Empirical Studies within the Cochrane Collaboration

This section presents a collection of feature articles highlighting some of the methodological research currently being carried out within The Cochrane Collaboration. To register ongoing methodological research within The Cochrane Collaboration please contact shopewell@cochrane.ac.uk.

Review production in The Cochrane Collaboration – where is it happening and why?

Peter Gøtzsche, Britta Tendal and Mike Clarke

Correspondence to:
pcg@cochrane.dk
Nordic Cochrane Centre, Copenhagen, Denmark.

Background: The Cochrane Collaboration is an international organization, with members from all healthcare specialties and most parts of the world. Authors work on Cochrane reviews, supported mainly by Cochrane Review Groups, but also by Centres and Branches, with input from Methods Groups and Fields, including the Cochrane Consumer Network.

Objective: We are seeking to answer the question: where do Cochrane reviews come from, and why? As a starting point, we limited our explorations to areas of the world (rather than areas of health care) and also to a few rather obvious possible causes. We suspected that countries with many reviews per million inhabitants might be those that: had a Cochrane Centre or a Branch; registered a Centre or a Branch early in the growth of The Cochrane Collaboration; had a Cochrane Review Group (CRG) or a satellite of a CRG; had a tradition for performing many randomized trials of healthcare interventions.

Methods: We used Issue 10 2010 of the *Cochrane Database of Systematic Reviews*, which had 6369 full reviews and protocols, collectively called reviews in the following. The contact addresses for these reviews covered a total of 75 countries, 28 of which hosted a registered Centre or Branch. We focused on 48 countries, which were the contact country for at least five reviews (see www.cochrane.dk/research/review production for the full data set).

Summary of main results: Twenty-six of these 48 countries had a Centre or Branch, and 22 had not. Countries with at least one review per million inhabitants were predominantly those that had a Centre or Branch, 20 of 26 versus six of 22 ($P = 0.0002$, Fisher's exact test) (see Table 1 where we also indicate if there is a CRG or a satellite of a CRG in the country). Sixteen countries had a CRG or satellite, and 15 of these countries are represented in Table 1. Thus, countries with at least one review per million inhabitants were predominantly those that had a CRG or a satellite, 15 of 16 versus 11 of 32 ($P = 0.0001$).

Since the existence of a Centre or Branch is closely related to the existence of a CRG or satellite, it is not possible to separate the effects of these two possible causal factors on review production. There are also notable exceptions to the general picture. For example, although there is no Centre or Branch in Ireland, review production there is very high. This might be related to the fact that the UK Cochrane Centre is the reference centre in The Cochrane Collaboration for Ireland, receives funding from the Irish Health Research Board to provide training and support in Ireland, and conducts similar activities in both Northern Ireland and Ireland. Thus, the UK Cochrane Centre could be considered to be a UK and Ireland Cochrane Centre.

France and Russia are special cases of countries that used to have a Centre or Branch, but in which review production is relatively rare. The French Cochrane Centre was registered in 1996 and deregistered in 2002; the new Centre opened in 2010. The review production in France is currently 0.43 per million inhabitants. The Russian Branch of the Nordic Cochrane Centre was registered in 1999 and deregistered in 2007. The review production in Russia is 0.03 per million inhabitants. Only Turkey, Ethiopia, Indonesia, and Bangladesh are lower, with 0.01 per million inhabitants.

Figure 1 shows the relation between Cochrane review production and date of registration of the Centre or Branch in these countries.

There does not seem to be a temporal relation between review production and the age of the Centre or Branch. However, the number of observations is small, and Bahrain and New Zealand might be

Table 1. Reviews per million inhabitant and association with Cochrane entity.

Country	Reviews per million inhabitants	Centre or Branch	Cochrane Review Groups or satellites
UK	35.8	yes	25 CRGs 3 satellites
Australia	34.3	yes	5 CRGs 4 satellites
Bahrain	30.0	yes	
New Zealand	23.5	yes	1 CRG
Netherlands	18.4	yes	2 CRGs
Denmark	16.3	yes	3 CRGs
Ireland	15.5	no	1 CRG
Canada	15.1	yes	7 CRGs
Switzerland	10.6	yes	
Norway	8.0	yes	1 satellite
Finland	6.0	yes	1 CRG
Israel	4.6	no	
Singapore	4.6	yes	
Italy	3.1	yes	2 CRGs
Austria	2.3	no	
South Africa	2.2	yes	1 satellite
Portugal	1.9	no	1 CRG
Germany	1.8	yes	2 CRGs
Belgium	1.6	yes	
Spain	1.6	yes	1 CRG
USA	1.5	yes	2 CRGs 2 satellites
Uruguay	1.4	no	
Chile	1.1	yes	
Costa Rica	1.1	no	
Hong Kong	1.1	yes	
Thailand	1.1	yes	

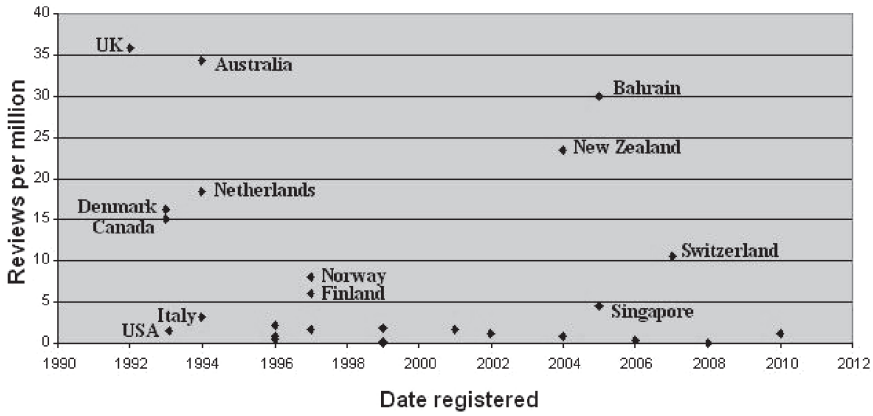

Figure 1. Cochrane reviews or protocols for countries with a centre or branch.

exceptions (see below), in which case there would be a relation with older Centres and Branches being associated with higher production.

Bahrain is the contact address for 24 reviews in a population of only 800,000 people. The reason that this might be an exception is that the Director of the Bahrain Branch, Zbys Fedorowicz, has devoted much effort to Cochrane activities, including the mentorship of colleagues in Bahrain and elsewhere, and is the contact person for all these 24 reviews. Furthermore, these reviews tend to be smaller than the typical Cochrane review, with narrowly focused questions, and contain between zero and six trials (median two trials).

People in New Zealand have been active in The Cochrane Collaboration since its early years, which is not reflected in the current status of Cochrane infrastructure in that country, with only one CRG and a relatively recently established Branch. At one stage, there were three CRGs in New Zealand: Musculoskeletal Injuries Group (now Bone, Joint and Muscle Trauma Group) for seven years from 1998; the Depression, Anxiety and Neurosis Group for six years from 1996; and the sole remaining CRG, Menstrual Disorders and Subfertility Group, which was registered in 1996. There has also been a very active cluster of editors and authors from the Incontinence Group in Dunedin. This activity may have created a critical mass of interest in the work of The Cochrane Collaboration in New Zealand. For example, for several years before the opening of its Branch of the Australasian Cochrane Centre, the government funded a Cochrane Fellow, sitting with the Cochrane Menstrual Disorders Group and working with the Australasian Cochrane Centre to co-ordinate activities, in particular training for review authors in the country. There has also long been a culture of evidence use in New Zealand, with a leading Guideline Group and review activity. For comparison, Denmark has a similar sized population (5.5 million versus 4.3 million in New Zealand), has three CRGs (registered between 1996 and 2000, which are all still in the country) a Centre (registered in 1993) and has a similar number of reviews per million inhabitants: 16.3 compared to 23.5 for New Zealand.

Review production is also large in the UK and Australia, about double the number of reviews per million inhabitants compared to The Netherlands, Denmark and Canada. These are followed by Switzerland, Norway, Finland, Singapore and Italy. One of the reasons for the productivity in Switzerland might be the clusters of clinical research at the universities of Basel, Bern, Genève and Zürich, and the fact that the World Health Organization (WHO) is based in Geneva. It includes several people with strong track records in systematic reviews who promote evidence-based healthcare activities and are involved in the production of The WHO Reproductive Health Library, which is based on Cochrane reviews. In contrast to Denmark (16.3 reviews per million inhabitants), Norway (8.0 reviews per million), and Finland (6.0 reviews per million), review production is much rarer in Sweden (0.97 reviews per million). This is likely to be related to the strong tradition Sweden has for health technology assessment, which has involved many specialists in its work who see this as their primary task, rather than producing Cochrane reviews.

Review production is also relatively low in the USA, when considered alongside the size of its population (1.5 per million). The authors are not supported financially for their time working on reviews and US doctors have little time available outside that which is compensated, but this is unlikely to be a major reason, because this is also the case in the UK and in other countries. A more likely reason might be that many US clinicians do not realize that a support system is in place to help them work on Cochrane reviews.[1] For example, the US satellite of the Cochrane Eyes and Vision Group has successfully recruited US authors, who have provided feedback that they value the methodological assistance they received from the satellite. A second reason may be somewhat self-perpetuating in that when potential contributors to the work of The Cochrane Collaboration who are based in the US look at the list of authors or editors for most CRGs, they see disproportionately few, or no US-based members, and may conclude that the Cochrane effort has little US input or leadership. One solution to this might be to encourage more prominent US clinicians to join the editorial boards of the 52 CRGs. A third reason could be the US tradition for creating its own structures, even when international organizations already exist, for example, most recently the Evidence-based Practice Centers. A fourth reason could be that the number of Cochrane entities is very small compared to the population size.

Figure 2 shows the relation between the production of Cochrane reviews in a country and the production of randomized trials in that country (as defined by the publication type Randomized Controlled Trial in PubMed and the correspondence address for these articles). Contrary to what we expected, there appears to be no relationship between a high output of trials and a high output of Cochrane reviews. If anything, there might be an inverse relationship, with very high outputs for trials in the Nordic countries (including Sweden) that are not matched by as high an output of Cochrane reviews.

Conclusions: When we set out on this exploration, we wondered if there is anything we can learn that might help The Cochrane Collaboration to produce reviews in more efficient ways in the future. At the moment, we remain uncertain about ways to achieve this, based on the current analyses, and we will continue to investigate this and conduct more analyses. We invite comments for a fuller article, in which we would explore this issue, and additional ones.

It is not easy to draw reliable conclusions about review production based on observational data when, in addition, the most obvious predictive factors are correlated. One might ask, for example, whether Centres and Branches were established in countries where there was already a high output of healthcare research or systematic reviews, and a tradition for evidence-based health care? Or whether one or more pioneers encouraged the production of systematic reviews that would not otherwise have happened, proved instrumental in establishing a Cochrane Centre, Branch or Review Group, and promoted evidence-based health care and research more generally?

As we worked on this study, we realized that it might be helpful to compare review production with the spread of an infectious disease. The enthusiasm for working on a Cochrane review can be infectious, but the infected contacts are likely to be less contagious than the original case, and second-order contacts even less so. This would lead to higher disease prevalence in small populations than in large ones, as one or a few seed cases would have a proportionately greater effect in small populations than in large populations when considering the number of Cochrane reviews per million inhabitants. This mechanism seems plausible, and it would be expected to result in higher values for review production in small countries. The data in the table agree reasonably well with this hypothesis. The UK is an exception but this can be explained. This is where The Cochrane Collaboration started and where in particular Iain Chalmers proved to be a particularly strong initial seed infecting many people with the 'Cochrane virus.' In addition, there are 25 CRGs and 3 satellites in the UK.

As just indicated, clustering effects are an important issue, with these appearing around Centres and Branches, and around CRGs. Claire Allen and Kiley Richmond from The Cochrane Collaboration Secretariat have recently investigated this for CRGs and found national clustering of authors around the editorial base. For example, when they considered all authors of Cochrane reviews (not just the contact authors) at the beginning of 2010,[2] 4.8% of those linked to the three CRGs in Denmark are based in Denmark, while Danish authors make up only 0.7% of the authors linked to the 23 CRGs in the UK. Similarly, 19.6% of the authors contributing to reviews published by the Danish CRGs are based in the UK, while 35.7% of the authors contributing to reviews published by the UK CRGs are based in the UK.

One explanation for this clustering is that, for some CRGs, the co-ordinating editor or other members of staff of the editorial base are co-authors on a large number of the reviews produced by their group. For example, Christian Gluud, Co-ordinating Editor of the Cochrane Hepato-Biliary Group, which is based in Denmark, has co-authored 64 of his group's 222 reviews (as of January 2011), and Peter Tugwell, Co-ordinating Editor of the Cochrane Musculoskeletal Group, which is based in Canada, has co-authored 49 of his group's 227 reviews. This would have more effect on the Allen and Richmond type of analyses than on the work we have done, since our work is based on the location of the contact author only. It is much more likely that someone from the CRG's editorial base will be a co-author, rather than the contact author, given that being contact

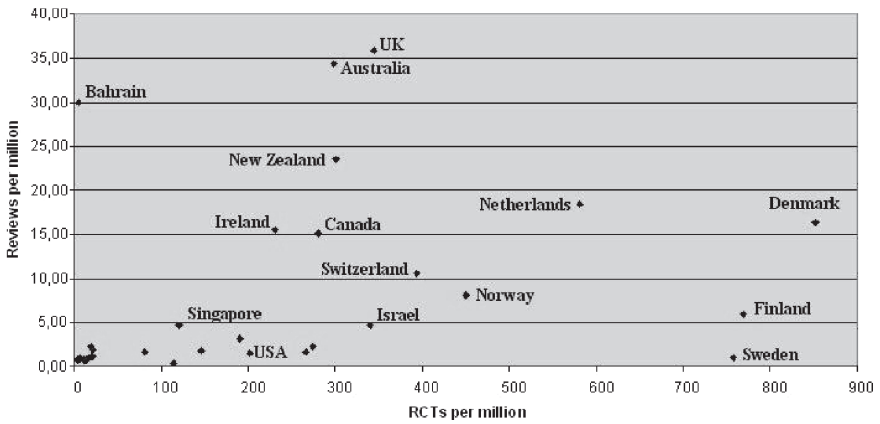

Figure 2. Cochrane reviews or protocols related to production of randomised trials.

author is usually far more labour-intensive and time-consuming, not least because of the expectation that reviews are regularly updated.

It seems reasonable to conclude that the existence of Cochrane entities in a country plays a major role for review productivity. We also note that our choice of denominator – million inhabitants – has limitations. It does not distinguish between large and small countries, does not take Gross National Product, language problems or number of clinicians into account. Furthermore, there have been instances of funding for a considerable number of reviews in some countries, and we have not taken into account the degree to which the same authors co-author many reviews. Finally, we have not looked at the intensity of training review authors.

We plan to continue our work on this project, and some of the issues we should like to address in the future are: whether someone in a Centre, Branch, or CRG is directly responsible for the productivity in their country because they are the contact author for multiple reviews; whether a Centre, Branch or CRG influences the productivity for their country because of the support they provide to authors locally; whether the patterns we have seen for the contact authors, are different for other authors; whether the location of the editors of a CRG influences its output, and the productivity of the country in which the editor is based.

Acknowledgments: We thank Kay Dickersin, Sally Green, Mark Jeffery, Cindy Farquhar, Alvaro Atallah, Alessandro Liberati, Iain Chalmers, and Zbys Fedorowicz for their comments and insight as we have explored these issues. We should welcome comments from others on our interpretation and plans for future analyses.

References

1. Dickersin K. Health-care policy. To reform U.S. health care, start with systematic reviews. *Science* 2010; 329(5991): 516–7.

2. Allen C, Richmond K. The Cochrane Collaboration: International activity within Cochrane Review Groups in the first decade of the twenty-first century. *Journal of Evidence Based Medicine* 2011; 4(1): 2–7.

Risk of Bias tool evaluation: summary results from focus groups and online surveys

Jelena Savovic, Laura Weeks, Julian Higgins, Doug Altman, Lucy Turner, David Moher and Jonathan Sterne

Correspondence to:
j.savovic@bristol.ac.uk
School of Social and Community Medicine, University of Bristol, UK.

Objective: To obtain feedback from a range of stakeholders within The Cochrane Collaboration regarding their experiences with and perceptions of the Risk of Bias (RoB) tool and associated guidance materials.

Methods: We used qualitative and quantitative methods to evaluate the RoB tool. We held four focus groups with 25 international participants, using a semi-structured format with a list of pre-specified topics. The focus groups were fully transcribed and analysed, and their results informed the development of questionnaires for online surveys. We conducted two surveys, one for review authors, and one for managing editors and other Cochrane Review Group staff. We enquired about experience and perceptions of the RoB tool, bias domain-specific issues, incorporation of risk of bias assessments in meta-analyses, and training requirements. Authors who had not previously used the RoB tool were only asked about training requirements and the reasons for not using the tool. The surveys were distributed through established Cochrane mailing lists and administered online between 1 and 22 February 2010.

Summary of main results: We received 190 responses from review authors who had used the RoB tool and 132 from authors who had not. Of the 58 Cochrane Review Group staff who responded, 19 were Managing Editors, 11 Co-ordinating Editors, 11 Editors, and 17 other Cochrane Review Group staff. Authors take on average 10 to 60 minutes per study to complete risk of bias assessments, and 83% deemed this acceptable. Over half of respondents have used the RoB tool to update an existing review, and 93% of them stated they assessed risk of bias for both existing and newly included studies. The majority of authors (84%) complete the recommended 'Risk of bias' table in RevMan, while 36% also include at least one 'Risk of bias' figure or table. Over 72% of respondents stated they often or always included quotes from the study report to support their judgment, and the majority thought that this feature adds transparency and increases confidence in risk of bias assessments. Authors reported some difficulties in completing each bias domain, but the domains thought to be most difficult were 'Incomplete outcome data' and 'Selective outcome reporting'. Nevertheless, over 90% of respondents felt 'somewhat' to 'very confident' in their risk of bias assessments.

The survey showed that authors needed clearer guidance on what to do with risk of bias assessments once completed: fourteen per cent did not incorporate their risk of bias assessments into review conclusions at all, 55% include a narrative summary, 40% conduct a sensitivity analysis based on risk of bias assessments, and 11% restrict the primary analysis to studies of low risk (authors could tick all options that applied).

Almost a third of responders used a modified version of the RoB tool to assess randomized trials. Modifications included the addition of new domains, modified criteria for Yes/Unclear/No judgements, or removal of some domains (blinding, when not feasible, for example). Modifications were usually based on their own expertise, or following guidelines from their Cochrane Review Group. A fifth of authors told us they used the RoB tool to assess