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ORIGINAL ARTICLE

A structured approach to information retrieval improved identification of funding and researchers' conflicts of interest in trials included in Cochrane reviews

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Abstract

Objectives: To compare the contemporary Cochrane review approach for retrieving information on trial funding and researchers' conflicts of interest with a structured approach for information retrieval.

Study Design and Setting: Methodological study of 100 Cochrane reviews from August to December 2020 and one randomly selected trial from each review. Reporting of trial funding and researchers' conflicts of interest in reviews was compared with information identified using a structured retrieval process, and time to retrieve information was noted. We also formulated a guide to systematic reviewers for efficient information retrieval.

Results: Sixty-eight of 100 Cochrane reviews reported trial funding and 24 reported trial researchers' conflicts of interest. A simple structured approach, searching only trial publications (including conflicts of interest disclosure forms), identified funding for 16 additional trials and conflicts of interest information for 39 additional trials. A comprehensive structured approach, searching multiple information sources, identified funding for two additional trials and conflicts of interest for 14 additional trials. The median time to retrieve information was 10 minutes per trial (interquartile range: 7−15) for the simple approach and 20 minutes (11−43) for the comprehensive approach.

Conclusion: A structured information retrieval approach improves identification of funding and researchers' conflicts of interest in trials included in Cochrane reviews.

Keywords: Conflicts of interest; Funding; Cochrane review; Randomized trial; Systematic review; Methodological study

1. Introduction

Industry funding and researchers' conflicts of interest are frequent in randomized clinical trials and are generally considered a potential concern for users of trial results, including patients, clinicians, guideline developers, and health care funders [1−3]. Many journals require trial

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What is new?

Key findings

- A third of contemporary Cochrane reviews did not report trial funding and three-quarters did not report trial researchers' conflicts of interest.
- Searching the main trial publication and conflicts of interest disclosure forms using a simple structured information retrieval approach substantially improved identification of trial funding and conflicts of interest information. A comprehensive approach including multiple additional information sources, such as trial protocols, marginally improved information retrieval over the simple approach.
- The comprehensive retrieval approach took approximately twice as long time to complete as the simple approach (20 minutes compared to 10 minutes).

What this adds to what was known?

- Our findings highlight that trial funding and researchers' conflicts of interest are inadequately reported in Cochrane reviews and how a structured information retrieval approach may improve this.

What is the implication and what should change now?

- We suggest that systematic reviewers start by reading the main trial publication and associated disclosure forms when retrieving trial funding and trial researchers' conflicts of interest. If information is missing from these sources reviewers should consider undertaking a more comprehensive search using other sources. However, reviewers should also consider time constraints when deciding what sources to search.

authors to declare funding and conflicts of interest, providing a framework for a balanced interpretation of trial results.

In the context of systematic reviews, Cochrane requires reviewers to report the funding of any included trial as well as trial researchers' conflicts of interest [4]. However, Turner et al. [5] found that only 65% of Cochrane reviews from 2018 reported trial funding and merely 22% reported trial researchers' conflicts of interest. In other types of systematic reviews, reporting was worse, with 10% of reviews reporting funding and 1% reporting conflicts of interest, although the quality of reporting differed across journals [5].

Systematic reviews often include older trials that lack information on funding and researchers' conflicts of interest [6]. While contemporary trial publications more often contain relevant information [1,2], reviewers may sometimes need to retrieve the information elsewhere, for example from trial protocols and public conflicts of interest databases like the US Open Payments Database [7]. Little is known, however, about the usefulness and effort required for such a strategy.

We therefore compared the approach used in contemporary Cochrane reviews for retrieving and reporting funding of included trials and trial researchers' conflicts of interest with a structured information retrieval approach, and assessed the time effort required for such an approach. We also explored the association between trial characteristics and the availability of information on funding and researchers' conflicts of interest in the main trial publication and provide a practical guide to reviewers on efficient and structured information retrieval.

2. Methods

We conducted a methodological study on a sample of contemporary Cochrane reviews and trials included in the reviews (study protocol in Appendix 1).

2.1. Eligibility criteria and inclusion

On December 14th, 2020, using the Cochrane Library one author (EF) included the 100 most recently published Cochrane reviews from the Cochrane Database of Systematic Reviews. From each review we then selected one meta-analysis of the primary outcome based on a decision hierarchy (Appendix 2) thereby including 100 unique meta-analyses.

Using a random number generator, we then included one trial from each of the 100 included meta-analyses (Appendix 3). For each trial we retrieved the main trial publication (i.e., primary reference in Cochrane review) and any supplementary documents including separate conflicts of interest disclosure forms (e.g., ICMJE disclosure form [8]).

2.2. Terminology

For pragmatic reasons we focused solely on the conflicts of interest of *primary trial researchers*, defined as any academically employed first, second, last and corresponding author of the main trial publication and any trial statisticians employed by an academic institution (e.g., university, hospital, or other public institution). For the identified funding and conflicts of interest, we assessed their relevance to each trial (i.e., whether identified parties had an interest in the direction of any trial outcome included in the Cochrane review syntheses).

By *Cochrane approach* for retrieving funding and conflicts of interest information, we implied the typical approach used in contemporary Cochrane reviews (reflecting the average spectrum of practices). By *structured approach* we implied either a systematic search for relevant information in the main trial publication and associated conflicts of interest disclosure forms (i.e., *simple approach*), or a systematic search including multiple additional information sources (i.e., *comprehensive approach*).

We made a distinction between funders and sponsors of the included studies. By funders we meant any organization, industry or nonindustry, providing financial or nonfinancial support, whereas sponsors were defined as organizations responsible for the initiation and management of the trial alltogether (additional information on terminology in Appendix 4).

2.3. Data extraction and information retrieval

From each Cochrane review, we extracted review characteristics, meta-analysis characteristics and the reviews' characteristics of the included trials as well as any information on trial funding and researchers' conflicts of interest. Using a pilot tested data sheet, one author (EF) extracted data which was verified by another author (AT). In case of disagreements, a third author (AL) acted as arbiter. From each trial publication we also extracted trial characteristics and information on funding and primary trial researchers' conflicts of interest (complete list of data in Appendix 5).

For trials where information in trial publications or conflicts of interest disclosure forms was unavailable or was unclear (e.g., information on funding available but not conflicts of interest), one author (EF) searched other sources relevant to the specific information. These additional sources were trial protocols, public conflicts of interest databases, trial registry data, secondary publications to the main trial publication and other publications by the same primary trial researchers, as well as publicly available company data (Appendix 6). We also emailed the corresponding authors of trials published within the last decade (and sent reminders after 4 weeks). Lastly, we noted which sources contained the relevant information and any inconsistencies between sources (e.g., trial publication listing a single funder vs. protocol listing two funders).

2.4. Information retrieval time

For each trial we measured the time taken to retrieve information on funding, researchers' conflicts of interests and involvement of funders and researchers with relevant conflicts of interest (disregarding time to contact corresponding trial authors). We stopped measuring the time after the first 30 trials as the author had gained sufficient experience with searching all the different information sources with the 'learning curve' leveling out.

2.5. Analysis

We summarized characteristics of the included Cochrane reviews and trials. We determined the number and proportion of trials with available funding and conflicts of interest information (including involvement of trial funders and researchers with relevant conflicts) using i) the Cochrane approach (i.e., information available in Cochrane reviews), ii) the simple approach (only searching trial publications and disclosure forms), and iii) the comprehensive approach (searching multiple additional information sources).

We calculated the median time used to retrieve information on trial funding and researchers' conflicts of interest using the simple approach and the comprehensive approach. This calculation included the first 30 trials in the simple approach sample and the remainder of the 30 still missing relevant information for the comprehensive approach (i.e., 27 trials).

Finally, using logistic regression, we estimated the association between trial characteristics and availability of funding and primary trial researchers' conflicts of interest information in the main trial publication. Our analysis was prespecified in our protocol and we report the results of the unadjusted and adjusted (multivariate) analyses. Our choice of predictors (i.e., trial characteristics) was decided prior to analysis and all predictors were included in the multivariate model. We included type of intervention, publication year (up to 2010 or after [9,10]), sample size and journal impact factor as predictors. The analysis was done using the logistic regression model for binary outcomes in STATA 17.

2.6. Guide for retrieving information on trial funding and conflicts of interest

One author (EF) developed a list of key learning points from the information retrieval process. Through an iterative process of ongoing discussions and revisions among us, the points were condensed to a final guide. In the process, we emphasized practical advice, incorporating the publication year of a trial and the type of information searched for.

3. Results

We screened 155 Cochrane reviews from August to December 2020 and included 100 reviews and one trial from each review (Fig. 1).

3.1. Cochrane review and trial characteristics

The median number of trials included in the primary meta-analysis was four (interquartile range (IQR): 2−8) (Table 1). Ninety-six of the 100 selected trials were published in journals and four were only available as conference abstracts. The median trial publication year was

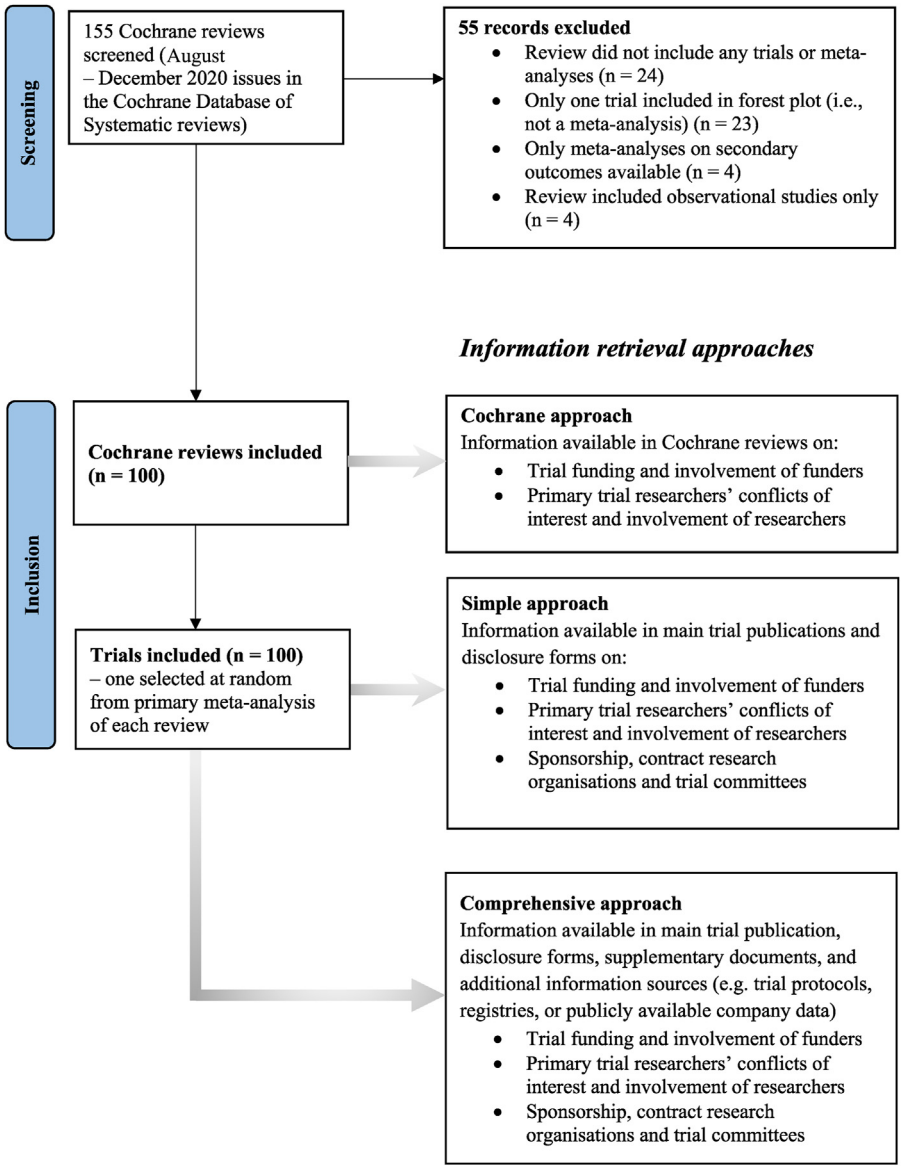

Fig. 1. Flowchart of inclusion process of Cochrane reviews and trials and the three approaches for retrieving trial funding and researchers' conflicts of interest information.

2011 (IQR: 2005−2016) and the median sample size was 122 (IQR: 50−317).

Of the 100 Cochrane reviews examined, 68 reported trial funding, 16 stated that trial funding could not be retrieved and the remaining 16 did not include a trial funding category (Table 2). Seven Cochrane reviews reported the funder's involvement in a trial (beyond providing funding).

Twenty-four Cochrane reviews reported trial researchers' conflicts of interest, 16 stated that trial researchers' conflicts of interest could not be retrieved and the remaining 60 reviews did not include a conflicts of interest category (Table 2). Of the 24 reviews reporting researchers' conflicts of interest, 11 reported that one or more researchers had conflicts of interest. In five of these 11 reviews, the types of conflicts of interest or the number of researchers with conflicts of interest were not specified. No Cochrane review reported how trial researchers with conflicts of interest were involved in the trial.

3.2. Structured information retrieval approaches: funding

Using the simple approach, searching only the main trial publication and associated disclosure forms, we retrieved funding for 16 additional trials, to a total of 84 trials (Table 2 and Fig. 2). Twenty-two out of 25 (88%) trials published in the most recent quarter of the sample (2016−2020) had funding information available in trial publications (Fig. 3).

Table 1. Characteristics of included Cochrane reviews and trial publications

Category	Median (IQR)
Cochrane reviews (N = 100)	
Number of trials included in primary meta-analysis	4 (2–8)
Trial publications (N = 100)	
Journal impact factor[a]	5.9 (3.8–21.9)
Publication year	2011 (2005–2016)
Trial sample size	122 (50–317)

Category	*n*
Cochrane reviews (N = 100)	
Subject area[b]	
Abdomen and endocrine	11
Acute and emergency care	4
Cancer	6
Children and families	20
Circulation and breathing	21
Mental health and neuroscience	15
Musculoskeletal, oral, skin and sensory	14
Public health and health systems	9
Type of primary meta-analysis outcome[c]	
Clinically important	67
Surrogate	33
Trial publications (N = 100)	
Publication format	
Journal publication	96
Conference abstract	4
Type of trial interventions	
Drug	47
Device	11
Nutrition and supplements	12
Behavior and education	9
Exercise and rehabilitation	5
Mixed[d]	6
Other[e]	10
Sponsor[f]	
Industry	19
Nonindustry organization	9
Individual investigator	2
Not reported	70
Trial committee involved[g]	32
Commercial contract research organization involved[h]	21

Abbreviation: IQR, interquartile range.

[a] Based on Journal Citation Reports [11] for 2020 for 91 trial publications (five trials were published in journals not indexed in the 2020 Journal Citation Reports and four trials were published as conference abstracts).

[b] Based on Cochrane's previous eight Review Networks that were closed down in 2021 [12].

[c] Clinically important outcomes refer to outcomes with direct relevance to patients (e.g., mortality) and surrogate outcomes refer to other outcomes of indirect relevance (e.g., blood pressure as a measure for stroke risk).

[d] Two or more types of interventions (e.g., drug therapy and psychotherapy).

[e] For example, acupuncture or general surgery.

[f] A sponsor is an individual, company, institution or organization with the responsibility for the initiation and management of a trial.

[g] A trial committee is typically an independent committee involved in trial conduct, for example, a data or monitoring board or a steering committee data safety and monitoring board or a steering committee.

[h] A commercial contract research organization is a commercial company, typically contracted by an industry funder to undertake different aspects of a trial such as data management or statistical analysis.

Table 2. Retrieval of funding and researchers' conflicts of interest in trials included in Cochrane reviews using different information approaches for information retrieval

Category	Cochrane approach (*n*)	Simple approach (trial publications and disclosure forms) (*n*)	Comprehensive approach (including other information sources[a]) (*n*)
Funding retrieved	68	84	86
Industry funding	28	30	30
Nonindustry funding	35	37	39
Mixed funding[b]	4	15	15
No external funding	1	2	2
Funding not retrieved	32[c]	16	14
Researchers' conflicts of interest retrieved	24	63	77
Primary trial researchers with conflicts of interest	11	33	33
Financial conflicts of interest	10	31	31
Financial and nonfinancial conflicts of interest	1	2	2
Primary trial researchers without conflicts of interest	13	30	44
Researchers' conflicts of interest not retrieved	76[d]	37	23

[a] Trial protocols and registries, secondary and other trial publications, information from a clinical study report and publicly available company data, and e-mail exchange with corresponding trial authors.
[b] Mixed funding refers to the same trial having received both industry and nonindustry funding.
[c] Sixteen Cochrane reviews stated explicitly that funding was not retrievable from the trial publication whereas 16 other Cochrane reviews did not include a trial funding category in the table of study characteristics.
[d] Sixteen Cochrane reviews stated explicitly that primary trial researchers' conflicts of interest were not retrievable from the trial publication, whereas 60 other Cochrane reviews did not include a conflicts of interest category in the table of study characteristics.

Using the comprehensive approach, searching multiple additional information sources, we retrieved funding for two additional trials (from a trial registry and a trial protocol) to a total of 86 trials. We found one instance of discrepant funding information between the trial report and the corresponding Cochrane review (Appendix 7). No discrepancies were found between information retrieved from trial publications and other sources.

Of the 84 trials with information on funding retrieved from trial publications, we assessed 41 (49%) trials to have funders with relevant conflicts of interest (Table 3). According to the 41 trial publications, the funders were involved in 24 (59%) trials, not involved in 5 (12%) trials, and involvement was not available in 12 (29%) trials. For those 12 trials, we retrieved information on funder involvement from other sources in six cases (Fig. 4). The sources were email

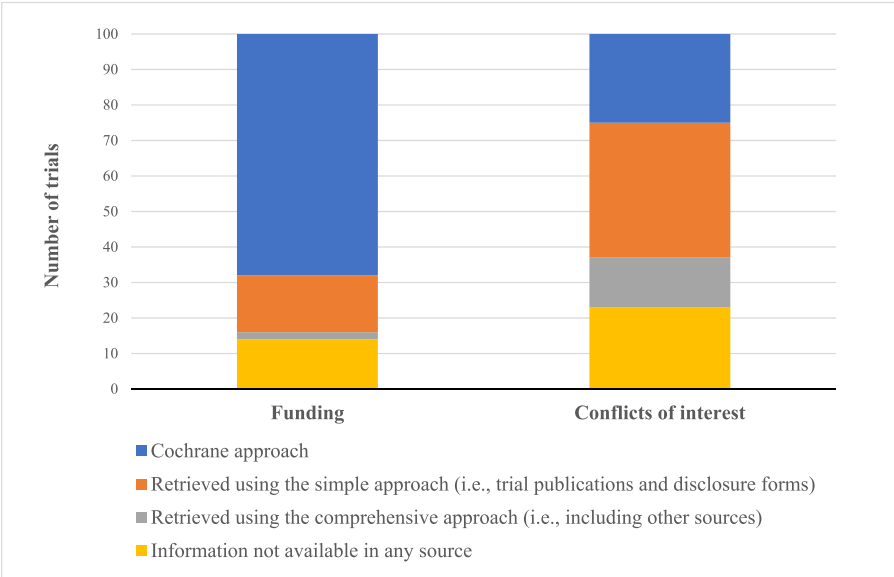

Fig. 2. Availability of information on funding and primary trial researchers' conflicts of interest stratified by type of information retrieval approaches. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

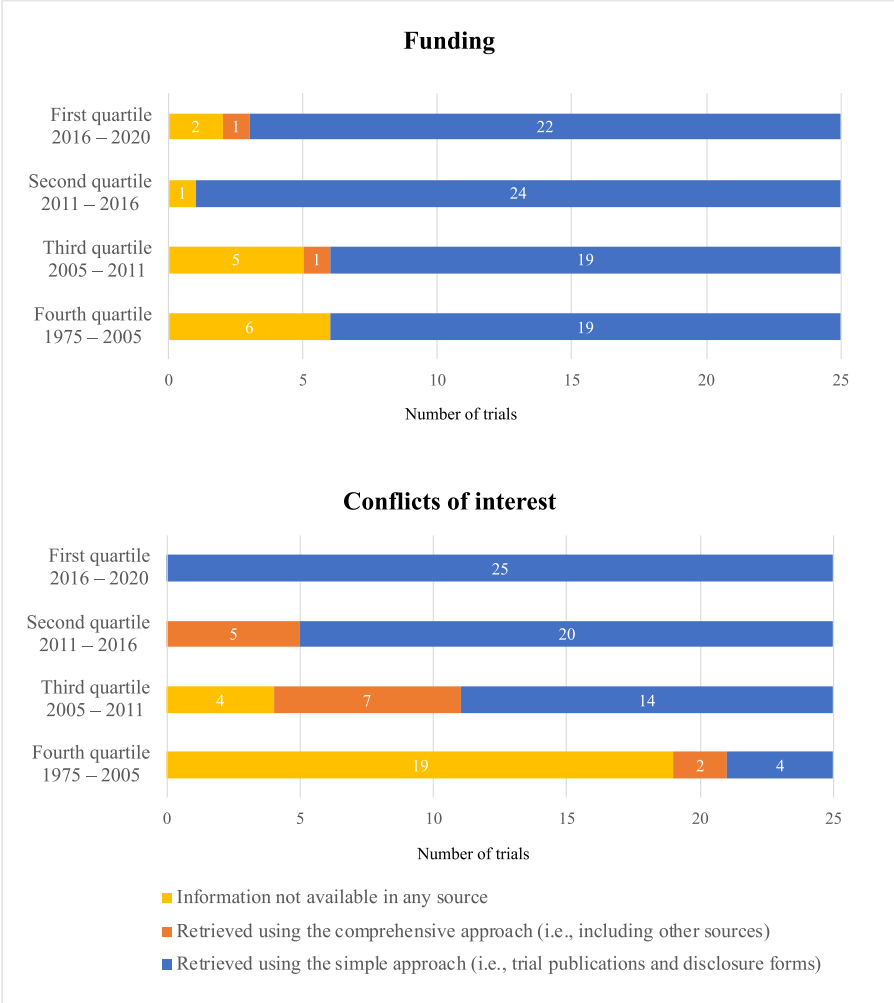

Fig. 3. Retrieval of funding and primary trial researchers' conflicts of interest by trial publication year. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

exchange with corresponding authors ($n = 2$), publicly available company data ($n = 1$), trial protocol ($n = 1$), secondary publication ($n = 1$), and trial registry ($n = 1$).

3.3. Structured information retrieval approaches: primary trial researchers' conflicts of interest

Using the simple approach, searching only the main trial publication and associated disclosure forms, we retrieved conflicts of interest information for 39 additional trials (Table 2), to a total of 63 trials. All trials published in the most recent quarter of the trial sample (2016–2020) had conflicts of interest information available in trial publications (Fig. 3).

Using the comprehensive approach, searching multiple additional information sources, we retrieved primary trial researchers' conflicts of interest for 14 additional trials (13 from other publications by the researchers and one from a secondary trial publication, Table 2, Figs. 2 and 4) to a total of 77 trials. For trials with information reported in both Cochrane reviews and trial publications, we found discrepancies in conflicts of interest information in one case (Appendix 7). No discrepancies were found between information retrieved from trial publications and other sources. Of the 63 trials with conflicts of interest information retrieved from trial publications, we assessed 30 (48%) trials as having primary trial researchers with relevant conflicts of interest (Table 3). According to the 30 trial publications, researchers with relevant conflicts of interest were involved in 19 (63%) trials and involvement was not reported in the remaining 11 (37%) trials. For those 11 trials, we retrieved information on involvement by searching other sources in six cases: email exchange with corresponding authors ($n = 3$), trial protocols ($n = 2$) and other publications by primary trial researchers ($n = 1$).

3.4. Time to retrieve information from trial publications and for searching other sources

The simple approach took a median of 10 minutes (IQR: 7–15). The comprehensive approach took a median of 20 minutes (IQR: 11–43) (Appendix 7). The longest time required to retrieve information for a trial was 27 minutes

Table 3. Information on involvement of funders and primary trial researchers with relevant conflicts of interest in trials included in Cochrane reviews using different approaches for information retrieval

Funders with relevant conflicts of interest ($N = 41$[a])	Simple approach (trial publications and disclosure forms) (n)	Comprehensive approach (including other information sources[b]) (n)
Overall trial level		
Involvement	24	29
No involvement	5	6
Involvement not retrieved	12	6
Trial design		
Involvement	15	19
No involvement	6	7
Involvement not retrieved	20	15
Trial conduct		
Involvement	16	21
No involvement	5	6
Involvement not retrieved	20	14
Trial analysis or reporting		
Involvement	21	23
No involvement	4	5
Involvement not retrieved	16	13
Primary trial researchers with relevant conflicts of interest ($N = 30$[c])		
Overall trial level		
Involvement	19	25
No involvement	0	0
Involvement not retrieved	11	5
Trial design		
Involvement	17	22
No involvement	1	2
Involvement not retrieved	12	6
Trial conduct		
Involvement	18	23
No involvement	0	1
Involvement not retrieved	12	6
Trial analysis or reporting		
Involvement	19	25
No involvement	0	0
Involvement not retrieved	11	5

[a] Forty-one out of the 84 trial publications that reported funding had on or more funders with relevant conflicts of interest. Of these 41 trials, 28 had industry funding and 13 had mixed funding (i.e., both industry and nonindustry funding).
[b] Trial protocols and registries, secondary and other trial publications, information from a clinical study report and publicly available company data, and e-mail exchange with corresponding trial authors.
[c] In 30 out of the 33 trial publications that reported primary trial researchers' conflicts of interest, we judged the conflicts of interest to be relevant (i.e., related to a party with an interest in the direction of any trial outcome included in the Cochrane review syntheses). Three trial publications listed researchers with conflicts of interest that were deemed to be irrelevant.

for the simple approach and 87 minutes for the comprehensive approach.

3.5. Association between trial characteristics and availability of information on funding and primary trial researchers' conflicts of interest in trial publications

In our univariate analysis we found a statistically significant association between large trial sample size and high journal impact factor, and the availability of funding information in trial publications (Table 4). There was also a statistically significant association between recent publication (after 2010), large trial sample size and high journal impact factor, and availability of primary trial researchers' conflicts of interest in trial publications (Table 4).

However, in our multivariate analysis we found no statistically significant association between any of the included trial characteristics and availability of funding

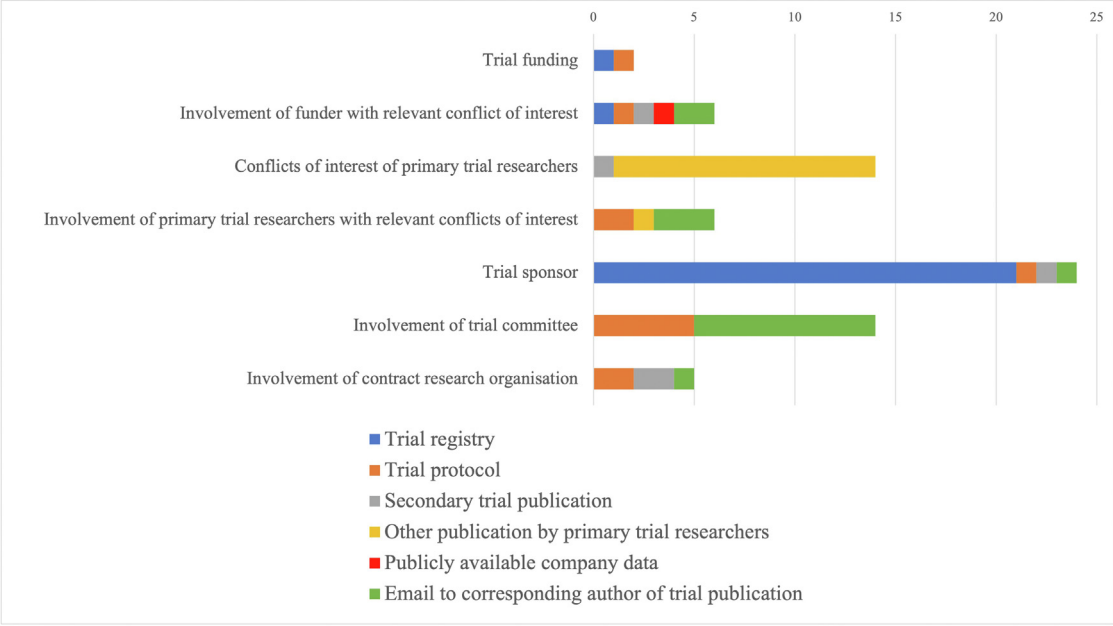

Fig. 4. Retrieval of funding, primary trial researchers' conflicts of interest and other information stratified by types of information sources used. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

information in trial publications. We did however find a statistically significant association between all trial characteristics (i.e., type of trial (drug and device), recent publication (after 2010), large trial sample size and high journal impact factor) and availability of conflicts of interest information in trial publications.

3.6. Guide for retrieving information on trial funding and trial researchers' conflicts of interest

The guide to systematic reviewers was based on a three-step structured approach to information retrieval: a simple approach, a near-comprehensive approach and a comprehensive approach (Table 5).

4. Discussion

In a sample of 100 Cochrane reviews published in 2020 (reflecting the Cochrane approach to information retrieval) trial funding was reported in 68 reviews and trial researchers' conflicts of interest in 24 reviews. Using a simple approach, searching only the main trial publication and associated disclosure forms, increased retrieval of funding and conflicts of interest information to a total of 84 and

Table 4. Factors associated with availability of information on funding and primary trial researchers' conflicts of interest in publications of trials included in Cochrane reviews

Category	*n*	Unadjusted OR (95% CI)	*n*	Adjusted OR[a] (95% CI)
Availability of funding information				
Trial characteristics				
Publication year after 2010 vs. 2010 and before	100	2.66 (0.85–8.34)	91	3.58 (0.80–16.11)
Drug or device vs. other types of interventions	100	0.88 (0.29–2.66)	91	1.25 (0.30–5.16)
Trial sample size median or above vs. under median	100	9.33 (1.99–43.68)	91	4.43 (0.83–23.79)
Impact factor median or above vs. under median	91[b]	5.23 (1.06–25.75)	91	3.41 (0.63–18.41)
Availability of primary trial researchers' conflicts of interest				
Trial characteristics				
Publication year after 2010 vs. 2010 and before	100	12.92 (4.61–36.22)	91	113.72 (13.11–986.34)
Drug or device vs. other types of interventions	100	1.77 (0.77–4.04)	91	8.29 (1.59–43.24)
Trial sample size median or above vs. under median	100	5.80 (2.33–14.44)	91	10.62 (2.30–49.00)
Impact factor median or above vs. under median	91[b]	1.90 (1.58–10.15)	91	5.90 (1.31–26.46)

Abbreviations: OR, odds ratio CI, confidence interval.

[a] Multivariate logistic regression. Full adjusted model includes all four listed covariates.

[b] We were not able to retrieve impact factor information for nine trials (five trials were published in journals not indexed in the 2020 Journal Citation Reports [11] and four trials were published as conference abstracts).

Table 5. A three-step guide for systematic reviewers on retrieving information on trial funding and primary trial researchers' conflicts of interest

Type of approach	Information sources	Guidance
Step 1: simple approach	Trial publications and conflicts of interest disclosure forms	Funding and conflicts of interest declarations are often reported in separate sections at the end of, or the beginning of, a trial publication. Look here first before reading the entire publication. Indirect funding such as free provision of a trial intervention by a commercial company is often described in the methods section. Involvement of company employees, either as authors or described in the acknowledgments, indicates funding by the company. Some journals (e.g., New England Journal of Medicine) do not report conflicts of interest in the trial publication but publish separate conflicts of interest disclosure forms that are often attached as supplementary material (i.e., typically the ICMJE disclosure form [10]). Look for such forms if there are no disclosures in the trial publication. If information on funding or conflicts of interest cannot be retrieved using the simple approach, consider proceeding to the near-comprehensive approach. However, if a trial is published before 1990, we recommend not proceeding as it is unlikely that the information is available using additional sources.
Step 2: near-comprehensive approach	Simple approach plus documents referred to in the main trial publication (e.g., a protocol, trial registry information, or secondary trial publications[a]), other publications by primary trial researchers, and e-mail exchange with corresponding author	Check if the trial publication includes supplementary materials such a *trial protocol*, a link to a *trial registry identifier* or if a published protocol or *secondary trial publication*[a] are cited. It is often easy to access such documents that are referred to in a time efficient manner. If the strategy above does not identify conflicts of interest information, consider searching *other publications* by the primary trial researchers on the same topic and published 3 years before or after the date of the main trial publication. *E-mail exchange* with the corresponding author of the main trial publication may identify relevant additional information. If information on funding or conflicts of interest cannot be retrieved using the near-comprehensive approach, proceed to the comprehensive approach. However, if a trial is published before 2000, we recommend not proceeding as it is unlikely that the information is available using additional sources.
Step 3: comprehensive approach	Near-comprehensive approach plus trial registries (when not referred to in the main trial publication), public disclosure databases, general web searches, publicly available company data, and regulatory data	If the trial publication does include a trial registry identifier, consider searching one or *more trial registries* (e.g., ClinicalTrials.gov). Trial registries often include information on sponsors, referring to the organization or individual responsible for initiating and conducting a trial. If a trial has a commercial company as sponsor, this indicates funding by the company. *Public conflicts of interest disclosure databases* (e.g., Open Payments) could be searched if other strategies for retrieving conflicts of interest information have failed (see Appendix 8 for list of databases). Most databases only have information relevant for trials published after 2010. *Clinical Study Reports* may contain relevant information and can be retrieved by searching drug and device *regulatory websites* and *company registries* (e.g., a publicly available Clinical Study Report from the European Medicines Agency's website).

[a] By secondary trial publication we mean a separate publication i.e. in some fashion based upon a main trial publication (e.g., a secondary analysis using the original dataset).

63 of reviews, respectively. A comprehensive approach, searching multiple additional information sources, only marginally increased retrieval of trial funding, but increases retrieval of trial researchers' conflicts of interest substantially. Median time used to retrieve information was 10 minutes per trial for the simple approach and 20 minutes for the comprehensive approach.

4.1. Strengths and challenges

This is the first study to describe how a structured approach for retrieving information on trial funding and researchers' conflicts of interest can be used by systematic reviewers. We emphasize the practical aspect of information retrieval for reviewers and provide data on the expected

gain and time needed for a chosen retrieval approach. We included contemporary Cochrane reviews, the study plan was detailed in our protocol, data extraction was done systematically by two authors, and the guide developed from this work is short and simple.

However, we only included one trial from each review as a pragmatic sampling strategy and we solely studied Cochrane reviews, and extrapolation of our results to other systematic reviews requires some caution. Still, it is likely that fewer other systematic reviews retrieve trial funding and researchers' conflicts of interest than Cochrane reviews [5], and adaptation and use of a simple structured retrieval approach may provide even greater benefit for other reviews than Cochrane reviews.

Our assessment of time for information retrieval must be interpreted as a first approximation as there was high variability between trials, mainly influenced by what information was available in the main trial publication. On the one hand, a typical reviewer will retrieve information from comparable trials and may have a steeper learning curve then we had. On the other hand, our approach implied a broad familiarization with the general practicalities of searching the different information sources. Our sample included relatively few datapoints on time to retrieve information from other sources, which made this estimate imprecise, and factors like trial publication year may have impacted the time spent on searching for additional information. The association between trial characteristics and availability of funding and conflicts of interest information should also be interpreted with some caution. We included four predictors in each of our two analyses thereby increasing the risk of spurious relationships (i.e., multiplicity), and the magnitude of our estimates is uncertain due to high degree of statistical imprecision (i.e., wide confidence intervals). Our findings therefore call for replication, preferably in larger datasets.

4.2. Other studies

Turner et al. [5] found that 65% of Cochrane reviews from 2018 reported trial funding and 22% trial researchers' conflicts of interest. In contrast, Roseman et al. [13] found that 30% of Cochrane reviews from 2010 reported trial funding and 11% conflicts of interest. Our study replicates and expands on their findings. While reporting of trial funding and conflicts of interest in Cochrane reviews seems to have improved since 2010 there is still room for improvement by applying a structured information retrieval approach.

Hakoum et al. [1] found that 89% of trial publications from 2015 (not necessarily included in a Cochrane review) reported trial funding, and 94% reported researchers' conflicts of interest. The corresponding proportions in trials included in our study were 84% and 63%. The discrepancy is likely a result of improvements in trial reporting over time as we included trials from 1975 to 2020 [14,15]. Key reasons for the improvement in reporting are likely the introduction of the CONSORT guidelines in 1996 and subsequent revisions in 2001 and 2010, and the introduction of ICMJE disclosure forms in 2009 [9,16−18].

4.3. Perspectives

Our results highlight that reporting of trial funding and conflicts of interest can be considerably improved in Cochrane reviews. In around half of reviews with missing information it can be quickly retrieved from the main trial publication and disclosure forms. While the Methodological Expectations of Cochrane Intervention Reviews require Cochrane reviewers to report funding and conflicts of interest in any trial included in the review [4] our results indicate that Cochrane reviewers and editors do not adhere to the requirement.

However, information remains unavailable for funding in approximately one in six trials and for conflicts of interest in approximately one in three trials when a simple approach is used. This seems mainly to apply to older trials (published before 2010, and especially before 2000). For some of these trials, the information can be retrieved, but it requires some degree of effort and our guide describes how to address the issue. Information in trial registries like ClinicalTrials.gov was first made public in 2000 [19] and the Open Payments' Database was first introduced in 2013 [20], thus information in sources other than main trial publications and disclosure forms are often unavailable for older trials, unless trial researchers are contacted and reply.

In a minority of recent trials, the information is unavailable in publications. Potential solutions are enforcement of reporting standards by biomedical journals [8,9] and public conflicts of interest databases [21], preferably a single easily searchable international platform. This would increase accessibility, accuracy and transparency of the reporting of conflicts of interest [22].

4.4. Implications

Cochrane reviewers and editors can improve the procedures involved in retrieving and reporting trial funding and researchers' conflicts of interest. Our guide provides a simple and easy to use approach that will enable reviewers to decide when they consider a simple approach to suffice and when to invest more time in the more comprehensive approaches. We have only studied Cochrane reviews, but the issues are also relevant for other systematic reviews. TACIT (Tool for Addressing Conflicts of Interest in Trials) is a tool under development, intended to support systematic reviewers in retrieving and processing information on trial funding and trial researchers' conflicts of interest [23−25]. Our guide on information retrieval may also prove helpful for users of TACIT once the tool is published and made available for public use.

5. Conclusions

A structured information retrieval approach improves identification of funding and researchers' conflicts of interest in trials included in Cochrane reviews. A simple approach, searching only trial publications and conflicts of interest disclosure forms, may suffice for some reviews and can often be done quickly. We hope our guide for efficient retrieval of information on trial funding and conflicts of interest may be useful for Cochrane reviewers and systematic reviewers in general.

Declaration of competing interest

AH, AL, EF and IB are all affiliated with national Cochrane centers and AH and IB are convenors of the Cochrane Bias Methods group. AH is the Assistant Editor of the Cochrane Methodology Review Group. LAS is coconvenor of the Cochrane Individual Participant Data Meta-analysis Group. The authors have no other relevant interests to disclose.

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Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jclinepi.2023.06.020.

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