651	4.89	6.83
National Insts Health (USA)	109	987	689	6.32	9.06
German Research Society(GERMANY)	107	971	684	6.39	9.07
National Inst Allerg & Inf Dis(US)	105	1337	1028	9.79	12.73
London Sch Hyg & Trop Med(UK)	105	598	435	4.14	5.70
National Inst Diabetes, Digest&Kidn(US)	78	765	482	6.18	9.81
Swedish Medical Res Council(SWEDEN)	62	312	241	3.88	5.03
United Nations Devel Prog.(INTERNATIONAL)	57	257	232	4.06	4.51
World Bank(INTERNATIONAL)	52	196	189	3.64	3.77
Howard Hughes Medical Inst(US)[not on graph]	51	1953	944	18.51	38.29

Table C19: Actual and expected citation rates — Australian organisations funding more than 100 publications (Chart 13)

<b>Australian organisations (Pubs&gt;100)</b>	<b>Pubs</b>	<b>Act. Cites</b>	<b>Exp. Cites</b>	<b>Av. Exp. Cites</b>	<b>Av. Act. Cites</b>
NHMRC	3134	16665	15682	5.00	5.32
ARC	1092	4395	4581	4.19	4.02
National Heart Fdn	293	1420	1315	4.49	4.85
DEETYA	222	932	1033	4.65	4.20
Ramaciotti Fdn	149	610	610	4.09	4.09
Vic Anti-Cancer Council	148	1441	1042	7.04	9.74
Meat Res Council	118	435	332	2.81	3.69
NSW Govt	116	514	355	3.06	4.43
Univ Qld Funds	115	389	364	3.16	3.38
CSIRO	102	412	338	3.31	4.04
Univ Sydney Funds	101	246	345	3.42	2.44

Table C20: Actual and expected citation rates — Australian organisations funding between 50 and 99 publications (Chart 14)

<b>Australian organisations (Pubs 50-99)</b>	<b>Pubs</b>	<b>Act. Cites</b>	<b>Exp. Cites</b>	<b>Av. Exp. Cites</b>	<b>Av. Act. Cites</b>
Wool Research Trust Fund	99	210	244	2.47	2.12
Aust. Natl Council on A I D S	98	460	442	4.51	4.69
Queensland Cancer Fund	92	770	542	5.89	8.37
Aust. Red Cross Society	85	460	402	4.73	5.41
Aust. Government (not specified)	82	313	374	4.56	3.82
Dept. Community Serv & Hlth	73	195	173	2.36	2.67
Qld Dept. Primary Industry	59	96	85	1.45	1.63
Aust.Research Grants Scheme	57	107	150	2.63	1.88
Univ. Melbourne Funds	56	201	203	3.62	3.59
Aust. Pig Res & Devel Corp	54	130	90	1.66	2.41
Royal Children's Hosp Funds, Melb	52	187	234	4.50	3.60

Table C21: Differential funding of biomedical publications by level of research (Table 11)

Level of research	Funded		Unfunded		Total No.	Govt		Industry		Non-Profit	
	No.	%	No.	%		No.	%	No.	%	No.	%
Clinical observation	836	34.7	1571	65.3	2407	433	51.8	65	7.8	320	38.3
Clinical mix	1341	56.3	1040	43.7	2381	714	53.2	106	7.9	536	40.0
Clinical investigation	2379	71.6	945	28.4	3324	1567	65.9	230	9.7	967	40.6
Basic research	2763	79.8	700	20.2	3463	2037	73.7	194	7.0	908	32.9
<b>TOTAL</b>	<b>7319</b>	<b>63.2</b>	<b>4256</b>	<b>36.8</b>	<b>11575</b>	<b>4751</b>	<b>64.9</b>	<b>595</b>	<b>8.1</b>	<b>2731</b>	<b>37.3</b>

Table C22: Differential funding of sectors undertaking biomedical research (Table 12)

Sectors	No. funded	% funded	No. unfunded	%Unfunded	Total
Government	657	71.8	258	28.2	915
Hospitals	1839	47.1	2063	52.9	3902
Medical Research Institutes	1296	82.6	273	17.4	1569
CSIRO	473	71.2	191	28.8	664
Universities	5078	65.3	2696	34.7	7774
Other Institutions	411	73.1	151	26.9	562
<b>Total</b>	<b>7652</b>	<b>61.6</b>	<b>4777</b>	<b>38.4</b>	<b>12429</b>

Table C23: Differential funding of biomedical publications by ASRC sub-field (Table 13)

Sub-fields	Funded		Unfunded		Total No.	Govt		Industry		Non-Profit	
	No.	%	No.	%		No.	%	No.	%	No.	%
General biology	1146	75.5	371	24.5	1517	839	73.2	100	8.7	366	31.9
Genetics & molecular biology	881	74.7	298	25.3	1179	573	65.0	62	7.0	329	37.3
General medical & health sciences	239	70.9	98	29.1	337	163	68.2	27	11.3	104	43.5
Immunology	670	78.4	185	21.6	855	445	66.4	75	11.2	268	40.0
Medical biochem & clinical chemistry	33	55.9	26	44.1	59	17	51.5	9	27.3	11	33.3
Medical microbiology	180	83.3	36	16.7	216	126	70.0	24	13.3	57	31.7
Pharmacology	551	69.3	244	30.7	795	388	70.4	52	9.4	209	37.9
Physiology	500	74.6	170	25.4	670	381	76.2	22	4.4	191	38.2
Neurosciences	631	74.5	216	25.5	847	495	78.4	28	4.4	218	34.5
Clinical sciences	2986	53.1	2641	46.9	5627	1755	58.8	220	7.4	1198	40.1
Public health research	278	63.6	159	36.4	437	158	56.8	28	10.1	105	37.8
Health services research	74	25.3	218	74.7	292	35	47.3	5	6.8	25	33.8
Other medical & health sciences	32	44.4	40	55.6	72	20	62.5	3	9.4	11	34.4
Interdisciplinary biomedical	676	78.0	191	22.0	867	474	70.1	46	6.8	230	34.0
<b>Total</b>	<b>7652</b>	<b>61.6</b>	<b>4777</b>	<b>38.4</b>	<b>12429</b>	<b>4960</b>	<b>64.8</b>	<b>606</b>	<b>7.9</b>	<b>2833</b>	<b>37.0</b>

Table C24: Differential funding of biomedical publications by ISI subject category (Tables 14 & 15)

ISI subject category	Funded		Unfunded		Total No.	Govt		Industry		Non-profit	
	No.	%	No.	%		No.	%	No.	%	No.	%
Anatomy & morphology	62	77.5	18	22.5	80	44	71.0	4	6.5	34	54.8
Anesthesiology	58	24.3	181	75.7	239	13	22.4	6	10.3	23	39.7
Behavioural Sciences	50	58.8	35	41.2	85	35	70.0	1	2.0	16	32.0
Biochemistry & molecular biology	1004	77.2	296	22.8	1300	740	73.7	93	9.3	329	32.8
Biology	184	73.0	68	27.0	252	142	77.2	10	5.4	41	22.3
Biomethods	59	59.0	41	41.0	100	37	62.7	4	6.8	18	30.5
Cardiovascular system	206	69.1	92	30.9	298	122	59.2	10	4.9	114	55.3
Cell biology	410	75.2	135	24.8	545	294	71.7	28	6.8	152	37.1
Chemistry, clinical & medicinal	33	100.0		0.0	33	17	51.5	9	27.3	11	33.3
Clinical neurology	171	59.8	115	40.2	286	114	66.7	11	6.4	70	40.9
Critical care	47	22.5	162	77.5	209	19	40.4	5	10.6	17	36.2
Dentistry, oral surgery & medicine	57	47.9	62	52.1	119	29	50.9	3	5.3	19	33.3
Dermatology & venereal diseases	40	100.0		0.0	40	13	32.5	1	2.5	24	60.0
Endocrinology & metabolism	400	77.7	115	22.3	515	295	73.8	30	7.5	122	30.5
Gastroenterology & hepatology	133	64.3	74	35.7	207	86	64.7	11	8.3	45	33.8
Genetics & heredity	482	77.4	141	22.6	623	290	60.2	38	7.9	182	37.8
Geriatrics & gerontology	31	100.0		0.0	31	17	54.8	1	3.2	9	29.0
Hematology	208	73.8	74	26.2	282	132	63.5	16	7.7	114	54.8
Immunology	667	78.4	184	21.6	851	445	66.7	75	11.2	266	39.9
Infectious diseases	122	75.3	40	24.7	162	78	63.9	7	5.7	42	34.4
Medicine, general & internal	442	43.3	578	56.7	1020	263	59.5	46	10.4	171	38.7
Medicine, miscellaneous	73	25.6	212	74.4	285	35	47.9	5	6.8	25	34.2
Medicine, research & experimental	239	70.9	98	29.1	337	163	68.2	27	11.3	104	43.5
Microbiology	373	77.9	106	22.1	479	257	68.9	25	6.7	105	28.2
Neurosciences	631	74.5	216	25.5	847	495	78.4	28	4.4	218	34.5
Nutrition & dietetics	83	61.5	52	38.5	135	40	48.2	10	12.0	41	49.4
Obstetrics & gynecology	135	55.3	109	44.7	244	75	55.6	14	10.4	37	27.4
Oncology	239	63.6	137	36.4	376	140	58.6	11	4.6	118	49.4
Ophthalmology	110	61.8	68	38.2	178	47	42.7	9	8.2	56	50.9
Orthopedics	22	42.3	30	57.7	52	8	36.4	2	9.1	14	63.6
Otorhinolaryngology	25	37.9	41	62.1	66	13	52.0	5	20.0	6	24.0
Parasitology	256	83.4	51	16.6	307	185	72.3	20	7.8	109	42.6
Pathology	87	31.0	194	69.0	281	41	47.1	3	3.4	46	52.9
Pediatrics	122	32.7	251	67.3	373	50	41.0	8	6.6	48	39.3
Pharmacology & pharmacy	498	70.2	211	29.8	709	354	71.1	47	9.4	194	39.0
Physiology	438	74.2	152	25.8	590	337	76.9	18	4.1	157	35.8
Psychiatry	156	44.3	196	55.7	352	107	68.6	5	3.2	42	26.9
Psychology	67	57.8	49	42.2	116	57	85.1	0	0.0	19	28.4
Public health	167	64.5	92	35.5	259	95	56.9	11	6.6	59	35.3
Radiology & nuclear medicine	71	37.0	121	63.0	192	38	53.5	7	9.9	31	43.7
Reproductive systems	158	72.8	59	27.2	217	107	67.7	25	15.8	38	24.1
Respiratory system	109	63.0	64	37.0	173	72	66.1	6	5.5	43	39.4
Rheumatology	49	100.0		0.0	49	21	42.9	5	10.2	18	36.7
Substance abuse	28	100.0		0.0	28	23	82.1	7	25.0	5	17.9
Surgery	139	38.7	220	61.3	359	51	36.7	8	5.8	70	50.4
Toxicology	86	57.3	64	42.7	150	53	61.6	11	12.8	30	34.9
Transplantation	67	65.0	36	35.0	103	27	40.3	4	6.0	29	43.3
Tropical medicine	60	76.9	18	23.1	78	36	60.0	2	3.3	15	25.0
Urology & nephrology	78	49.1	81	50.9	159	36	46.2	3	3.8	25	32.1
Vascular diseases	55	100.0		0.0	55	32	58.2	5	9.1	28	50.9
Virology	180	83.3	36	16.7	216	126	70.0	24	13.3	57	31.7
<b>TOTAL</b>	<b>7652</b>	<b>61.6</b>	<b>4777</b>	<b>38.4</b>	<b>12429</b>	<b>4960</b>	<b>64.8</b>	<b>606</b>	<b>7.9</b>	<b>2833</b>	<b>37.0</b>

Table C25: Funding of most highly cited publications by ASRC sub-field (Table 16)

	All publications			Top 5% most highly cited					Top 1% most highly cited				
	Aust	Funded		Total Aust		Funded			Total Aust		Funded		
		No	% <i>a</i>	Pubs	Cites	No	% <i>b</i>	Ratio <i>b/a</i>	Pubs	Cites	No	% <i>c</i>	Ratio <i>c/a</i>
General biology	1517	1146	75.5	95	17	85	89.5	1.2	20	40	19	95.0	1.3
Genetics & molecular biology	1179	881	74.7	70	18	65	92.9	1.2	14	63	13	92.9	1.2
General medical & health sci	337	239	70.9	18	20	17	94.4	1.3	4	39	4	100.0	1.4
Immunology	855	670	78.4	44	19	40	90.9	1.2	10	37	9	90.0	1.1
Medical microbiology	216	180	83.3	12	12	10	83.3	1.0	2	19	2	100.0	1.2
Pharmacology	795	551	69.3	41	9	33	80.5	1.2	8	21	6	75.0	1.1
Physiology	670	500	74.6	34	10	33	97.1	1.3	6	20	6	100.0	1.3
Neurosciences	847	631	74.5	49	11	45	91.8	1.2	9	21	8	88.9	1.2
Clinical sciences	5627	2986	53.1	322	11	263	81.7	1.5	59	25	52	88.1	1.7
Public health	437	278	63.6	25	9	22	88.0	1.2	4	21	4	100.0	1.6
Interdisciplinary biomedicine	867	676	78.0	34	13	34	100	1.3	7	162	7	100.0	1.3

Table C26: Funding of most highly cited publications by ISI subject category (Table 17)

	All publications			Top 5% most highly cited					Top 1% most highly cited				
	Aust	Funded		Total	Aust	Funded			Total	Aust	Funded		
	No	%		Pubs	Cites	No	%	Ratio	Pubs	Cites	No	%	Ratio
		<i>a</i>				<i>b</i>	<i>b/a</i>				<i>c</i>	<i>c/a</i>	
Anesthesiology	239	58	24.3	11	12	2	18.2	0.7	2	26	0	0.0	0.0
Biochemistry & molecular biology	1300	1004	77.2	75	19	66	88.0	1.1	15	45	14	93.3	1.2
Biology	252	184	73.0	15	11	14	93.3	1.3	3	20	3	100.0	1.4
Biomethods	100	59	59.0	5	10	4	80.0	1.4	1	18	1	100.0	1.7
Cardiovascular system	298	206	69.1	17	17	15	88.2	1.3	4	26	4	100.0	1.5
Cell biology	545	410	75.2	33	21	30	80.9	1.1	7	86	6	85.7	1.1
Clinical neurology	286	171	59.8	17	9	13	76.5	1.3	3	19	3	100.0	1.7
Critical care	209	47	22.5	13	11	3	23.1	1.0	2	26	0	0.0	0.0
Dentistry, oral surgery & medicine	119	57	47.9	8	4	6	75.0	1.6	1	12	1	100.0	2.1
Endocrinology & metabolism	515	400	77.7	26	13	23	88.5	1.1	6	28	6	100.0	1.3
Gastroenterology & hepatology	207	133	64.3	11	14	9	81.8	1.3	2	22	2	100.0	1.6
Genetics & heredity	623	482	77.4	32	19	29	80.6	1.0	6	63	6	100.0	1.3
Hematology	282	208	73.8	15	20	13	86.7	1.2	3	38	3	100.0	1.4
Immunology	851	667	78.4	44	19	40	90.9	1.2	10	37	9	90.0	1.1
Infectious diseases	162	122	75.3	9	18	8	88.9	1.2	2	34	2	100.0	1.3
Medicine, general & internal	1020	442	43.3	49	13	41	83.7	1.9	9	39	9	100.0	2.3
Medicine, miscellaneous	285	73	25.6	16	8	4	25.0	1.0	3	25	0	0.0	0.0
Medicine, research & experimental	337	239	70.9	18	20	17	94.4	1.3	4	39	4	100.0	1.4
Microbiology	479	373	77.9	27	14	20	74.1	1.0	5	29	4	80.0	1.0
Neurosciences	847	631	74.5	49	11	45	91.8	1.2	10	20	9	90.0	1.2
Nutrition & dietetics	135	83	61.5	7	17	7	100.0	1.6	1	23	1	100.0	1.6
Obstetrics & gynecology	244	135	55.3	13	11	9	69.2	1.3	3	23	3	100.0	1.8
Oncology	376	239	63.6	19	17	15	78.9	1.2	4	28	4	100.0	1.6
Ophthalmology	178	110	61.8	9	8	9	100.0	1.6	1	14	1	100.0	1.7
Parasitology	307	256	83.4	16	11	15	93.8	1.1	3	18	2	66.7	0.8
Pathology	281	87	31.0	13	7	8	51.5	1.7	3	16	3	100.0	3.2
Pediatrics	373	122	32.7	14	6	8	57.1	1.7	4	10	4	100.0	3.1
Pharmacology & pharmacy	709	498	70.2	37	9	30	81.1	1.2	7	19	5	71.4	1.0
Physiology	590	438	74.2	29	9	27	93.1	1.3	5	14	5	100.0	1.3
Psychiatry	352	156	44.3	15	10	13	86.7	2.0	4	21	3	75.0	1.7
Psychology	116	67	57.8	5	8	5	100.0	1.7	1	39	1	100.0	1.7
Public health	259	167	64.5	13	9	10	76.9	1.2	2	19	1	50.0	0.8
Radiology & nuclear medicine	192	71	37.0	11	11	9	81.8	2.2	2	24	2	100.0	2.8
Reproductive systems	217	158	72.8	9	12	7	77.8	1.1	3	23	3	100.0	1.4
Respiratory system	173	109	63.0	9	12	5	55.6	0.9	2	21	1	50.0	0.8
Surgery	359	139	38.7	29	8	20	69.0	1.8	6	23	5	83.3	2.2
Toxicology	150	86	57.3	7	8	6	85.7	1.5	2	34	2	100.0	1.7
Transplantation	103	67	65.0	7	19	5	71.4	1.1	2	37	2	100.0	1.5
Urology & nephrology	159	78	49.1	7	10	4	57.1	1.2	2	13	1	50.0	1.0
Virology	216	180	83.3	12	12	10	83.3	1.0	2	23	2	100.0	1.2

Table C27: Distribution of NHMRC-funded publications by number of acknowledgments (Chart 15)

No. ackn.	NHMRC funded publications (Number)	NHMRC funded publications (%)	Other funded publications (Number)	Other funded publications (%)
1	902	28.8	2206	48.8
2	998	31.8	1261	27.9
3	620	19.8	542	12.0
4	303	9.7	247	5.5
5	149	4.8	133	2.9
6	73	2.3	55	1.2
7	42	1.3	37	0.8
8	20	0.6	15	0.3
9	17	0.5	8	0.2
10	7	0.2	5	0.1
11+	3	0.1	9	0.2
<b>Total</b>	<b>3134</b>	<b>100.0</b>	<b>4518</b>	<b>100.0</b>

Table C28: Distribution of NHMRC funded publications by type of funding (Table 18)

Type of funding	NHMRC acknowledgments		Other funding acknowledgments	
	(Number)	%	(Number)	%
Extramural grants and contracts	2860	85.5	8662	64.2
Intramural support	104	3.1	2093	15.5
Personal support	371	11.1	1222	9.1
In-kind support	9	0.3	1447	10.7
Travel funding		0.0	46	0.3
Non-specified support	2	0.1	25	0.2
<b>Total</b>	<b>3346</b>	<b>100.0</b>	<b>13495</b>	<b>100.0</b>

Table C29: Distribution of NHMRC funded publications by type of research (Chart 16)

Type of research	NHMRC funded publications		Other funded publications	
	(Number)	%	(Number)	%
Clinical observation	238	7.8	2500	27.3
Clinical mix	447	14.7	2010	22.0
Clinical investigation	1147	37.8	2257	24.7
Basic research	1202	39.6	2386	26.1
<b>Total</b>	<b>3034</b>	<b>100.0</b>	<b>9153</b>	<b>100.0</b>

Table C30: Distribution of NHMRC-funded publications by type of collaboration (Chart 17)

	NHMRC funded publications		Other funded publications	
	(Number)	%	(Number)	%
Single	134	4.3	293	6.5
Group	2297	73.3	2534	56.1
Institutional	321	10.2	345	7.6
National	1001	31.9	1324	29.3
International	567	18.1	1466	32.4
<b>Total</b>	<b>3134</b>	<b>100.0</b>	<b>4518</b>	<b>100.0</b>

Table C31: Proportion of total Australian publications with NHMRC funding by ASRC sub-fields (Chart 18)

ASRC Sub-fields	NHMRC Pubs	Total matched Pubs	NHMRC(%)
General biology	494	1517	32.6
Genetics & molecular biology	357	1179	30.3
General medical & health sciences	123	337	36.5
Immunology	372	855	43.5
Medical microbiology	62	216	28.7
Pharmacology	298	795	37.5
Physiology	270	670	40.3
Neurosciences	399	847	47.1
Clinical sciences	1277	5627	22.7
Public health research	93	437	21.3
Interdisciplinary biomedical	174	867	20.1
<b>TOTAL</b>	<b>3134</b>	<b>12429</b>	<b>25.2</b>

Table C32: Distribution of NHMRC funded publications by ASRC sub-fields (Table 19)

ASRC sub-fields	NHMRC (Number)	NHMRC (%)	Other (Number)	Other (%)
General biology	494	15.8	652	14.4
Genetics & molecular biology	357	11.4	524	11.6
General medical & health sciences	123	3.9	116	2.6
Immunology	372	11.9	298	6.6
Medical microbiology	62	2.0	118	2.6
Pharmacology	298	9.5	253	5.6
Physiology	270	8.6	230	5.1
Neurosciences	399	12.7	232	5.1
Clinical sciences	1277	40.7	1709	37.8
Public health research	93	3.0	185	4.1
Interdisciplinary biomedical	174	5.6	502	11.1
<b>Total</b>	<b>3134</b>	<b>100.0</b>	<b>4518</b>	<b>100.0</b>

Table C33: Actual and expected citation rates of NHMRC funded publications by ASRC sub-fields (Chart 19)

ASRC sub-fields	NHMRC Pubs	Act. Cites	Exp. Cites	Av. Exp. Cites	Av. Act. Cites
General biology	494	3364	3174	6.42	6.81
Genetics & molecular biology	357	2880	2503	7.01	8.07
General medical & health sciences	123	782	831	6.76	6.36
Immunology	372	2256	2317	6.23	6.06
Medical microbiology	62	235	307	4.96	3.79
Pharmacology	298	906	972	3.26	3.04
Physiology	270	955	1056	3.91	3.54
Neurosciences	399	1543	1655	4.15	3.87
Clinical Sciences	1277	6039	5318	4.16	4.73
Public health research	93	320	288	3.09	3.44
Interdisciplinary biomedical	174	792	646	3.71	4.55

Table C34: Proportion of total Australian publications with NHMRC funding by ISI subject category (Table 20)

ISI subject category	Total matched	NHMRC	%
Anatomy & morphology	80	24	30.0
Anesthesiology	239	4	1.7
Behavioural Sciences	85	6	7.1
Biochemistry & molecular biology	1300	456	35.1
Biology	252	75	29.8
Biomethods	100	22	22.0
Cardiovascular system	298	116	38.9
Cell biology	545	207	38.0
Clinical neurology	286	88	30.8
Critical care	209	11	5.3
Dentistry, oral surgery & medicine	119	22	18.5
Endocrinology & metabolism	515	241	46.8
Gastroenterology & hepatology	207	81	39.1
Genetics & heredity	623	158	25.4
Hematology	282	118	41.8
Immunology	851	372	43.7
Infectious diseases	162	54	33.3
Medicine, general & internal	1020	132	12.9
Medicine, miscellaneous	285	11	3.9
Medicine, research & experimental	337	123	36.5
Microbiology	479	81	16.9
Neurosciences	847	399	47.1
Nutrition & dietetics	135	21	15.6
Obstetrics & gynecology	244	45	18.4
Oncology	376	113	30.1
Ophthalmology	178	30	16.9
Orthopedics	52	8	15.4
Otorhinolaryngology	66	10	15.2
Parasitology	307	90	29.3
Pathology	281	34	12.1
Pediatrics	373	38	10.2
Pharmacology & pharmacy	709	283	39.9
Physiology	590	246	41.7
Psychiatry	352	81	23.0
Psychology	116	23	19.8
Public health	259	57	22.0
Radiology & nuclear medicine	192	26	13.5
Reproductive systems	217	43	19.8
Respiratory system	173	59	34.1
Surgery	359	47	13.1
Toxicology	150	21	14.0
Transplantation	103	27	26.2
Tropical medicine	78	20	25.6
Urology & nephrology	159	32	20.1
Vascular diseases	55	30	54.5
Virology	216	62	28.7
<b>Grand Total</b>	<b>12429</b>	<b>3134</b>	<b>25.2</b>

Table C35: Distribution of NHMRC funded publications by ISI subject categories (Table 21)

<b>ISI subject category</b>	<b>NHMRC</b>	<b>%</b>	<b>Other</b>	<b>%</b>
Anatomy & morphology	24	0.8	38	0.8
Anesthesiology	4	0.1	54	1.2
Behavioural Sciences	6	0.2	44	1.0
Biochemistry & molecular biology	456	14.6	548	12.1
Biology	75	2.4	109	2.4
Biomethods	22	0.7	37	0.8
Cardiovascular system	116	3.7	90	2.0
Cell biology	207	6.6	203	4.5
Clinical neurology	88	2.8	83	1.8
Critical Care	11	0.4	36	0.8
Dentistry, oral surgery & medicine	22	0.7	35	0.8
Endocrinology & metabolism	241	7.7	159	3.5
Gastroenterology & hepatology	81	2.6	52	1.2
Genetics & heredity	158	5.0	324	7.2
Hematology	118	3.8	90	2.0
Immunology	372	11.9	295	6.5
Infectious diseases	54	1.7	68	1.5
Medicine, general & internal	132	4.2	310	6.9
Medicine, miscellaneous	11	0.4	62	1.4
Medicine, research & experimental	123	3.9	116	2.6
Microbiology	81	2.6	292	6.5
Neurosciences	399	12.7	232	5.1
Nutrition & dietetics	21	0.7	62	1.4
Obstetrics & gynecology	45	1.4	90	2.0
Oncology	113	3.6	126	2.8
Ophthalmology	30	1.0	80	1.8
Orthopedics	8	0.3	14	0.3
Otorhinolaryngology	10	0.3	15	0.3
Parasitology	90	2.9	166	3.7
Pathology	34	1.1	53	1.2
Pediatrics	38	1.2	84	1.9
Pharmacology & pharmacy	283	9.0	215	4.8
Physiology	246	7.8	192	4.2
Psychiatry	81	2.6	75	1.7
Psychology	23	0.7	44	1.0
Public health	57	1.8	110	2.4
Radiology & nuclear medicine	26	0.8	45	1.0
Reproductive systems	43	1.4	115	2.5
Respiratory system	59	1.9	50	1.1
Surgery	47	1.5	92	2.0
Toxicology	21	0.7	65	1.4
Transplantation	27	0.9	40	0.9
Tropical medicine	20	0.6	40	0.9
Urology & nephrology	32	1.0	46	1.0
Vascular diseases	30	1.0	25	0.6
Virology	62	2.0	118	2.6
<b>TOTAL</b>	<b>3134</b>	<b>100.0</b>	<b>4518</b>	<b>100.0</b>

Table C36: Actual and expected citation rates by ISI categories — categories in which NHMRC funded > 100 publications (Chart 20)

ISI subject categories	NHMRC Pubs	Act. Cites	Exp. Cites	Av. Exp. Cites	Av. Act. Cites
Biochemistry & molecular biology	456	3261	3063	6.72	7.15
Cardiovascular system	116	629	544	4.69	5.42
Cell biology	207	1854	1495	7.22	8.96
Endocrinology & metabolism	241	1178	1014	4.21	4.89
Genetics & heredity	158	1297	1203	7.61	8.21
Hematology	118	777	730	6.18	6.58
Immunology	372	2256	2317	6.23	6.06
Medicine, general & internal	132	954	723	5.48	7.23
Medicine, research & experimental	123	782	831	6.76	6.36
Neurosciences	399	1543	1655	4.15	3.87
Oncology	113	739	631	5.58	6.54
Pharmacology & pharmacy	283	846	936	3.31	2.99
Physiology	246	761	864	3.51	3.09

Table C37: Actual and expected citation rates by ISI categories — categories in which NHMRC funded 50-99 publications (Chart 21)

ISI subject categories	NHMRC Pubs	Act. Cites	Exp. Cites	Av. Exp. Cites	Av. Act. Cites
Biology	75	269	294	3.92	3.59
Clinical neurology	88	337	412	4.68	3.83
Gastroenterology & hepatology	81	323	290	3.57	3.99
Infectious diseases	54	348	290	5.38	6.44
Microbiology	81	446	343	4.23	5.51
Parasitology	90	350	294	3.27	3.89
Psychiatry	81	251	227	2.81	3.10
Public health	57	223	209	3.66	3.91
Respiratory system	59	159	177	3.00	2.69
Virology	62	235	307	4.96	3.79

Table C38: Most highly cited NHMRC-funded publications by ASRC sub-field (Table 22)

	All publications			Top 5% most highly cited					Top 1% most highly cited				
	Aust	Ackn. NHMRC		Total Aust		Ackn. NHMRC			Total Aust		Ackn. NHMRC		
		No	%	Pubs	Cites	No	%	Ratio	Pubs	Cites	No	%	Ratio
General biology	1517	494	32.6	95	17	42	44.2	1.4	20	40	11	55.0	1.7
Genetics & molecular biology	1179	357	30.3	70	18	41	58.6	1.9	14	63	8	57.1	1.9
General medical & health sci	337	123	36.5	18	20	10	55.6	1.5	4	39	2	50.0	1.4
Immunology	855	372	43.5	44	19	23	52.3	1.2	10	37	6	60.0	1.4
Medical microbiology	216	62	28.7	12	12	3	25.0	0.9	2	19	1	50.0	1.7
Pharmacology	795	298	37.5	41	9	23	56.1	1.5	8	21	4	50.0	1.3
Physiology	670	270	40.3	34	10	23	67.6	1.7	6	20	5	83.3	2.1
Neurosciences	847	399	47.1	49	11	33	67.3	1.4	9	21	5	55.6	1.2
Clinical sciences	5627	1277	22.7	322	11	128	39.8	1.8	60	25	24	40.0	1.8
Public health	437	93	21.3	25	9	10	40.0	1.9	5	21	0	0.0	0.0
Interdisciplinary biomedicine	867	174	20.1	34	13	15	44.1	2.2	9	162	4	44.4	2.2

Table C39: Most highly cited NHMRC-funded publications by ISI subject category (Table 23)

	All publications			Top 5% most highly cited					Top 1% most highly cited				
	Aust	Ackn. NHMRC No	% <i>a</i>	Total Aust Pubs	Ackn. NHMRC Cites	No	% <i>b</i>	Ratio <i>b/a</i>	Total Aust Pubs	Ackn. NHMRC Cites	No	% <i>c</i>	Ratio <i>c/a</i>
Biochemistry & molecular biology	1300	456	31.1	75	19	30	40.0	1.3	15	45	8	53.3	1.7
Biology	252	75	29.8	15	11	3	20.0	0.7	3	20	0	0.0	0.0
Cardiovascular system	298	116	38.9	17	17	10	58.8	1.5	4	26	3	75.0	1.9
Cell biology	545	207	38.0	33	21	21	63.6	1.7	7	86	3	42.9	1.1
Clinical neurology	286	88	30.8	17	9	7	41.2	1.3	3	19	1	33.3	1.1
Endocrinology & metabolism	515	241	46.8	26	13	14	53.8	1.1	6	28	4	66.7	1.4
Gastroenterology & hepatology	207	81	39.1	11	14	5	45.5	1.2	2	22	0	0.0	0.0
Genetics & heredity	623	158	25.4	32	19	15	46.9	1.8	6	63	4	66.7	2.6
Hematology	282	118	41.8	15	20	8	53.3	1.3	3	38	2	66.7	1.6
Immunology	851	372	43.7	44	19	23	52.3	1.2	10	37	6	60.0	1.4
Infectious diseases	162	54	33.3	9	18	4	44.4	1.3	2	34	1	50.0	1.5
Medicine, general & internal	1020	132	12.9	49	13	17	34.7	2.7	9	39	4	44.4	3.4
Medicine, research & experimental	337	123	36.5	18	20	10	55.6	1.5	4	39	2	50.0	1.4
Microbiology	479	81	16.9	27	14	8	29.6	1.8	5	29	2	40.0	2.4
Neurosciences	847	399	47.1	49	11	33	67.3	1.4	10	20	6	60.0	1.3
Obstetrics & gynecology	244	45	18.4	13	11	2	15.4	0.8	3	23	1	33.3	1.8
Oncology	376	113	30.1	19	17	10	52.6	1.7	4	28	3	75.0	2.5
Ophthalmology	178	30	16.9	9	8	1	11.1	0.7	1	14	0	0.0	0.0
Parasitology	307	90	29.3	16	11	7	43.8	1.5	3	18	2	66.7	2.3
Pediatrics	373	38	10.2	14	6	3	21.4	2.1	4	10	2	50.0	4.9
Pharmacology & pharmacy	709	283	39.9	37	9	22	59.5	1.5	7	19	4	57.1	1.4
Physiology	590	246	41.7	29	9	20	69.0	1.7	5	14	4	80.0	1.9
Psychiatry	352	81	23.0	15	10	5	33.3	1.4	4	21	1	25.0	1.1
Public health	259	57	22.0	13	9	6	46.2	2.1	2	19	0	0.0	0.0
Reproductive systems	217	43	19.8	9	12	2	22.2	1.1	3	23	1	33.3	2.1
Respiratory system	173	59	34.1	9	12	1	11.1	0.3	2	21	1	50.0	1.5
Surgery	359	47	13.1	29	8	10	34.5	2.6	6	23	2	33.3	2.5
Virology	216	62	28.7	12	12	3	25.0	0.9	2	23	1	50.0	1.7

Table C40: Institutions producing research publications funded by NHMRC (Table 24)

<b>Institution</b>	<b>Pubs</b>	<b>%</b>
University of Melbourne	425	13.6
University of Sydney	333	10.6
Monash University	253	8.1
University of Queensland	250	8.0
University of New South Wales	215	6.9
Walter & Eliza Hall Institute of Medical Research	190	6.1
Flinders University of South Australia	184	5.9
University of Western Australia	159	5.1
Queensland Institute of Medical Research	137	4.4
University of Adelaide	121	3.9
Royal Prince Alfred Hospital	103	3.3
Australian National University	91	2.9
Baker Medical Research Institute	74	2.4
Prince of Wales & Prince Henry Hospitals Group	72	2.3
Adelaide Medical Centre for Women & Children	70	2.2
Prince Henrys Institute of Medical Research	68	2.2
St Vincents Hospital, Sydney	65	2.1
Garvan Institute of Medical Research	62	2.0
Howard Florey Institute	57	1.8
Royal Childrens Hospital, Melbourne	57	1.8
Amalgamated Melbourne & Essendon Hospitals	53	1.7
Westmead Hospital and Medical Centre	52	1.7
Royal Adelaide Hospital	49	1.6
La Trobe University	49	1.6
CSIRO	49	1.6
University of Newcastle	48	1.5
St Vincents Institute of Medical Research	48	1.5
Royal North Shore Hospital	41	1.3
Western Australian Institute of Child Health	40	1.3
University of Tasmania	39	1.2
Austin Hospital	35	1.1
Ludwig Institute Cancer Research	35	1.1
South Australian Government	34	1.1
Prince Wales Medical Research Institute	33	1.1
Austin Research Institute	32	1.0
Hanson Centre for Cancer Research	30	1.0
St Vincents Hospital, Melbourne	29	0.9
Murdoch Institute for Research into Birth Defects Ltd	27	0.9
Royal Perth Hospital	25	0.8
Childrens Medical Research Institute	24	0.8
Heart Research Institute	24	0.8
Sir Charles Gairdner Hospital	21	0.7
Royal Brisbane Hospital	21	0.7
Mental Health Research Institute	21	0.7
Centenary Institute of Cancer Medicine & Cell Biology	20	0.6
Monash Medical Centre	20	0.6
<b>Total</b>	<b>3134</b>	<b>100.0</b>

Table C41: Actual and expected citation rates — NHMRC funded institutions with an average cpp > 8 (Chart 22)

<b>Institution</b>	<b>Pubs</b>	<b>Act. Cites</b>	<b>Exp. Cites</b>	<b>Av. Exp. Cites</b>	<b>Av. Act. Cites</b>
Walter & Eliza Hall Institute	190	2012	1713	9.02	10.59
Garvan Institute Med Res	62	769	483	7.78	12.40
Howard Florey Institute	57	553	291	5.10	9.70

Table C42: Actual and expected citation rates — institutions publishing more than 100 NHMRC funded publications (Chart 23)

<b>Institution</b>	<b>Pubs</b>	<b>Act. Cites</b>	<b>Exp. Cites</b>	<b>Av. Exp. Cites</b>	<b>Av. Act. Cites</b>
University Melbourne	425	1789	2002	4.71	4.21
University Sydney	333	1488	1485	4.46	4.47
Monash University	253	1225	1243	4.91	4.84
University Queensland	250	924	968	3.87	3.70
University New South Wales	215	1356	1049	4.88	6.31
Fklinders University SA	184	814	870	4.73	4.42
University Western Australia	159	711	740	4.65	4.47
Queensland Inst Med Research	137	720	649	4.74	5.26
University Adelaide	121	457	525	4.34	3.78
Royal Prince Alfred Hospital	103	557	449	4.36	5.41

Table C43: Actual and expected citation rates — institutions publishing between 50 and 99 NHMRC funded publications (Chart 24)

<b>Institution</b>	<b>Pubs</b>	<b>Act. Cites</b>	<b>Exp. Cites</b>	<b>Av. Exp. Cites</b>	<b>Av. Act. Cites</b>
Australian National University	91	435	395	4.34	4.78
Baker Med Research Institute	74	435	364	4.92	5.88
Prince Wales & Prince Henry Hosp Grp	72	455	329	4.57	6.32
Adelaide Med Ctr Women & Children	70	392	425	6.08	5.60
Prince Henrys Institute Med Research	68	355	290	4.26	5.22
St Vincents Hospital, Sydney	65	442	351	5.40	6.80
Royal Childrens Hospital, Melbourne	57	220	259	4.54	3.86
Amalgamated Melb & Ess Hosps	53	331	339	6.40	6.25
Westmead Hosp & Med Ctr	52	194	236	4.54	3.73

## Appendix D Details of the most highly cited publications in each ISI subject category

Category	Journal	No. cites	No. authors	No. institutions	Overseas Collaborators	Australian institutions	Funding bodies	Funding country	Type of funding
<b>Anesthesiology</b>									
Behavioural sciences	<i>Sleep</i>	8	3			Univ Sydney Royal Prince Alfred Hospital	NHMRC	AU	E
							AMP medical research fund	AU	E
							Swedish medical research council	SWE	E
							Swedish heart and lung foundation	SWE	E
Biochemistry & molecular biology	<i>Cell</i>	127	6	3	1 US	Walter & Eliza Hall Institute Med Res Monash Univ, Fac Med	NHMRC	AU	E
							ARC	AU	E,P
							Howard Hughes medical institute	US	I
							Natl institute for allergy & infectious diseases	US	E
							Leukemia society of America	US	P
and						Cancer research institute	US	P	
Cell biology									
Biology	<i>1: Bioscience</i>	24	8	7	6 US	Univ Queensland, Fac Biol & Chem Sci	William & Mary college funds	US	E
							Natl drug crime prevention fund	US	E
							Environment protection authority	US	I
	<i>2: Develop Bio</i>	24	5	3	2 JPN	Ludwig Institute for Cancer Research	Japanese ministry of education	JPN	E
Biomethods	<i>Meth Enzym</i>	18	3	2	1 AUT	Heart Research Institute	NHMRC	AU	E
							Deutsche Forschungsgemeinschaft	GER	E
							Austrian fund for scientific research	AUT	E
Biotechnol & applied microbiology	<i>J Gen Virol</i>	25	5	1		CSIRO, Inst Plant Production & Processing	Gene Shears P/L	AU	E
							DIST	AU	E
and Virology									
Cardiovascular system	<i>Hypertensio</i>	49	8	6	3 SCT 1 ENG 1 FRA	Austin Hospital	Scottish dept of health	UK	E
							Medical research council	UK	I
							Aust national heart foundation	AU	T

								British heart foundation	UK	E
<b>Clinical neurology</b>	<i>Ann Neurol</i>	34	2	2	1	SWE	Prince Henry Hospital	Basser Trust	AU	E
								Wellcome Trust	UK	P
								Swedish Medical Research Council	SWE	E
								Perini family trust	AU	E
								Sandoz Pharmaceuticals	SWT	E
								Warren & Cheryl Anderson foundation	AU	E
								Glaxo Pharmaceuticals	UK	K
								Australian brain foundation	AU	E
								Glaxo Australia	AU	E
								<b>NHMRC</b>	AU	E
<b>Critical care</b>	<i>Anaesth I C</i>	33	7	5			Royal Victorian Eye & Ear Hospital	no acknowledgments		
							Prince Wales Hospital			
<i>and</i>							Royal Melbourne Hospital			
<b>Medicine, miscell.</b>							Univ Adelaide, Fac Med			
							Royal Adelaide Hospital			
<b>Dentistry</b>	<i>J Clin Per</i>	12	6	3			Royal Melbourne Hospital	Abbott Australasia	AU	K
							Royal Melbourne Dental Hospital			
							Univ Melbourne, Fac Med			
<b>Endocrinology &amp; metabolism</b>	<i>Trends Endo</i>	50	1	1			Royal Prince Alfred Hospital	<b>NHMRC</b>	AU	E
<b>Gastroenterol &amp; hepatology</b>	<i>Gut</i>	23	7	2			Royal Perth Hospital	Roy Perth Hospital medical research fdn	AU	E
							Busselton Populat Studies	Peters Ice Cream Co	AU	E
<b>Genetics &amp; heredity</b>	<i>Nat Genet</i>	110	11	4	3	US	Murdoch Univ, Sch Phys Sci Engn & Tech	<b>NHMRC</b>	AU	E
								Natl centre human genome research	US	E
								Howard Hughes medical institute	US	I
								Natl inst arthritis, diabet, digestion & kidney res	US	E
<b>Hematology</b>	<i>Blook</i>	88	1	1			Walter & Eliza Hall Institute Med Res	<b>NHMRC</b>	AU	E
								National cancer institute	US	E
								Victorian anti-cancer council	AU	E
<b>Immunology; and Infectious Disease</b>	<i>Infec Immun</i>	69	3	2	1	US	Univ New South Wales, Fac Life Sci	<b>NHMRC</b>	AU	E

Medicine, general & internal	<i>Eng J Med</i>	94	12	10	1 BEL	Univ New South Wales, Fac Med Prince Wales Hospital	<b>NHMRC</b> Wellcome research labs	AU	I
					2 SPA			UK	I
					1 DEN				
					1 GER				
					1 NOR				
					1 ENG				
					1 AUT				
Medicine, research & experimental	<i>J Clin Inv</i>	63	4	3	2 US	Royal Prince Alfred Hospital	Natl centre research resources	US	E
							Genentech Inc	US	K
							Natl inst child health & human development	US	E
Microbiology	<i>J Clin Micr</i>	48	22	11	3 SCO	Australian Red Cross	Australian Red Cross	AU	I
					1 FIN		Scottish blood transfusion service	UK	E
					1 HK		Medical research council	UK	E
					1 NTH		Saudi Arabian government	SAU	I
					1 HUN		Netherlands Red Cross	NTH	I
					1 TAI		Japanese Red Cross	JPN	I
					1 SAU		Finnish Red Cross	FIN	I
					1 JPN		Hong Kong Red Cross	HK	I
Nutrition & dietetics	<i>Am J Clin N</i>	23	3	1	CSIRO, Inst Animal Production & Processing	Sigrid Juselius foundation	FI	E	
						Finska Läkaresällskapet	FI	E	
						Perklens foundation	FI	E	
						Orion-Farmos Pharmaceuticals	FI	K	
Obstetrics & gynecology	<i>Biol Reprod</i>	70	1	1	Prince Henrys Institute Medical Research	<b>NHMRC</b>	AU	E	
Oncology	<i>Oncogene</i>	79	10	2	1 UK	Garvan Institute Medical Research	NSW government	AU	E
							<b>NHMRC</b>	AU	E
							Tenovus cancer fund	UK	I
							MLC Life ltd	AU	E
Ophthalmology	<i>Vision Res</i>	17	3	3	2 UK	Univ Melbourne, Fac Med	Science & engineering research council	UK	E
							Visual research trust	UK	E
Parasitology	<i>Parasit Tod</i>	28	4	2	1 UK	Walter & Eliza Hall Institute Med Res	John & Catherine T MacArthur foundation	US	E
							Royal Melbourne Hospital funds	AU	E
							Wellcome Trust	UK	E
							Medical research council	UK	P
							<b>NHMRC</b>	AU	E
Pathology	<i>Am J Path</i>	28	6	4	3 US	Monash Medical Centre	Otsuka America Pharmaceuticals PL	US	I

Pediatrics	<i>Pediat Res</i>	22	4	2		Flinders Univ S Australia, Fac Hlth Sci	Nestle Produkte Scotia Pharmaceuticals	SWT UK	E E
Pharmacology	<i>Pharm Rev</i>	156	8	6	1 SWT 1 US 2 ENG 1 NTH	Univ Sydney	Sandoz Pharmaceuticals Du Pont Ltd Wellcome res labs Syntex Inc Glaxo Pharmaceuticals	SWZ UK UK US UK	I I I I I
Physiology	<i>Physiol Rev</i>	26	1	1		Univ Sydney	National heart foundation <b>NHMRC</b> Clive & Vera Ramaciotti fdn	AU AU AU	E E E
Psychiatry	<i>Arch G Psyc</i>	45	5	5	4 US	Univ Queensland, Fac Soc & Behav Sci	ADM	?	?
Psychology	<i>Psychol Rev</i>	39	4	1		Macquarie Univ, Sch Behav Sci	Medical research council Macquarie University funds ARC	UK AU AU	K E E
Public health	<i>Diabetes</i>	39	6	4	1 US 1 FIN	Monash Univ, Ctr molecular biology & med Caulfield Hospital	Miles Laboratories Inc Finnish cultural foundation	UK FIN	I,E E
Radiology & nuclear medicine	<i>Am J Neuror</i>	27	4	3	2 UK	Austin Hospital	Natl hospital neurology and neurosurgery Hospital for sick children special trust Action research for crippled children	UK UK UK	I I E
Reproduct systems	<i>Biol Reprod</i>	70	1	1		Prince Henrys inst med	<b>NHMRC</b>	AU	E
Respiratory system	<i>Eur Resp J</i>	48	8	5	4 CAN	Royal Prince Alfred Hos	no acknowledgments		
Surgery	<i>1: Circulation</i>	38	7	10	8 US 1 NTH	Univ Melbourne, Fac Med	Natl heart, lung and blood institute <b>NHMRC</b> Deutsche Forschungsgemeinschaft William Milton fund American heart association	US AU GER ? US	E,P E E E E
also for Transplantation (No. 2 only)	<i>2: Transplant</i>	38	7	4	3 US	Monash Univ, Fac Med	<b>NHMRC</b> Deutsche Forschungsgemeinschaft Natl institute allergy & infectious diseases	AU GER US	E P E
Toxicology	<i>Mutat Res</i>	50	1	1		Murdoch Institute Birth Defects	<b>NHMRC</b> London school hygiene & tropical medicine	AU UK	E E
Urology & nephrology	<i>Kidney Int</i>	37	5	2	1 US	Monash Medical Centre	Synergen Inc Baxter Healthcare corp	US US	I E

## Appendix E Explanatory Charts and Tables

Chart E1: World average citation per publication rates — ASRC sub-fields

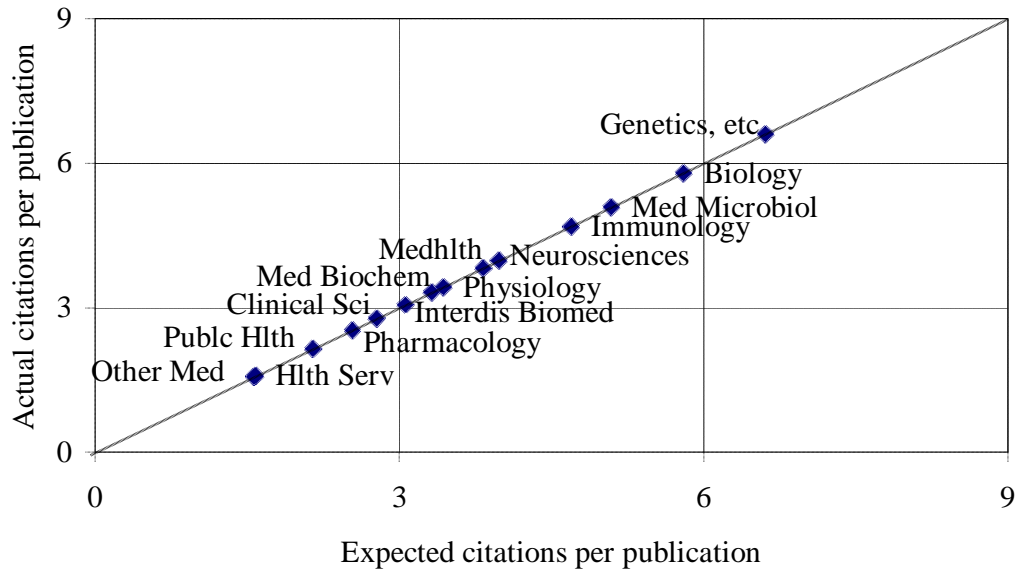


Chart E2: World average citation per publication rates — ISI subject categories in which NHMRC funds > 100 publications

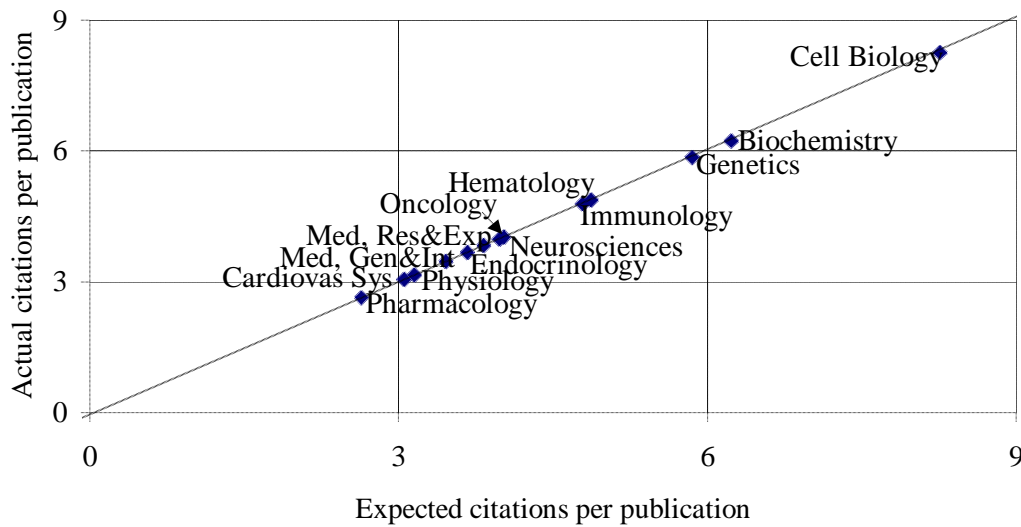


Chart E3: World average citation per publication rates – ISI subject categories in which NHMRC funds 50-99 publications

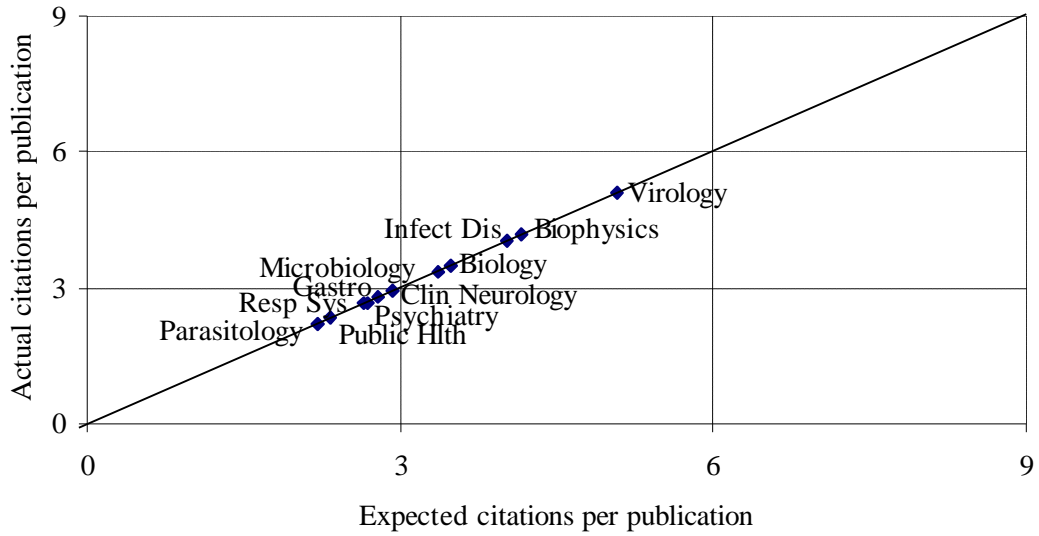


Chart E4: Relationship between level of research and level of funding, by ASRC sub-field

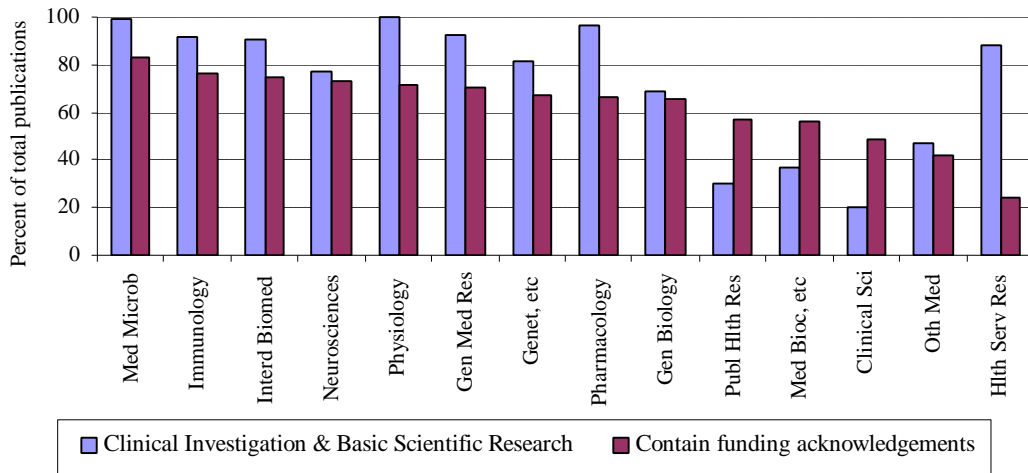


Chart E5: Relationship between level of research and level of funding, for selected ISI subject categories

